

*Editorial*

# Combating disease and promoting health: challenges for health research

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Health challenges at global, regional and national levels are constantly changing with time, due to the impact of many different factors. Considerable progress was made in the 20th century in combating infectious diseases with the development of drugs for the treatment of bacterial infections and a wide range of metabolic disorders as well as vaccines to prevent some bacterial and viral infections. Achievements included the eradication of smallpox and progress towards eradication of polio. However, major challenges now arise from new, emerging and re-emerging infectious agents. In parallel, the epidemiological transition towards noncommunicable diseases that was perceived as a characteristic of affluence is now being seen in many low- and middle-income countries, presenting a new range of challenges for prevention, diagnosis and treatment of these chronic conditions. Additional factors that are stretching the capacities of all countries, but especially those at the lower end of the income scale, include the rising tide of injuries, impacts of globalization on health and the recognition that social, economic and political determinants of health are also important and that many factors outside the health sector or system impact on the health of populations. Specific targets, whether for improvements in

efficiency or cost-effectiveness or for the achievement of international goals such as the Millennium Development Goals, are also stretching the capacities of planners, managers and service deliverers—often in situations where factors such as HIV/AIDS or migration are depleting an already under-strength health workforce.

There are no simple solutions, no “magic bullets”, to help confront these challenges. It is clear, however, that health research has many vital and indispensable roles to play. The research needed covers a very broad spectrum, encompassing studies in basic and biomedical sciences to help understand the biological basis of disease states and identify effective treatments and the implementation of research to ensure the effective deployment of interventions. It includes health policy and systems research to enable the use of proven and effective interventions by policy-makers, managers and deliverers of services; social sciences and behavioural research; and operational research.

Overall, this wide spectrum of essential health research, spanning the creation of global public goods such as new knowledge, processes and tools, the adaptation of these goods to local settings, the monitoring and evaluation of their effective deployment and of the health status of the population,

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requires the existence and utilization of appropriate research capacity at global and local levels. In an increasingly globalized health environment, how is responsibility for financing the necessary health research to be shared among the global and local actors? Who sets the priorities in each arena, who does the work, and who uses the results?

These questions are central to meeting the current challenges faced in combating disease and promoting health. They are at the core of Forum 10, the annual meeting of the Global Forum for Health Research being held in Cairo from 29 October to 2 November 2006. Like these challenges, Forum 10 blends a range of perspectives from the global to the local, bringing together policy-makers, funders, development partners, research leaders, community representatives and the media from around the world but also focusing in particular on the Eastern Mediterranean Region and the host country.

The overall objective of the Global Forum for Health Research, which began formal operations in 1998, is to help focus research efforts on the health problems of the poor through an improvement in the allocation of research funds, support of better priority setting processes and methodologies, promotion of relevant research, support for concerted efforts in health research and dissemination of the research findings. In a current collaboration with the Regional Office for the Eastern Mediterranean of World Health Organization (WHO-EMRO), the Global Forum is examining how research results can be better aligned with the information and evidence needs of policy-makers.

The Global Forum for Health Research particularly welcomes this Special Issue of the *Eastern Mediterranean Health Journal*, which provide a wide range of perspectives in a series of papers that reflect the spectrum of health research interests across the Region.

#### **Forum 11**

The 11th meeting of the Global Forum for Health Research will take place in China from 29 October to 2 November 2007, with the theme: "Equitable access: research challenges for health in developing countries".

For more information contact the Global Forum for Health Research: <http://www.globalforumhealth.org>.

*Invited paper*

# Reproductive health: a call to the research community

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الصحة الإنجابية: دعوة لتعزيز البحوث المجتمعية  
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**الخلاصة:** لقد أصبحت الصحة الإنجابية تحظى باهتمام واعتراف متناميين، بدليل إدراج عناصرها في ثلاثة من المرامي الإنمائية للألفية التي أقرها المجتمع الدولي، فضلاً عن اعتبارها أساسية لإحراز المرامي الأخرى. ولاتزال مشاكل الصحة الإنجابية مسؤولة عن جزء كبير من عبء المرض، وبخاصة بين النساء. ولقد أقرت جمعية الصحة العالمية استراتيجية الصحة الإنجابية للتسريع من وتيرة التقدم المُحرَز صَوْب تحقيق المرامي الإنمائية الدولية وأهدافها. ولما كان العنصر البحثي عنصراً لا يُستغنى عنه فإن المجتمع البحثي مدعو إلى تعزيز استجائيته والأثر المُحتمل لإسهاماته في هذا المجال. وهناك عشرة اقتراحات مقدّمة للدراسة في هذا المضمّن.

**ABSTRACT** Reproductive health has been receiving increasing recognition and attention. Its elements are included as 3 of the 8 Millennium Development Goals adopted by the world government community, and it is considered essential for reaching the other goals. Reproductive health problems still account for a major share of the burden of disease, particularly in women. The 57th World Health Assembly adopted a reproductive health strategy to accelerate progress towards the attainment of international development goals and targets. A research component is indispensable. The research community is called upon to enhance the responsiveness and potential impact of its contribution. Ten propositions are submitted.

## **Santé génésique : appel à la communauté de chercheurs**

**RÉSUMÉ** La santé génésique fait l'objet d'une reconnaissance et d'une attention croissantes. Ses éléments sont inclus dans trois des huit objectifs du Millénaire pour le développement adoptés par la communauté internationale, et elle est considérée comme essentielle pour réaliser les autres objectifs. Les problèmes de santé génésique représentent toujours une part majeure de la charge de morbidité, notamment chez les femmes. La Cinquante-Septième Assemblée mondiale de la Santé a adopté une stratégie sur la santé génésique afin d'accélérer les progrès sur la voie de la réalisation des objectifs et cibles de développement international. Une composante recherche est indispensable. La communauté de chercheurs est appelée à renforcer l'adéquation et l'impact potentiel de sa contribution. Dix propositions sont soumises.

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## Reproductive health

Health is defined in the World Health Organization (WHO) Constitution as a “state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” [1]. In the same context, reproductive health can be defined as a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity in all matters relating to the reproductive system and to its functions and processes [2]. This definition embraces a number of positive elements, including ability, success and safety [3]. It implies the ability to have children, the ability to regulate fertility, and the ability to have mutually fulfilling sexual relationships. It implies success in the pregnancy outcome and in infant and child survival and healthy growth and development. It implies safety in pregnancy and childbirth, safety in sex and safety in fertility regulation.

Reproductive health is not simply a health issue. It is a broader development issue. The crucial importance of reproductive health was elaborated, not in a health conference, but in a development conference, the Cairo International Conference on Population and Development in 1994 [2]. Although, for certain ideological and political sensitivities, reproductive health as an entity was not explicitly included as 1 of the 8 Millennium Development Goals (MDGs) adopted by the world government community, elements of reproductive health are included in 3 of the Goals [4]. Moreover, the UN Millennium Project Report submitted to the UN Secretary General in 2005 explicitly acknowledges that sexual and reproductive health is essential for reaching all the goals, and details how reproductive health impacts on each goal [5].

For Goal 1 (Eradicate extreme poverty and hunger), the report indicates that smaller families and longer birth intervals,

a result of contraceptive use, allow families to invest more in each child’s nutrition and health. At the national level, voluntary reduction of birth rates may enable faster social and economic development.

On Goal 2 (Achieve universal primary education), the report indicates that families with fewer children, and children spaced further apart, can afford to invest more in each child’s education.

For achieving Goal 3 (Promote gender equity and empower women), controlling whether and when to have children is a critical aspect of women’s empowerment. Women who can plan the timing and number of their births also have greater opportunities for work, education and social participation outside the home.

Goal 4 (Reduce child mortality) and Goal 5 (Improve maternal health) are reproductive health goals on their own.

As to Goal 6 (Combat HIV/AIDS, malaria and other diseases), sexual and reproductive health care includes preventing and treating sexually transmitted infections (STIs), including HIV/AIDS. In addition, reproductive health care can bring patients into the health care system, encouraging diagnosis and treatment of other diseases and conditions.

Under Goal 7 (Ensure environmental sustainability), providing sexual and reproductive health services and avoiding unwanted births can help stabilize population numbers in rural areas, slow urban migration and balance natural resource use with the needs of the population.

As to Goal 8 (Develop a global partnership for development), the report mentions that affordable prices for drugs to treat HIV/AIDS and a secure supply of contraceptives would greatly advance reproductive health programmes in all developing countries. It would also be a model for other health and development areas. The implication is that failure of countries to improve reproductive



health will not only mean failure to achieve the directly related health MDGs, but will also impact on the other goals.

The potential contribution of the reproductive health field to the MDGs can go beyond its impact on the implementation of the different goals. Although the reproductive health field is badly in need of more resources, it has a lot to offer. The reproductive health field has built vast networks of service providers, in the public and private sector, particularly in resource-poor settings. Probably more than any others, the field is rich in civil society networks working at the grassroots level to promote behavioural change and to mobilize communities. A rich experience taking place over several decades provides lessons to learn, lessons from successes and, equally important, lessons from mistakes and failures. This vast reservoir of know-how can be utilized to help in implementing the MDGs [6].

Reaching the MDGs is still a challenge for countries of the WHO Eastern Mediterranean Region. The 2005 report to the UN Secretary General by the Millennium Project highlights that the region of West Asia, which includes many countries typically classified as part of the Middle East, is off-track for a majority of the goals. The region of North Africa is moving in the right direction in every indicator, but it needs to accelerate progress to achieve the goals.

### Status of reproductive health

The status of reproductive health is a major international concern. A recent WHO document highlighted that reproductive and sexual ill-health accounts for 20% of the global burden of ill-health for women, and 14% for men [7]. Although the past decades have witnessed significant improvements in the health of populations, reproductive

health shows the highest discrepancies of all health indicators between countries.

*"The world health report 2005. Make every mother and child count"* estimated that each year 3.3 million babies, or maybe even more, are stillborn, more than 4 million die within 28 days of coming into the world, and a further 6.6 million young children die before their 5th birthday [8]. Maternal deaths also continue unabated: the annual total now stands at 529 000 often unpredicted deaths which occur during pregnancy itself (some 68 000 as a consequence of unsafe abortion), during childbirth, or after the baby has been born, leaving behind devastated families. The report laments how this situation can continue when the causes of these deaths are largely avoidable.

Table 1 provides information about death and burden of disease in the WHO Eastern Mediterranean Region (EMR) as a result of some reproductive health conditions [9]. The information is provided separately for 2 groups of countries in the Region, those classified as mortality stratum B (low child mortality and low adult mortality) and mortality stratum D (high child mortality and high adult mortality). The majority of population in the Region belongs to the latter group.

An EMR factsheet shows reproductive health indicators for the Region as a whole [10] (Table 2). These figures do not reflect the wide discrepancies between and within countries of the Region.

### Priority elements in reproductive health

A recent WHO strategy document outlined 5 priority elements of reproductive health to be targeted for action: improving antenatal, delivery, postpartum and newborn care; providing high-quality services for fam-

**Table 1 Deaths and burden of disease in the WHO Eastern Mediterranean Region [9]**

Cause	Mortality stratum		Total ( <i>n</i> = 21 countries) No. (000s)
	Low child, low adult ( <i>n</i> = 12 countries) No. (000s)	High child, high adult ( <i>n</i> = 9 countries) No. (000s)	
<i>Population</i>	142 528	360 296	502 824
<i>Deaths</i>			
Total	706	24 074	24 780
STIs excluding HIV	0	23	23
HIV/AIDS	1	43	44
Childhood diseases	0	153	153
Maternal conditions	3	65	86
Perinatal conditions	28	275	303
<i>DALYS</i>			
Total	24 074	115 005	139 079
STIs excluding HIV	144	1 327	1 471
HIV/AIDS	51	1 351	1 402
Childhood diseases	55	5 568	5 623
Maternal conditions	412	4 104	4 516
Perinatal conditions	1 321	1 081	2 402

STI = sexually transmitted infections; HIV = human immunodeficiency virus; AIDS = acquired immune deficiency syndrome.

DALYS = disability-adjusted life years.

ily planning, including infertility services; eliminating unsafe abortions; combating STIs, including HIV, reproductive tract infections, cervical cancer and other gynaecological morbidities; and promoting sexual health [7].

While countries may need to assign a relative weight to each of these reproductive health priority areas, it is important to recognize that reproductive health is an integrated package, and not the sum total of individual separate elements [11]. People cannot be considered healthy if they have one element of reproductive health but lack another. Moreover, the various elements of reproductive health are strongly inter-related. Improvements in one element can result in potential improvements in others. Similarly, lack of improvement in one element can

hinder progress in others. For example, the magnitude of the problem of infertility will not be ameliorated except by a reduction of STIs, by safer births that avoid postpartum infection and by decreasing the need for or the resort to unsafe abortion practices. Infant and child survival, growth and development cannot be improved without good maternity care. Proper planning of births, including adequate child spacing, is a basic ingredient of any child survival package. Unless adequately controlled, STIs and in particular HIV infection, can impede further progress in child survival. Fertility regulation is a major element in any safe motherhood strategy. It reduces the number of unwanted pregnancies, with a resultant decrease in total exposure to the risks of pregnancy, and decreases the number of

**Table 2 Reproductive health indicators for the Eastern Mediterranean Region [10]**

Variable	Value
Percentage of pregnant women attended by trained personnel (Attended at least once during pregnancy by trained personnel, excluding trained or untrained traditional birth attendants, for reasons relating to pregnancy)	60.3%
Percentage of deliveries attended by trained personnel (Excluding trained or untrained traditional birth attendants. Skilled birth attendants are defined by the WHO as "trained midwives, nurses, nurse-midwives or doctors who have completed a set course of study and are registered or legally licensed to practice")	53.3%
Percentage of caesarean sections out of all deliveries (Number of caesarean sections per 100 deliveries conducted in health institutions run by the public, private and non-governmental sector)	17.4%
Percentage of women using a contraceptive method (Married women of reproductive age, 15–49 years)	40.5%
Percentage of pregnant women with anaemia (Women screened during pregnancy for haemoglobin concentration with a haemoglobin concentration less than 110 g/L)	40.9%
Total fertility rate (Total number of children a woman would have by the end of her reproductive period if she experienced the currently prevailing age-specific fertility rates throughout her childbearing life)	4.0
Maternal mortality ratio (Number of maternal deaths per 100 000 live births)	370
Neonatal mortality rate (Number of deaths of live born infants, occurring during the period from birth to 28 completed days after birth per 1000 live births)	32.7
Percentage of low birth weight (Live births weighing less than 2500 g)	18.7%

unsafe abortions. Proper planning of births can also decrease the number of high-risk pregnancies.

### **A reproductive health strategy to accelerate progress towards the attainment of international development goals and targets**

A strategy was developed by the WHO as a result of extensive consultations in all

regions with representatives from ministries of health, professional associations, non-governmental organizations, United Nations partners and other key stakeholders [7]. It lays out the actions needed for accelerating progress towards the attainment of the MDGs and other international goals and targets relating to reproductive health, especially those from the International Conference on Population and Development (ICPD) in 1994 and its 5-year follow-up

(ICPD+5). The strategy was adopted by the 57th World Health Assembly in May 2004.

WHO proposed 5 overarching action areas for countries:

- strengthening health systems capacity;
- improving information for priority setting;
- mobilizing political will;
- creating supportive legislative and regulatory frameworks;
- strengthening monitoring, evaluation and accountability.

The relevance of each of these key action areas varies for the different priority elements of reproductive health. Also, a strategy for reproductive health cannot be universally adopted. It has to be adapted by each country, and tailored to its needs, resources and capacities. EMR includes 21 countries, stretching from Morocco to Pakistan, with a total population of over 500 million. Diverse cultural, social, economic, ethnic and political dynamics coexist within the Region. Development progress has been uneven both between and within countries. But there is no country, however limited its resources may be, that cannot adopt and implement a strategy to improve the reproductive health of its population.

While these overarching action areas apply, in varying degrees, to all public health problems, there are special considerations for reproductive health, which dictate the need for research. It is inconceivable that a country can properly implement a strategy for reproductive health, without having a research component.

### **A call to the reproductive health research community**

A review of the progress of research in the field of reproductive health over the past

few decades reveals a mixed picture of fascination and frustration. The technological advances are fascinating but the fact that so few of these have led to improvements in the health of all people is frustrating. The Constitution of the World Health Organization emphasizes that: “the extension to all peoples of the benefits of medical, psychological and related knowledge is essential to the fullest attainment of health” [1]. This ideal is still far from being attained. Although a large volume of knowledge is already available to produce a significant impact on reproductive health, the fruits of this knowledge are still not within the reach of the majority of the world population.

The research community calls, and rightly so, for the need for more research, for more resources for research and for the importance of generating more knowledge and developing new technologies. The plain fact, however, is that more health research, by itself, will not achieve the desired impact on reproductive health unless the fruits of this research reach and benefit all people. The research community is called upon to “go the extra mile”, to ensure that research is responsive to the real needs, and that it is communicated to where the action is, and to where it can have an impact.

Research is an investment for which policy-makers expect a return, and the investment should be made wisely. The research community should build more bridges with health policy-makers. The mission of the researchers should not end at implementing research projects and publishing results in scientific journals. Researchers should ensure that the results are communicated to where the action is, and should undertake a synthesis of research findings to promote their utilization. Biomedical research is not the only research needed to improve reproductive health. Health systems, human behaviour and the social context are

important determinants of reproductive health and should be targeted for adequately conducted research. The research community should be more cost-conscious when it recommends interventions to the health service. To produce good research that will attract attention and that can have an impact, particularly in low resource settings, researchers need to collaborate to make the best use of available limited capacities. Finally, the research community has a role and a responsibility in mobilizing the political will and commitment.

## **Ten propositions for the research community**

### **1. Researchers should recognize that research is an investment**

Researchers should appreciate that policy-makers consider research as an investment. Research competes for funding with other investments. As with any serious investment, a return is expected. Investors in scientific research in general, whether public or private, expect the return on their investment to be in the form of health promotion, wealth creation, or both. Scientific research, including health research, is viewed as an engine of economic growth in developed and also recently in some large and small developing countries. The health industry is one of the fastest growing industries, and one of the most profitable. In assessing the potential impact of research on health promotion, there is an economic return, which should not be undervalued. Reproductive health research is research for development and not only for health. Health is also wealth. Healthy people are needed to create wealth. Even when health research does not make money, it can save money. Publicly funded research is as important to enable health managers and policy-makers to save money, and avoid wastage, as it is valuable

in industry to make money. There can be significant cost savings to the health service as a result of properly conducted health research.

Since resources are finite, even in rich countries, researchers should set priorities according to the expected return on the investment. This has to be based on a number of considerations [12].

A first consideration is the relative magnitude of the health problem, as determined by its prevalence and its seriousness. A health problem may be prevalent but not serious, and may be serious but not widely prevalent. Reproductive health is not about a disease problem that affects a small number of people. The consequences of reproductive ill health are serious in terms of morbidity and mortality, and affect people in the prime of their lives. The gravity of the health problem should also take into consideration not only its physical impact in terms of morbidity and mortality but also its psychological and social impacts. There is also a question of urgency when the magnitude of health problems is considered. A health problem is urgent when it gets worse with the passage of time, as with a disease that is rapidly spreading (such as STIs and HIV/AIDS) or population growth that is gathering momentum, because of lack of access to fertility regulation.

The fact that a health problem is of high magnitude does not necessarily mean that it should be a priority for research. The know-how to deal with the problem may be already available, but it is not applied and made available. The need may be for action and not for more research. Research should not be an excuse for delaying action.

A health problem may be of high magnitude, and there may be a need for research to be able to address it. However, before it can be put as a priority for research, other questions need to be asked. Is enough known

about the problem now to consider looking for possible interventions? Are we in a position to move forward to develop and implement interventions? How cost-effective will these interventions be? Can they be developed soon and for a reasonable outlay? This may not always be the case.

A health problem may be of high magnitude, there may be a need for research to be able to address it and such research is feasible. However, for such research to be a priority, another question needs to be asked. Is this need for research already being met by currently ongoing research, to which not much can be added? In this context, the contribution of the private sector has to be examined. Industry is a major actor in health research. Research in industry, however, is market-driven and not needs-driven. Since people would be willing to pay more for a cure, preventive technologies generally receive a lower priority in private sector investment than curative technologies. The ageing population, with its purchasing power and chronic health needs, is driving the market for private sector research. Only a very small share of the large research investment by industry is addressed to the health problems of developing countries, where the markets are less profitable.

## **2. Researchers should build bridges with health policy-makers**

Health research is needed so that policy decisions can be based on evidence. Health policy-makers, particularly in developing countries, may not appreciate the contribution which research can make. There is still a divide between the universe of research and the universe of policy-making. The stereotype of the researcher in her or his ivory tower still prevails. As a matter of fact, health managers and policy-makers may be doing research without knowing it. Health research is simply the process for

systematic collection, description, analysis and interpretation of data that can be used to improve the health of individuals or groups. The research process changes “information” into “knowledge”, through critical assessment and relating it to other existing human knowledge. As they go through this research exercise, health managers and policy-makers need to understand more about the process of research. There is a need for researchers to demystify the scientific process and to engage policy-makers. The use of complex instrumentation is not a necessary requirement for all types of good research. Key attributes of good research are proper planning, accuracy in data collection and proper unbiased interpretation.

## **3. Research should be communicated to where the action is**

Research is not complete until it is written up and its results communicated. Publication in scientific journals and presentation in scientific meetings are the main traditional venues used by scientists to communicate their research findings. Scientists aim to publish their research findings in scientific journals that are peer-reviewed, that are indexed, and that have a high impact factor.

While it is important to share the results of research with other scientists who may build upon them to further advance the science, it is also important to communicate the results with those who may benefit from it, who may use it, and who have a stake in it.

Health policy-makers need adequate and scientifically validated information for evidence-based policy. Where the research has policy implications, researchers have the responsibility to communicate the results to the concerned policy-makers. Merely publishing the study or sending a copy of the report of the study is not adequate. It is much better, where possible, to have a



face-to-face presentation with ample time for discussion. Communication should not be left out until the completion of the research. It should ideally start during the stage of planning the research to ensure that research questions are framed appropriately and tested in relevant contexts using interventions that can be replicated in practice. Where possible, those who are most likely to use the results of research should also be involved in the implementation of the research project.

#### **4. Researchers should synthesize research findings to enable their utilization**

For research to be utilized, it has to be presented in a form that can be assimilated. The amount of research conducted and published in the field of reproductive health is enormous. The results are not always consistent. There is a problem for a busy practitioner, health manager or health policy-maker to make their way through this maze of research, with sometimes conflicting findings or conclusions.

Doing original research is important. But the research community should give equal attention to so-called secondary research, where research findings in a topic are synthesized and presented as systematic reviews, evidence-based reviews and clinical practice guidelines. Despite their central role in a knowledge-based health system, these reviews do not attract the same level of academic recognition as primary research. The WHO Reproductive Health Library is an example of a strategy to address this gap [13]. The Library is currently published annually in CD-ROM in English and Spanish. It provides systematic reviews of interventions in the field of reproductive health with commentaries from people with knowledge of how these can be applied in low- and middle-income countries. The

Library is a collaborative effort between the WHO's Department of Reproductive Health and Research, the Cochrane collaboration, and Reproductive Health Library partner institutions in low- and middle-income countries.

#### **5. The research community should recognize health systems as an important target for action-oriented research**

Researchers usually focus on health problems and finding solutions for them. They pay less attention to the health system that is charged with implementing these solutions. The result is that the research may not be applied. An analogy may be made to the computer field. Programmers can develop the best computer software. However, an enthusiastic buyer will be disappointed to find out that her or his hardware does not have the system requirements to run this excellent software, whether because of limited capacity or less than required quality. There will be a need to search for ways to expand the memory capacity, upgrade the quality, and/or look for software that can run on the system.

A major problem in developing countries is the lack of coverage or capacity of the health care systems, that make even relatively simple health technologies difficult to deliver. Also, a health system with good coverage may lack quality. Good anatomy of health systems does not always mean good physiology. For example, in a community where prenatal care is nearly universal, 97% of all deliveries take place in a health facility, 30% of deliveries are attended by an obstetrician, another 30% by a general physician and 4% by a nurse. In addition, where emergency obstetric care is available at regional hospitals and facilities specifically designated for complicated births, maternal mortality ratio was



variously estimated as 110–220 per 100 000 live births [14]. WHO has been advocating health systems research [15]. In spite of its important role in bringing the fruits of knowledge and technology to all people, as a discipline, health systems research still lacks adequate recognition in academic circles.

Strengthening health systems capacity and improving quality is a requisite for attaining the health-related MDGs and promoting reproductive health. Special concerns include the need for improving information for priority setting, the case for integration of services and the need for monitoring and evaluation.

#### *Improving information for priority setting*

Faced with the limited resources in their health system, policy-makers may have to make tough choices about what they can achieve. Sound judgements and decisions cannot be made without adequate epidemiological data; a proper understanding of the type, severity and distribution of reproductive and sexual risk exposure and ill-health in the population; and the cost-effectiveness of different interventions. Collection and analysis of data can be challenging in certain areas of reproductive health where the information is sensitive. Examples include STIs and HIV infection risk factors and unsafe abortion when abortion is against the law.

#### *The case for integration*

Reproductive health needs are rarely met through comprehensive programmes and services. The practice is rather for separate vertical programmes, commonly not taking into consideration the perceptions of those who are in need of these services. Integration of services should be approached in a pragmatic way and should be based on sound research. Services should be inte-

grated when integration makes their delivery more cost-effective. Different situations in countries should be judged in their own context. Integrated service delivery can be made more cost-effective either through better utilization, resulting in an increase of output, or through cost savings, resulting in a decrease of inputs. In practice, in the case of reproductive health, integration of services does not mean so much the combining together of existing services for different components of reproductive health. It means rather the addition of new interventions and new opportunities to serve users, to currently existing services, where the capacity exists. The principle should be that no opportunity should be missed for meeting all reproductive health needs.

#### *The need for monitoring and evaluation*

Monitoring and evaluation are research activities. They should be based on a well-designed and appropriately implemented research methodology. They are essential for managers and policy-makers to know how their programmes and policies are working or not working in the system and why. For reproductive health in particular, it is essential to monitor the introduction of health-sector reforms, sector-wide approaches, and the implementation of other financing mechanisms such as poverty reduction strategy papers and cost-sharing, to ensure that essential service packages benefit women and children, meet reproductive health needs and do not discriminate against the poor. There is a need for a gender perspective to be an integral part of the health system.

### **6. The reproductive health research community should recognize the need for behavioural research**

In many areas of reproductive health, lifestyle behaviour may be the most impor-

tant health determinant. “*The world health report 2002. Reducing risks, promoting healthy life*” estimates that globally about 2.9 million deaths (5.2% of total) and 91.9 million DALYs [disability-adjusted life years] lost or 6.3% of all DALYs, are attributable to unsafe sex [16]. The report also estimates that throughout the world, lack of contraception caused about 149 000 (0.3%) deaths and 8.8 million (0.6%) DALYs.

A recent report from the World Bank highlighted that the lack of solid data to understand the contexts and determinants of risk behaviours throughout the Middle East and North Africa region seriously limits intervention strategies [17]. People are at-risk of acquiring an HIV infection because of what they are doing or what they might be persuaded to do. Prevention strategies differ considerably for these different groups. Few countries in the EMR have made serious attempts to find out how many of these people are at-risk, where they are located, and how they may be accessed for education and services. This lack of knowledge can seriously impair the planning and design of HIV prevention programmes. Learning how to reach these people in confidential ways would make a great contribution to the national AIDS programmes.

Health researchers need to team up with behavioural researchers in order to understand the behavioural underpinnings of poor reproductive health and develop appropriate strategies to address them.

### **7. The community of health researchers should recognize the importance of social determinants in reproductive health**

From the time of Hippocrates, medicine has been practised in a social context. The conditions in which people lived and the ways in which they behaved were of great significance to the practice of medicine.

Then came the age of biology and technology. Spectacular scientific advances had a tremendous impact on the practice of medicine. On the positive side, physicians had the tools to achieve curative wonders, in ways that were never available before. On the negative side, as physicians became more technically oriented, they became less socially conscious. As they learned more about cell and molecular biology, they tended to forget that these molecules and cells constitute human beings with a social life of their own. It is only recently that medicine is rediscovering its social roots [18].

While the cult of high technology still attracts fervent followers, most health professionals are willing to concede that a major proportion of ill health results from socio-economic factors, and that there is a limit to what modern medicine can achieve without social interventions. However, there is no consensus on the implication of this for the health profession. It can be argued that the health community has limited capacity for direct action outside the health sector, and limited credibility for doing so. However, the profession has a social responsibility to study and to disseminate information on the effect on health of actions taken or not taken outside the health sector. The profession has also to be a social advocate for the health of vulnerable groups in society and for the right of access to health care without discrimination. The health profession can no longer play the ostrich, bury its head in the sands of biology, and turn its back on the reality of people's lives. Social determinants, including gender issues, are particularly important in reproductive health. Improving reproductive health will not be achieved with machines, devices or drugs, without taking into consideration the social context.

Social determinants are the conditions in which people live and work. They are

the “causes behind the causes” of ill health. In March 2005, WHO launched the Commission on Social Determinants of Health, a new body to spearhead action on the social causes behind ill-health [19]. The new Commission includes leading global experts on health, education, housing and economics. Commissioners will work to recommend the best ways to address the social determinants of health and safeguard the health of poor and marginalized populations, and to break the cycle of poverty and ill-health. The objective is that health policies should move beyond exclusively disease-focused solutions and include the social environment. The core of the Commission’s work will be to identify, evaluate, adapt and distribute effective strategies to address social determinants, with the aim of supporting governments to scale-up interventions. The Commission will operate for 3 years.

#### **8. Researchers should recognize that money matters**

Reproductive health researchers need to be cost-conscious when they do research and make recommendations for action. It was only recently that economists began to give attention and apply classic economic theory to issues in the use of health care resources. No matter how rich a nation is, the amount of resources it devotes to health is, and always will be, limited and in competition with other possible uses. As resources are finite, each decision to use resources in one way implies a sacrifice of an opportunity to use the resources in an alternative way. In economic evaluation, costs are regarded as opportunity costs.

A common misconception is that health economics is about cutting costs. Health economics is a logic framework, which allows us to reach conclusions about the best way that resources can be allocated. All

methods of economic evaluation in health care have one principle in common. They examine one (or more) possible interventions and compare the costs of inputs or resources necessary to carry out such interventions with their effects or economically assessed benefits. Competing interventions may show little difference in outcome. The addition of the economic perspective offers a further dimension of evaluation. Health economists can be valuable assets to the reproductive health research team.

#### **9. Researchers need to collaborate and not only to compete**

Countries need to strengthen their capacities for health research. It will be an investment and it will be worth it. But in addition to this, researchers need to make the best use of what they have. Promoting collaboration can compensate for the weakness of the infrastructure of the health research system. Collaboration can be within the country and/or between countries sharing the same health concerns.

Emphasizing the importance of reproductive health research as an area of strategic priority for programme and policy development, the WHO Regional Office for the Eastern Mediterranean created a network for reproductive health research [20]. This network aims to facilitate exchange of information and research-related experiences in the field of reproductive health between and within countries. The reproductive health research network consists of 2 components. The first is a comprehensive directory about governmental, private, non-governmental institutes, scientific bodies, research agencies, advocacy group and organizations concerned with and involved in reproductive health research in countries of the region. The second is a searchable database about research activities conducted from 1995 to present.

### 10. Reproductive health researchers have a role in mobilizing political will

It has been said that where there is a will, there is a way. The converse, however, is not necessarily true. Researchers invest their energy in generating the data about reproductive health problems and solutions, and optimistically expect that this automatically triggers the political will to take action. This does not necessarily happen. Mobilizing political will for reproductive health is particularly a challenge in societies where women and their issues are marginalized, and where women are not significant actors in the political arena.

Political will is not only essential for committing the resources to expand access and improve the quality of reproductive health services. It is also important for creating supportive legislative and regulatory frameworks. Laws and policies play

an important role, positive or negative, in facilitating universal and equitable access to reproductive health information, education and services. Reproductive health is rather unique among other public health areas. There is no society, present or past, nor any legal and moral code that takes a neutral stand about sexual and reproductive health issues.

Civil society groups with a health agenda are now active in many countries, and also at the regional and international level. Health researchers should team up with these groups where there is a need to build up political commitment and to advocate for legislative or regulatory change. Where appropriate, researchers should be able to communicate research findings to the public. Research is needed to build a strong evidence-based case for strategic investment in reproductive health, and for moving it up the national agenda.

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*Invited paper*

# An Islamic perspective on human genetic and reproductive technologies

H. Hathout<sup>1</sup>

## التكنولوجيات الإنجابية والوراثية من منظور إسلامي

حسان محمود حتوت

**الخلاصة:** يُعَدُّ التقدُّم الحديث الذي طرأ على التكنولوجيات الوراثية والإنجابية من التطوُّرات الحديثة التي قد تخل بالتوازن بين العناصر المادية والروحية للحياة. وتطرح هذه الورقة البحثية منظوراً إسلامياً تجاه بعض هذه التطوُّرات بما فيها الإجهاض، والإخصاب في المختبرات (طفل الأنبوب)، والهندسة الوراثية، والاستنساخ، وبحوث الخلايا الجذعية.

**ABSTRACT** Modern advances in human genetic and reproductive technologies are among the recent developments disturbing the balance between the spiritual and the material components of life. This paper gives an Islamic perspective on some of these advances, including abortion, *in vitro* fertilization, genetic engineering, cloning and stem cell research.

## Perspective islamique de la génétique humaine et des technologies de la reproduction

**RÉSUMÉ** Les progrès modernes réalisés dans le domaine de la génétique humaine et des technologies de la reproduction font partie des développements récents qui viennent perturber l'équilibre entre les composantes spirituelle et matérielle de l'existence. Cet article présente une perspective islamique concernant certains de ces développements, dont l'avortement, la fécondation *in vitro*, le génie génétique, le clonage et la recherche sur les cellules souches.

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## Introduction

Although we all depend on the human mind in finding our way in this world, it is obvious that the religious side operates under a primary belief in the existence of God, His infinity in all His attributes, and His concern with all that happens in the universe He created. The infinity of God might be beyond our comprehension, but this is only natural because, being finite ourselves, we cannot grasp the infinite. This is not just religious jargon, because we teach infinity in our mathematics classes and even give it a special sign.

Muslims believe that Islam is the continuum and the culmination of, not an alternative to, the sister Abrahamic faiths of Judaism and Christianity. In the Quran, they are links of the one chain of God's message to humanity. The Quran, which Muslims believe is God's very word, says: *The same religion He enjoined on you as the one He enjoined on Noah, and this We reveal unto you and that We enjoined upon Abraham, Moses and Jesus, that you should uphold the faith and break-not your unity therein* (42:13). This commonality we respect, although we are aware that on further comparison it is natural to find differences and distinct schools of thought between the faiths, and even within one faith.

To present Islam in a few brief words, it could be likened to a three-story building. The foundation is belief in God and heeding Him in all aspects of life. The first floor is that of worship, including five ritual prayers every day, fasting the days of the lunar month of Ramadan every year, giving *zakat* tax (a percentage of saved income) to the poor every year, and pilgrimage to the mosque of Abraham in Mecca once in your life if you can. The second floor deals with the world, including fellow human beings, and life in general. It includes dos and

don'ts and delineates good and bad. This code of human behaviour is the same in all the Abrahamic faiths.

The third floor is the constitutional and legal one that compliments and protects the other two. The floors are interconnected and cannot be separated from one another. There is no church or clergy in Islam and so the question of separation of church and state does not arise.

Planet Earth is made primarily of atoms following atomic laws. Atoms combine to form molecules that also interact and combine with one another following chemical laws, giving molecules of variable complexity. Complexity progresses until we reach the molecule which can split into two halves, each replenishing itself, utilizing the surrounding molecules. At this point, life has been born and chemistry takes us to biology. Biology has led to the appearance of so many forms of living beings, either existing on Earth at the same time or appearing consecutively over successive eras. Whether this happens fortuitously or to design of an all-encompassing Planner has been a subject of debate until this very day. The believers call this Planner God in English; He has other names in other languages.

Because physical life on Earth is derived from the Earth itself, individual life must be temporary, otherwise Earth would be exhausted making new lives. In addition, those new lives would not have enough Earth for life and sustenance. And so death is the other face of life.

For individual life to be replenished, there must therefore be a mechanism for replacing the deceased. This is the function of what we call reproduction. It occurs in nature in so many forms. The simplest perhaps is the fission of a living cell into two—asexual reproduction. In more complex systems, sexuality appears but with



both male and female gonads existing in the same body (hermaphrodite). In the next level, the sexes differentiate and the sex cells are deposited in proximity and meet outside the body. Higher still, the cloacal openings of male and female come in contact and sperm goes into the female to fertilize an ovum. This is encased in a calcium shell with a certain amount of nutrient and laid outside the body until the chick can peck its way into the world. In higher forms, the fetus has to remain inside its mother's uterus for a longer period until born. In the human, it remains inside for about 280 days, and when born, it is far from ready and must be cared for for an even longer period.

Such is biology, but it is obvious that although man shares it with the animal kingdom, there is more to human beings than their biology. The quest for knowledge, the concepts of good and evil, the values he clings to even against biological temptation, the concept of right and wrong, and the concept of accountability sooner or later are human ingredients that are beyond the terrestrial scope. Humans are biology plus something else that is unique to the species. We are spiritual beings even though housed in a biological container. This spiritual, non-earthly characteristic is what we believe to be the godly presence in a human. It is also the nobility of humanity: having endowed us with freedom, God will hold us responsible and even if we evade justice in this world, it will await us in the world to come. This might not appear to be scientific but science is still an infant, growing day by day but far from complete, and it cannot negate what it does not know.

So how is life to be managed in accordance with the Islamic way? The word "way" in religious terminology is *sharia*. Caution is advised, however, against trying to read the *sharia* as what many Muslim people may be doing, because both lack of faith and

incorrect knowledge have resulted in certain behaviours by Muslims that run contrary to the teachings of Islam. The same can probably be said concerning other religions.

There are five goals of the *sharia*: the protection and preservation of life, mind, religion, right of ownership and procreation (family). Each is serviced by branching groups and subgroups, covering the whole life. The sources of the *sharia* are the Quran (God's very word), the religious teachings of Prophet Muhammad ﷺ, the process of analogy and reasoning, *ijtihad*, and the unanimous opinion of recognized qualified scholars in a given time and place. Other juridical rules are:

- the choice of the lesser of two harms if both cannot be avoided;
- necessities overrule prohibitions;
- avoiding harm takes priority over bringing good;
- public interest overrules private interest;
- rulings of previous God-sent religions;
- judgements of the Companions of the Prophet ﷺ;
- doing no harm;
- harm is not to be repelled with harm;
- where the welfare of the people resides, there resides the statute of God (this is considered the rule of all rules in matters on which other invocations are silent);
- human needs are divided into essential, necessary, and complementary: they are assigned relative priority (including budgetary priority) in this order;
- the principle of precautionary preventive approach (*sadd al-thara'i*).

Following these guiding principles, Islamic jurisprudence evolved and survived over the ages. Human issues are categorized into essentials, necessities and complementaries and priorities should be allocated

in that order. Various schools of thought, called *mathahib*, have been formulated, and the door is always open to new schools of thought. The differences between these *mathahib* are no cause of enmity among their followers and are even considered a manifestation of God's mercy.

It was against this background that Islamic Organization for Medical Sciences looked at some biological issues in successive conferences that brought together scientists and religious scholars.

## Human genetic and reproductive technologies

### Abortion

This is prohibited in view of the sanctity of human life, whose beginning is characterized by:

- it is a clear event;
- growth by cell division;
- unless interrupted, it leads to a full human being; and
- it has the genome of humanity as well as the specific genome of a specific individual.

A fertilized ovum exhibits these features except that it cannot produce a human being unless implanted into the uterus, and so implantation was taken to herald the sanctity of human life. The embryo acquires certain rights. Aborting it is unlawful and legally punishable although the punishment is lower if it is carried out before 120 days, which is the time the spirit enters according to Prophet Muhammad ﷺ. When pregnancy poses a serious threat to the life of the mother or when the fetus is grossly malformed, abortion is allowed.

The question of abortion is a multifaceted one, and this is illustrated in the following story, which reveals a largely unseen

dimension of abortion. A couple requested help to reconcile them with a rebellious son. When he was reminded of the Quranic linking of worshipping God with kindness to parents, the son said, "It doesn't apply here, doctor. When they married, they decided to have two children and they aborted the four that followed my elder sister and myself. Had I been number three, they would have disposed of me as well."

### *In vitro* fertilization

*In vitro* fertilization is allowed between husband and wife during the span of their marriage. Marriage entails two individuals only (husband and wife), therefore donated sperm or ova or the use of a surrogate uterus is not accepted. *In vitro* fertilization is almost natural except for a detour outside the body where ovum and sperm can evade an obstructing barrier. In countries where the technique leads to surplus fertilized ova after a successful pregnancy, it is still debated whether to throw them away or to keep them in cold storage for long periods, but eventually they will acquire abnormalities or will perish.

### Genetic engineering

Genetic engineering seems to be a more serious development since it transgresses the distinctive genetic uniqueness of living species. There is a reference in the Quran where Satan tells God almighty that he would go after those human beings in their earthly abode and tempt them to do evil, including tampering with God's creation. The principle is clearly rejected by Islam but an exception is made when used to produce medicines or other material to alleviate suffering and illness. Using it to tamper with human individuality and eligibility for personal responsibility is forbidden. Apart from combating illness, it should not be allowed.

## Cloning

Cloning is indeed a most serious issue as it is a reversion to the most primitive form, asexual reproduction. It conflicts with the Quranic aphorism: *God created consorts for you from amongst you and through them He gave you children and grandchildren. Do they then believe in vain things and deny the blessing of God?* (16:72). The bleak prospects of cloning are already manifested by the very high rate of fetal wastage before a clone is born. In the human, we know that some genes are pathological but are compensated for and overpowered by their alleles, i.e. corresponding genes derived from the mating partner. This correction is lacking in asexual reproduction. Moreover, the family and other social relations would be shockingly disturbed if cloning becomes widespread. The process may be utilized for scientific research but never for reproduction.

## Stem cell research

A fertilized egg undergoes successive cell divisions in order to form the human body. In the earliest cycles, each cell can begin all over again as a single cell to form an entire organism. These are called "totipotent" cells. In later divisions, the cells cannot do this but can produce complete organs or tissues under special treatment and are, therefore, called "multipotent" or stem cells. Later still, the cells cannot do this: they are already committed to forming their ultimate tissue.

Stem cells can be procured from fertilized eggs in storage following *in vitro* fertilization, but also are found in the placenta, umbilical cord and the blood in the normal human circulatory system. Up to now, the most readily available source seems to be the surplus ova left over after *in vitro* fertilization. The use of these ova, however, has stirred a hot debate on the assumption that

it is utilizing a human being (although still at the stage of an ovum) for the interests of somebody else. One side of the debate raises the dictum of the "sanctity of human life". The hawks enthusiastic for war are often surprisingly adamant in their relentless defence of life in a surplus ovum in storage. From an Islamic point of view, we have already alluded to the inviolability of human life from the point of implantation onwards. A fertilized ovum in storage does not, however, possess the same rights as a fetus and it may be used if the purpose is to protect and save human life. Our argument rests on the following points:

- If kept in storage, the fertilized ovum will acquire genetic anomalies and will, sooner or later, die.
- It is not part of the feto-maternal unit of a pregnancy.
- A somatic cell, such as a skin cell, can be made into an embryo through the process of cloning and yet, nobody ever claimed sanctity for skin cells.
- According to Islamic teaching, a fertilized egg, not yet residing in the mother's uterus for 120 days, does not have the spirit instilled into it.
- If society has the right to conscript people to do military service with the risk of death or injury, it might as well have the right to conscript a number of ova.

Utilizing the juridical rule of "necessities overrule prohibitions", 1 does not equal 1000 but 1/1 equals 1000/1000. To consider the numerator and ignore the denominator would be grossly misleading. One always has to look to both sides of the coin. It is somewhat upsetting to see the issue relegated to the realm of politics. On so many occasions, politics has proved inconsistent, shifting between idealism and utilitarianism.

## Thoughts and afterthoughts

From a Muslim point of view, it seems that tackling the issues we have been discussing would be too fragmentary and too reductionist if isolated from the radical question. To Muslims, and in all probability to members of the Abrahamic faiths in general, mankind has a role in creation distinct from other creatures. The human race, in our belief, is assigned the task of being God's vicegerent on Earth. This is despite the fact that we have an earthly component dragging us down and a godly (spiritual) component lifting us up. Human beings are endowed with a built-in autonomy that enables them to make choices of their own free will. They are also endowed with the concept of good and evil and because they are given freedom of choice (within limitations), are inevitably accountable. To pass this test, God provided guidance carried by human messengers (prophets) as recurring reminders throughout human history. Some eternal milestones concerning good and evil have been delineated by God, otherwise the incomplete and suggestible human mind might miss its way and be seriously misled.

It is not surprising, therefore, that a secular person might often think differently and reach different conclusions. In our world, people do not conform to a single monolithic pattern in their way of thinking or in their pattern of belief or disbelief. This is a fact of life and we should accept it. There is a difference between loyalty to one's own beliefs and displaying them on the one hand, and fighting over them on the other. Furthermore, all of us being human, and with the accumulated acumen humanity has acquired, we have so much in common whatever ideology we profess.

One of the trends humanity has been pursuing lately is a disturbed balance between the spiritual and the material components

in life, with an obvious disequilibrium between idealism and utilitarianism in favour of the second. Whereas we raise our children warning them against selfishness, later, in adult life, we practice selfishness under the names of patriotism, racism, elitism, etc.

The voices raised in praise of humanity and human life are without doubt eclipsed by the fact that the industry of death has become the most profitable industry in our present-day world as evidenced by a comparison between the budgets for peaceful endeavours and those for military ones.

Until very recently, medical science was regarded as a unidirectional human endeavour espousing only healing and mercy to rich and poor, to friend and foe. When the first atomic bomb was dropped over Hiroshima, Oppenheimer (the father of the atomic bomb) said, "Today, physics has fallen into sin." We thought that medical science was immune to that, until sobering news came out about bacteriological and toxicological warfare. Until the 20th century, the idea of war as an inevitable evil was tolerated on the assumption that war was confined to the fighting forces only. This was superseded after the Spanish Civil War in the 1930s and through the Second World War and subsequent wars, including those in Korea and Viet Nam. Not only human life was involved, but also other living beings: animals, plant life, and even the soil.

Scientific progress aimed at the elimination of human suffering and disease is certainly a ray of hope, but even this bright picture generates some worries. The new achievements will entail high costs for treatment. Patent rights have already become an issue and it seems that medical scientists are moving from the sanctuaries of science to the vagaries of the market place. Monopoly is a reasonable idea but there should be limits. Expensive treatment should not be the

privilege of the rich, and the question of equity should not be outside the law.

A feature of modern times is “limited resources”. If we all subscribed to the concept of a large, single human family, it should follow that in dispensing resources, medications that would save the lives of the many should be given priority over those helping the few, even if such medications lag behind as profit-makers for the industry. If humanity could go beyond the idea that profits are

measured in terms of dollars, perhaps that would be a shift in the right direction.

People of conscience, especially those of faith, should join forces to create a counter wave against this rampant, selfish, materialistic, utilitarian philosophy in favour of a human attitude guided by compassion and love and human togetherness. Humanity should rise above the concept of “you and I” and embrace the concept of “we”!

#### **Report on Forum 9 meeting, 2005**

*Poverty, equity and health research*, summarizes the oral and poster presentations and group discussions that took place at Forum 9 in Mumbai, India, from 12 to 16 September 2005. Several key messages emerge in the report, including growing recognition that the “neglected diseases”, which have been of concern in recent years, are but an aspect of a wider picture involving “neglected people”, and the problems of “neglected health systems” that cannot deliver effective interventions.

The report stresses that reducing inequities in health requires political will, increased resources and enhanced effort to organize and deliver health products and services effectively. It also needs research—whether *biomedical research* to create the needed drugs, vaccines, diagnostics and medical appliances; *health policy and systems research* to understand and improve the organization and functioning of the health sector; *social sciences and behavioural research* to increase understanding of the factors that determine health and affect health-seeking behaviour; or *operational research* to examine how effectively systems and interventions are working on the ground and how they can be improved.

*Poverty, equity and health research. Report on Forum 9* is available from Global Forum for Health Research, 1–5 route des Morillons, PO Box 2100, 1211 Geneva 2, Switzerland. Telephone: (41) 22 791 4260; Fax: (41) 22 791 4394. It is also available free online from: <http://www.globalforumhealth.org>.

*Invited paper*

# Human cloning: Eastern Mediterranean Region perspective

*M. Abdur Rab<sup>1</sup> and M.H. Khayat<sup>2</sup>***الاستنساخ البشري: من منظور إقليم شرق المتوسط**

محمد عبد الرب، محمد هيثم الخياط

**الخلاصة:** تبشّر الإنجازات التي تحقّقت مؤخراً في حقل الجينوميات والتكنولوجيا البيولوجية بالدخول إلى عصر جديد في مجال التنمية الصحية، حيث إن للاستنساخ العلاجي إمكانات هائلة لإحداث ثورة في أساليب المعالجة الطبية. على أن تكنولوجيا الاستنساخ تحمل في طياتها إمكانية إجراء استنساخ إنجابي، الأمر الذي يثير مخاوف قيمية وأخلاقية خطيرة. ولذلك فإن من الأهمية بمكان أن تصل البلدان الإسلامية إلى اتفاق حول هذه القضية الحيوية. وإذا كان تطوير العلم والتكنولوجيا بُغية تحقيق مستوى صحي أفضل يمثل التزاماً دينياً وأخلاقياً، فإن هناك حاجة عاجلة لقيام علماء المسلمين بمناقشة مسألة بحوث الخلايا الجذعية والاستنساخ مناقشة منطقية، على أن لا يُنظر في مثل هذا الحوار إلى المزايا العلمية فقط، بل يجب أخذ المُستتبعات الشرعية والأخلاقية والقيمية والقانونية أيضاً بعين الاعتبار.

**ABSTRACT** Recent advances in genomics and biotechnology have ushered in a new era in health development. Therapeutic cloning possesses enormous potential for revolutionizing medical and therapeutic techniques. Cloning technology, however, is perceived as having the potential for reproductive cloning, which raises serious ethical and moral concerns. It is important that the Islamic countries come to a consensus on this vital issue. Developing science and technology for better health is a religious and moral obligation. There is an urgent need for Muslim scholars to discuss the issue of stem cell research and cloning rationally; such dialogue will not only consider the scientific merits but also the moral, ethical and legal implications.

## **Clonage humain : perspectives pour la Région de la Méditerranée orientale**

**RÉSUMÉ** Les récentes avancées dans le domaine de la génomique et de la biotechnologie ont marqué le début d'une nouvelle ère dans le développement sanitaire. Le clonage thérapeutique possède un énorme potentiel pour révolutionner les techniques thérapeutiques médicales. Toutefois, la technologie du clonage est perçue comme ayant le potentiel pour le clonage reproductif, ce qui suscite de sérieuses préoccupations éthiques et morales. Il importe que les pays islamiques parviennent à un consensus sur cette question cruciale. Le développement de la science et de la technologie pour améliorer la santé est une obligation religieuse et morale. Il est urgent que les doctes musulmans étudient de façon rationnelle les questions de la recherche sur les cellules souches et du clonage ; un tel dialogue prendra en considération non seulement les bienfaits scientifiques mais également les implications morales, éthiques et juridiques.

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## Introduction

One of the greatest controversies triggered by the rapid pace of evolution in biology, particularly in genomics and biotechnology, has been the technique of cloning. The concept of human cloning has long been in the imagination of many scientists, scholars and fiction writers [1]. The basic techniques of cloning have been known for some time, and have been applied to both the plant and animal kingdoms without even stirring a ripple of concern in international conscience [2]. So long as this form of cloning (non-human) suits human needs, does not cause harm and does not conflict with religious beliefs, it has been considered acceptable.

In its simplest form, cloning is defined as the exact replication of cells. Unicellular organisms are primed to replicate (clone) themselves by nature. Multi-cellular organisms and higher species replicate naturally through a reproduction mechanism involving male and female germ cells. Cloning in higher species involves somatic cell nuclear transfer, a process in which the nucleus of a somatic (non-germ) cell is taken out and inserted into an enucleated fertilized female germ cell (egg, ovum). This cell then has the capacity to divide and grow into an exact replica of the original from whom the somatic cell was taken. That is how the first cloned sheep, named "Dolly", was created [3]. This is reproductive cloning, and can in theory be applied to any species of mammals, including humans.

We also know that within humans (and other animal species) there are cells called stem cells. These are undifferentiated cells that have not yet developed into particular types of cells in order to carry out specific functions in the body. Nevertheless, they have the DNA within their nucleus that encodes for genetic information for their future characterization as they develop;

for example a stem cell encoding for skin tissue will eventually develop into skin tissue, a stem cell encoding for heart tissue will eventually develop into heart tissue and so on. When the nucleus of a stem cell is removed and replaced by a nucleus of another cell type, the stem cell will then be reprogrammed to produce the product of the implanted nucleus, when it fully develops. This is therapeutic cloning. The stem cells possess pluripotential characteristics, and can differentiate into various cells and tissues when nurtured and grown in different culture media. The stem cells can be obtained from both adult and fetal tissues, umbilical cord and early embryos. However, it appears that the ability of the stem cells to transform is limited, except for those cells that are derived from human pre-embryos, which seem to have a high pluripotential capacity [4].

This paper outlines the debates prompted by progress in cloning research, with special reference to the Islamic perspective of the Eastern Mediterranean Region countries.

## Reproductive cloning versus therapeutic cloning: the global debate

At this time there is a global consensus across all countries, regions and faiths that reproductive cloning of humans should not be allowed. There are two main reasons. First, because the science and knowledge is limited and far too many risks are involved. Most cloned animals end in miscarriage. A significant proportion fail to develop beyond the early stages, and many are born suffering from a wide range of developmental problems and die prematurely [3]. It took 227 attempts to clone Dolly the sheep successfully.



Secondly, many scientists, bioethicists and religious scholars consider cloning procedures a danger to human identity. The concern is just not for technical or safety reasons, but a much broader set of ethical, cultural and social issues that have far-reaching implications for the centuries-old values and practices upon which humanity has survived. These include undermining the concept of reproduction and family, the ambiguity of relations of a cloned child with the progenitor, problems of personal identity and the psychological development of a clone, the disregard for human dignity, and, perhaps most serious of all, concerns about eugenics and trends towards “designer babies” and human enhancement [1]. No religion or society at this stage is prepared to allow clones of humans, and there is no ambiguity about this.

The debate regarding therapeutic cloning is, however, somewhat different. The central objective of this technique is to cure disease, improve health and hence strive for a better quality of life for humans. This calls for research and development in therapeutic cloning to improve the knowledge, skills, expertise and techniques for achieving the stated objective. The problem, however, is that therapeutic cloning requires embryonic stem cells, and to acquire these, early stage human embryos are needed. This raises serious ethical, moral and religious concerns, for example, about the rights of the embryo, the timing of the onset of life and the hazards to the woman. With widespread and unchecked use of stem cell technology, however, there is also the risk that it could fall into the wrong hands and be used for human cloning, with unimaginable consequences.

## The present situation

At present, in many countries, researchers are utilizing the unused fertilized eggs from infertility clinics for therapeutic cloning. These eggs are allowed to undergo division and development into early stage embryos, from which the embryonic stem cells are extracted. In some countries, researchers also create human embryos for the specific purpose of carrying out research into therapeutic cloning. This has been condemned by Islamic scholars. In several countries, however, this is permitted by appropriate legislation, but in others, researchers take advantage of a lack of specific regulations to continue with research in this area. As this technique is still developing, a relatively large number of embryos are required to obtain the relevant stem cells.

The issue of human cloning is indeed of global concern, and hence has been the focus of international debate. For several years now, countries have been calling for a United Nations convention to address human cloning. The issue is not about reproductive cloning, which, as already noted, everyone agrees should not be allowed. The stalemate is really between countries that favour a total ban on all forms of cloning, whether reproductive or for research into its therapeutic applications, and those that are of the view that the ban should only apply to reproductive cloning and that legislating therapeutic cloning should be left to the discretion of the countries.

Many countries consider that the need for research in therapeutic cloning outweighs the dangers that it poses and are creating favourable environments to support research and development in therapeutic cloning.

ing. Despite a European Parliament vote in November 2002 favouring a total ban on human cloning [5,6], the United Kingdom granted licences for human cloning for the purpose of harvesting stem cells [7]. Japan's top scientific council has recommended that the government allow limited cloning of human embryos for research purposes [8]. The United States of America (USA), whose government had earlier banned public sector funding for research on human cloning, has allowed limited and conditional support for embryonic stem cell research. The Arab countries have debated a region-wide ban on human cloning, whether for reproductive or therapeutic purposes [9].

At the global level, the debate on cloning has figured in the United Nations General Assembly. After long and complex discussions on the issue in 2003, the countries failed to reach a consensus [10]. However 2 years later, in 2005, the General Assembly finally adopted a resolution, containing the United Nations Declaration on Human Cloning. Eighty-five nations voted in favour of the resolution, including 24 Muslim countries (Table 1). The Declaration called on the Member States to undertake necessary measures to prohibit all forms of human cloning to the extent that they are contradictory to human dignity and the need to safeguard human life. The

**Table 1 Votes from countries from the Regional Office for the Eastern Mediterranean (EMRO) and other countries from the Organization of the Islamic Conference (OIC) on the United Nations Declaration on Human Cloning (Resolution adopted by the General Assembly in March 2005) [11]**

In favour		Against		Abstained		Absent	
OIC	EMRO	OIC	EMRO	OIC	EMRO	OIC	EMRO
Albania	Afghanistan	Gabon	–	Algeria	Egypt	Chad	–
Bangladesh	Bahrain			Azerbaijan	Islamic Republic of Iran	Gambia	
Benin	Iraq			Burkina Faso	Jordan	Guinea	
Brunei	Kuwait			Cameroon	Lebanon	Guinea-Bissau	
Comoros	Libyan Arab Jamahiriya			Indonesia	Oman	Kyrgyzstan	
Côte d'Ivoire	Morocco			Malaysia	Pakistan	Mali	
Djibouti	Qatar			Maldives	Somalia	Mauritania	
Guyana	Saudi Arabia			Turkey	Syrian Arab Republic	Mozambique	
Kazakhstan	Sudan				Tunisia	Niger	
Sierra Leone	United Arab Emirates				Yemen	Nigeria	
Suriname						Senegal	
Tajikistan						Togo	
Uganda						Turkmenistan	
Uzbekistan							

Member States were also called on to take adequate measures to protect human life and to prevent the exploitation of women in the application of life sciences as well as to adopt and implement national legislation for the purpose [11].

### Islamic perspectives on cloning

The issue of cloning within the Eastern Mediterranean Region is strongly linked to religious beliefs, and the ethical norms and values of society. It also must be viewed in the context of the technical skills, knowledge and expertise that exists currently in the Member States, and more importantly, it must also take into account the future stakes involved. Overall, progress in human embryonic cell research in the Region is weak; nevertheless, *in vitro* fertilization techniques are widely available. Many countries have well-developed facilities for embryonic cell research related to animals. In the absence of clear regulations and guidelines, the potential for exploitation and misuse therefore exists. At the same time, some Member States (as well as some other Muslim countries outside of the Eastern Mediterranean Region) are fast developing their scientific infrastructure, within which research and development for health is a major element and is gradually taking centre-stage. The overarching challenge is, therefore, to find a balance between the need to preserve human dignity and the need for continued improvement in the quality of human life through research and development.

From the Islamic perspective, the debate on human embryonic cloning hinges essentially on three key arguments:

- Does cloning conflict with Islamic beliefs and to what degree is it permitted?
- What are the consequences of cloning for society?

- At what stage is an embryo considered a living being?

The Islamic Fiqh Academy, in its 1997 meeting, agreed that cloning does not contradict the Islamic faith. God is the creator of the Universe and therefore the advancing knowledge and technology development that has made cloning possible was pre-ordained by God Almighty's will. Just as the person sowing the seed is not the creator of the resulting plant, so the cloning technician is not the actual creator of the plant or animal thus produced [12]. The scientific breakthrough in cloning can thus be regarded in a way as divine will to provide mankind with moral training and maturity [13]. There is a general consensus that cloning of plants or animals to improve quality and productivity as well as for cure of human diseases is not prohibited in Islamic law.

Muslim scholars are unanimous in their opposition to cloning of humans. There have been numerous calls for banning human cloning throughout the Muslim world by way of various *fatwa* (formal legal opinion or religious decree issued by an Islamic leader), community polls and national/international Islamic bodies [12,14,15]. The main reasons cited include the fear that man, by creating life, is attempting to play God. Only God is the Creator, not humans. It is an unnatural way of reproduction that is contrary to what God has ordained for humans. There will be loss of kinship and lineage, both of which are central and core values in Islam. Who would be the father, mother, brother or sister of the clone? Mixing of kinship or the loss of it, would be considered *haram* (unlawful) and is therefore prohibited by Islam. Cloning is also feared because of its ability to create "designer human beings", superior or inferior, depending upon the motives of the creator. This of course will be of great harm

to societies and nature. The fact is that all major religions of the world oppose human cloning [16], principally because of the fear that it would corrupt, taint or destroy traditional family relationships and lineage, that the destruction of embryos for research is tantamount to murder (in some religions), and that it meddles with God's universe in a way that humans should not.

The main concern about human cloning is, therefore, the inherent fear of the ability of humankind to regenerate itself, which obviously conflicts with the beliefs, value systems and environments within which humans have lived over the centuries of their existence. The current (but limited) state of knowledge and the high risks involved in cloning procedures and their outcomes further strengthen and justify the case against human cloning. Nevertheless, there is one common factor on which everyone agrees. And that is the desire of man to alleviate human suffering and disease. This has been a key tenet of human development throughout the ages, in all societies, cultures and religions. Throughout the Muslim world, and in all the religious *fatwa*, resolutions and recommendations against cloning, a clear message emanates: that the well-being of individual beings is sacrosanct. Islam encourages research and investigation. Modern drugs and vaccines are important discoveries that offer cure and prevention from diseases. The cloning technology now offers new ways and opportunities for disease cure. The Prophet (ﷺ) has very clearly commanded us to seek cure, for according to Abu Huraira: the Prophet (ﷺ) said, "There is no disease that Allah has created, except that He also has created its treatment." (Translation of Sahih Bukhari, Volume 7, Book 71, Number 582).

A *fatwa* by leading Egyptian Islamic legal scholar Sheikh Yusuf Al-Qaradawi,

whilst reasoning the forbidding of human cloning in Islam, stresses that Islam embraces scientific progress and research and that at no time during Islamic history has there ever been a conflict between Islam and science. Therefore, if cloning creates a human being, it is a violation of Islamic beliefs, but if it is to be used for specific parts of the human body such as the heart and kidneys, for the purpose of treatment, this is not only permitted, but recommended and rewarded by God. It is of interest to note that the members of the Islamic Fiqh Academy, in its 1997 seminar, while clearly articulating the position of the Academy against therapeutic cloning, allowed that in exceptional cases, it could be re-examined in the future, provided it is not implemented in contradiction to Islamic law [12].

From the discussion presented above, we can see that there is no disagreement on the issue when the matter relates to human cloning in Islam. There is a complete taboo and there are no opposing views on this. However, given that Islam mandates nations to pursue science and knowledge, and sanctifies the seeking of cure for human illnesses, the door for research in therapeutic cloning remains ajar. As long as the technology does not create humans, but seeks to cure disease and illness, and does not conflict with religious beliefs, it should be encouraged. The Eighth Conference of the Islamic Organization for Medical Sciences (IOMS) in Cairo in 2004 endorsed a draft of the First International Ethical Guideline of Medical Sciences from an Islamic Perspective. At the Conference, Muslim states were urged to allow the cloning of human embryos for research into possible medical treatments, i.e. therapeutic cloning, while maintaining a ban on the reproductive cloning of human beings [17].

## Religious views on the origin of life

Since stem cell research involves early-stage embryos, it is important to examine how Islam views the inception of life itself. The subject was the focus of discussion at the *Seminar on Human Life: its Inception and End as Viewed by Islam*, held in Kuwait in 1985 [18]. The participants graded inception into three clear stages. The first stage of inception is the time of fusion between the sperm and ovum into a zygote. This stage establishes the genetic code for the individual that will be created out of the zygote as it develops. The second stage begins when it settles inside a woman's body (assuming here, the womb). The third phase begins when the spirit (soul) is embedded into the fetus. This is considered to be day 120 of gestation. Some Muslims believe this to happen on day 40 of gestation. An embryo is considered a living organism from its conception and it is to be respected in all stages, especially after the spirit is breathed in. Tampering with an embryo—to cause abortion for instance—at any stage after conception is considered *haram* (unlawful) by many in Islam, except when the mother's life is in danger. Some experts believe that abortion before the 40th day of gestation, particularly when there is a justification, is lawful. It is quite clear that Muslims consider an embryo to acquire human status at the time when the spirit is breathed into it. So it can be argued at least that Islam does not totally prohibit early embryonic stage research, especially if it is justified and deemed necessary. However, the manner in which the early embryos may be obtained and the inherent risks to women who would be the source of such embryos pose serious ethical and social problems.

Most other major religions of the world hold similar views. The Roman Catholic

Church, however, vehemently opposes all forms of cloning, and does not allow any tampering with early embryos. Some leading figures among conservative Protestant churches, given the ambiguity on embryo status and the potential for health benefits, are opposed to reproductive cloning, but support therapeutic cloning. The international debate to ban all types of cloning, not surprisingly, is led by countries with a strong Roman Catholic population base and others who have similar views. The Jewish view on embryo status is akin to the Muslim view. Judaism does not consider a fertilized embryo to have a full human status and the need for research that has the potential to save and preserve life takes precedence.

The concept of life can also be seen through the prism of anatomical embryo development. Some consider an embryo to be alive when fetal movements are first noticed by a mother (at the 16th week of gestation), although ultrasound technology can visualize fetal movements as early as the 10th week of gestation. Others equate life in the embryo with early signs of heartbeat, which begins towards the end of the 3rd week of gestation. Still others would consider an embryo to be alive once the sensory systems start to develop after the 2nd week of gestation with the differentiation of the neural crest cells, the precursors of the human nervous system. In the United Kingdom, where early embryonic stem cell research has recently been legalized, the rules do not authorize embryos to be developed for more than 14 days [7].

## Conclusion

It is essential that any debate on cloning should not rest on scientific merit alone. By the same token, advances in science should not be regarded as a threat to religious belief



or as being in opposition to human values and culture. Research and science drive innovation for human development. It is important that when creative science and technology begin to impact on deeply rooted concepts of theology and culture, science and religion should engage in constructive dialogue and come to an informed consensus for the good of the public at large. In 2004, the magazine *Newsweek* reported the successful derivation of stem cells from cloned embryos in the USA [19]. The news accentuated the divide between those who believe that cloning should be outlawed entirely and those who support banning it for reproductive purposes but not for medical research. Times are changing now. Countries that strongly opposed any form of cloning at the last UN debate, such as the USA, are now repositioning their stance. The USA government has authorized limited stem cell research, and in at least one State cloning for stem cell research has been legalized [20]. Several other countries have followed suit. At the global level the number of countries that support therapeutic cloning for stem cell research while remaining opposed to reproductive cloning is growing. This has happened in the light of the emerging knowledge, promise and

renewed hope for disease cure that the technology offers.

It is important that the Islamic countries come to a consensus on this vital issue. Developing science and technology for better health is a religious and moral obligation. There is an urgent need for Muslim scholars to discuss the issues on cloning rationally, with careful analysis of the benefits and harms and resulting in a balanced outcome. The League of Arab States has also stressed the need for a regional dialogue on health care ethics and human cloning at all levels. At the United Nations many Muslim nations have now endorsed the idea. Some countries within the Islamic world are at the threshold of cutting-edge research and technology in genetics. Should we close the door to this development, without discussing all the possibilities, judging all the criteria involved and considering the potential impact for human health and alleviation of suffering?

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*Invited paper*

# Heartfile's contribution to health systems strengthening in Pakistan

*S. Nishtar<sup>1</sup>*

## إسهام مؤسسة هارت فايل في تعزيز النظم الصحية في باكستان

سانيا نيشتار

**الخلاصة:** تتحمل باكستان عبئاً مرضياً مزدوجاً، كما أن المؤشرات الصحية الرئيسية فيها لاتزال جامدة نسبياً. وعلى الرغم من بعض التحسّن على مستوى النتائج المتوسطة ومستوى العمليات، لايزال هناك عدد من التحديات، مثل الحاجة إلى مزيد من الاهتمام بتعزيز النظم الصحية. وفي هذا الإطار، سعت منظمة هارت فايل «Heart File» غير الحكومية إلى إحداث تغييرات على مستوى السياسات والنظم الصحية، وذلك بإنشاء آلية مؤسسية على مستوى السياسات من أجل تقوية النظم، وجدول أعمال لإصلاح القطاع الصحي الوطني يعتمد على تقوية النظم وعلى أسلوب مشترك بين القطاعات لتعزيز الصحة. وقد نجحت منظمة هارت فايل، عن طريق توفير البينات، في المساعدة على تعزيز الارتباط بين البينات وبين السياسة الصحية، وعلى إدخال مفاهيم معاصرة للسياسة الصحية والتخطيط وتقديم الخدمات.

**ABSTRACT** Key health indicators in Pakistan remain relatively intransigent. While there has been some improvement at intermediate outcome and process levels, several challenges remain, including an inattention to health systems strengthening. Within this context the NGO Heartfile has worked to bring about changes at a health policy and systems level through creation of a policy-level institutional mechanism for systems strengthening and a national health reform agenda based on systems strengthening and an intersectoral approach to health. By generating evidence, Heartfile has also assisted in strengthening the evidence-policy linkage, and in developing contemporary concepts for health policy and planning and service delivery.

### La contribution de Heartfile au renforcement des systèmes de santé au Pakistan

**RÉSUMÉ** Le Pakistan supporte une double charge de morbidité et les principaux indicateurs sanitaires demeurent relativement statiques. S'il y a une certaine amélioration aux niveaux intermédiaires de résultats et de processus, plusieurs problèmes demeurent, dont le manque d'attention accordé au renforcement des systèmes de santé. Dans ce contexte, l'organisation non gouvernementale Heartfile s'est efforcée d'introduire des changements au niveau des politiques et des systèmes de santé en créant un mécanisme institutionnel de prise de décision pour le renforcement des systèmes, un programme national de réforme sanitaire basé sur le renforcement des systèmes et une approche intersectorielle de la santé. En produisant des éléments d'information, Heartfile a également contribué à renforcer le lien entre la politique et les informations factuelles, et à élaborer des concepts contemporains pour la politique et la planification sanitaires et la prestation de services de santé.

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## Introduction

The health status of Pakistan's population illustrates that the existence of many health systems, several preventive and promotive interventions and one of the largest service delivery infrastructures in the world have been unable to contribute significantly to improving health outcomes [1]. However, notwithstanding the relative intransigency of key health indicators, some impact at the intermediate outcome stage has been observed and can be attributed to inputs at several levels. This article provides a snapshot of Pakistan's health indicators, the orientation of its health systems and the perceived impediments to achieving stipulated health sector targets and goals. Within this context, the article provides a perspective on the contribution made by the nongovernmental organization (NGO) Heartfile [2], to bring about changes at a health policy and systems level.

## Health status in Pakistan: a snapshot

With a population of 160 million, Pakistan is currently in the second stage of the demographic transition and is undergoing an epidemiological shift in its disease patterns, as evidenced by the double burden of disease [3]. There are several key health indicators for Pakistan.

### Infectious diseases

Infectious diseases contribute significantly both to adult and child mortality and morbidity in Pakistan; estimates indicate that they account for approximately 35% of the total deaths within the country [4]. Most consultations in children under 5 years of age are for acute respiratory infections, which account for 38% of the total consultations and an estimated 1.2 million

cases annually [4]. The incidence of acute diarrhoea is 5.1 episodes per year per child and one third of early childhood deaths are diarrhoea-related [5]. As regards malaria, the current annual parasite incidence has been reported at 0.682 per 1000 population; however the denominator for this is only the 25% of the population that accesses government facilities, and according to conservative estimates approximately half a million cases of malaria occur in the country annually [6]. For tuberculosis, Pakistan ranks 6th among the 22 high-burden countries in the world and harbours 43% of total cases in the Eastern Mediterranean Region of the World Health Organization (WHO) [1]. Tuberculosis is responsible for 5.1% of the total national disease burden in Pakistan [7]. However, the actual burden is envisaged to be much higher, given that more than 50% of outpatient contacts in the private sector are not reported in these figures. With hepatitis B and C, a high seroprevalence of 2% and 1.8% respectively has led to the coining of the term "a cirrhotic state" to describe the high prevalence of these diseases in Pakistan [8]. With regard to HIV/AIDS, until 2004 the HIV epidemic in Pakistan was considered at a "low level". However, recent data show a high prevalence among some vulnerable groups; for example, HIV infection among intravenous drug users in Karachi has been reported at 23%. This shifts the entire epidemic scenario of the country to a higher stage: to a "concentrated level" [9].

Given the burden of infectious diseases, a number of public health interventions are currently being implemented. As a result of these, some improvements have been shown at the intermediate outcome level, particularly with reference to knowledge, behaviour and health-seeking attitudes. About 50% of the urban population surveyed recently report using boiled water for

drinking, 83% are aware of the benefits of poliomyelitis immunization [10], and 77% are reported to have heard the word AIDS [11]. Progress has also been shown at the intermediate outcome level with regard to the implementation of various programmes. For example, the tuberculosis programme has reported implementation of the DOTS (directly observed treatment short-course) strategy in all 120 districts of the country, an increase in the smear-positive case detection rate from a baseline of 7% in 2001 to 54% in 2005 and a treatment success rate of 79% in the cohort of 2001 [7].

At a process level, the emergence of strategic plans—with intervention and evaluation components—in various programme areas is encouraging. These include the strategic enhanced programme of HIV/AIDS (2003–08), the strategic plan for implementing the Roll Back Malaria strategy (2005–10), the strategic plan of the national nutrition programme, the national plans for the prevention and control of hepatitis and blindness and the accelerated Expanded Programme on Immunization (EPI) efforts. However, sustained efforts with careful attention to impediments to programme implementation are necessary to translate these plans into concerted action.

With regard to infectious diseases control, a number of challenges still remain to be addressed. In terms of rare infectious diseases, there has been a resurgence of leishmaniasis in Pakistan after the influx of Afghan refugees and the recent earthquake on 8 October 2005; a 2.7% prevalence of anthroponotic cutaneous leishmaniasis lesions and a 4.2% prevalence of scars have been reported in the last 3 years [12]. However, despite its endemicity, there are no federal or provincial programmes for the control of leishmaniasis. Pakistan also continues to face the challenge of episodic viral haemorrhagic fevers as there are no

concerted response mechanisms against this [13]. At the same time, diseases such as leprosy, which were declared controlled a decade ago, still need to be under surveillance given the long incubation period.

### Maternal and child health

The current under-5 mortality rate, infant mortality rate and maternal mortality rate stand at 100 per 1000 live births, 73 per 1000 live births and 400 per 100 000 women of child-bearing age respectively [14]. Whereas there has been a steady, albeit slow, improvement in child survival, much of the improvement relates to older infants and the neonatal mortality rate has remained relatively resistant to change in the last few decades [15]. The maternal and child health challenge can be further highlighted by taking a snapshot of the nutritional status of Pakistan's children. Twelve per cent (12%) of children under 5 years of age are severely underweight and 38% are moderately to severely underweight. Significant rural and urban disparities have also been shown in child health status; infant mortality rates of 71, 104, 77 and 79 per 1000 live births has been reported for Sindh, Balochistan, Punjab and North-West Frontier Province (NWFP) respectively [16,17].

As regards maternal mortality, each year at least 25 000 women die due to complications of pregnancy or childbirth [1]. Ironically, 70%–80% of all maternal deaths are due to direct obstetric causes such as haemorrhage, infection, eclampsia and obstructed labour, all of which can be prevented. Moreover, a recently conducted national study estimates the national abortion rate at 29 per 1000 women of reproductive age, implying that a sizeable proportion of Pakistani women have abortions [18].

However in contrast to these trends, improvements at an intermediate outcome

level have been shown. An evaluation of the National Programme for Family Planning and Primary Health Care conducted in 2002 showed that the lady health worker services were having a positive impact on the health status of the poor [19,20]. The proportion of women (15–49 years of age) who gave birth during the last 3 years and had made at least 1 antenatal consultation has recently been reported at 50% as opposed to earlier estimates for 1999–2000, which stood at 18% [21], and the proportion of births attended by skilled birth attendants has also shown progress, increasing from 18% in 1999–2000 to 31% in 2003 [22]. Contraceptive prevalence has also improved in the last 5 years from 17% in 1999–2000 to 36% in 2003 [23].

Furthermore, improvement has also been observed at the process level. The National Maternal, Neonatal and Child Health Programme 2005–10 envisages improved access to maternal and child health services and it is also expected that strengthening of EPI and maternal and child health interventions as part of the lady health worker programme and the Women's Health Project and the incorporation of several health-related projects into the workplan of the National Commission for Human Development will also help in improving maternal and child health outcomes [24].

### **Noncommunicable diseases, injuries and mental health**

Noncommunicable diseases and injuries are amongst the top 10 causes of mortality and morbidity in Pakistan and account for 25% of the total deaths within the country [25,26]. One in 3 adults over the age of 45 years suffers from high blood pressure [27]; the prevalence of diabetes is reported at 10%, and 40% of men and 12.5% of women use tobacco in one form or another [28,29]. Karachi reports one of the highest

incidences of breast cancer for any Asian population [30]. In addition, estimates indicate that approximately 1 million people suffer from severe mental illness and over 10 million individuals from neurotic conditions [31]. There are more than 1.5 million blind people in the country [1]. Furthermore, 1.4 million road traffic crashes were reported in the country in 1999, 7000 of which resulted in fatalities [32]. In view of these data, 2 programmes have been launched in the last 3 years; the National Action Plan for the Prevention and Control of Noncommunicable Diseases in Pakistan and the National Blindness Prevention Programme. The former is an integrated programme on noncommunicable disease (NCD) prevention and control which views NCDs within an expanded definition which, in addition to diseases linked by common risk factors, also includes mental health and injuries. This programme has established a surveillance system through which it has established baseline risk parameters against which the impacts of intervention can be gauged in time.

### **Health systems configuration**

The health care system in Pakistan is partially vertical and in part, horizontal. Vertical segmentation is reflected in the manner in which separate organizations, such as the Federal Ministry of Health, the provincial health departments, private sector healthcare providers, NGOs, armed forces, parastatals and the employees' social security institutions, raise and allocate their own funds, pay their own providers and deliver services. In certain cases, these are truly vertical as they serve non-overlapping populations as in the case of the armed forces, Fauji Foundation, parastatals and social security institutions. However, a cer-

tain degree of overlap occurs in relation to the manner in which the Ministry of Health and the provincial health departments provide services versus the private sector. The system is also horizontally aligned in many areas as, for example, in the case of the Federal Ministry of Health and the national programmes and institutions that fall within its jurisdiction. The national programmes are discussed later. Institutions horizontally integrated with the Ministry of Health include the Pakistan Medical Research Council, the National Institute of Health, the Pakistan Institute of Medical Sciences, the Health Services Academy, the National Institute for the Handicapped, Jinnah Postgraduate Medical Centre, the National Institute of Cardiovascular Diseases and the National Institute of Child Health

Health is generally considered a provincial matter in Pakistan. The role of the federal government (Ministry of Health) involves policy-making, coordination, technical support, research, training and seeking of foreign assistance. The provincial and district departments of health are responsible for the delivery and management of health services with a recently enhanced role of the latter in view of administrative devolution [33]. Provinces can also legislate in many areas under the Concurrent Legislative List [34]. In theory, stewardship tasks in the health sector are entrusted to the Ministry of Health at the federal level and the departments of health at the provincial level. These are mandated to guide and regulate other organizations that are horizontally integrated with them and other vertically aligned health systems.

The State attempts to provide health care through a provincial and district level 3-tiered health care delivery system and a range of federally-led public health interventions with implementation arms at the provincial and district levels. The provincial

level system includes basic health units and rural health centres, which form the core of the primary health care model, secondary care which includes first and second referral facilities providing acute, ambulatory and inpatient care through Tehsil headquarter hospitals and district headquarter hospitals, and tertiary care which comprises teaching hospitals. Notwithstanding these facilities, most people receive health care through private out-of-pocket payments made directly to the providers at the point of care. Taxation and out-of-pocket payments are, therefore, the major modes of financing health within the country; donor contributions add to these. Less than 3.5% of employees are covered under the employees' social security scheme and although there are limited social protection funds such as *zakat* and *bait-ul-mal*, which serve approximately 3.4% of the population in need of care, a comprehensive social protection mechanism does not exist. Limited attempts have been made to bring into the mainstream philanthropic grants and private resources as modes of financing health.

In recent years, many alternative service delivery and financing models have been introduced at various levels, with varying levels of success, and several new health initiatives have also been launched. These include the Government of Punjab's Health Reform Unit, NWFP's WISHpad, legislation to make hospitals autonomous, the recent introduction of a national strategy to overhaul the primary health care system, pilot schemes to contract out basic health services in Punjab, the National Commission for Career Structures of Health Care Providers, the continuing medical education initiative of the College of Physicians and Surgeons, institutional mechanisms such as the National Health Policy Unit; World Bank-led greater impetus to institutionalizing public health surveillance, the multi-



donor-supported social protection strategy, recent investments in public health such as in the case of hepatitis and blindness and the most recent launching of social protection in NWFP.

Pakistan's health sector goals—those that are drawn on the Poverty Reduction Strategy Paper, the Millennium Development Goals (MDG) and others that are part of the Medium-Term Development Framework 2005–10 [35]—focus on achieving specific programme-related targets and a number of programmes have been structured to achieve these targets. Broadening the base of the programmes to hepatitis, NCDs and blindness reflects the expansion of the focus to what can be termed a “local MDG+ agenda”. However, despite the existence of a number of health systems and new initiatives, critical challenges still remain to be addressed.

## Challenges for the health systems

An overview of the health systems provides evidence of both efforts attempted as well as impediments. Programmes aimed at promoting health have been viewed as a developmental need and have, therefore, drawn policy and financial support from national plans for development with increasing allocations in recent years [36,37]. However, gaps in the implementation of policies and lack of an intersectoral approach to health have prevented this objective from fully translating into desired outcomes. The challenges facing the health systems fall under the following different areas.

### Area 1: disease burden disparities

Noncommunicable diseases contribute significantly to adult mortality and morbidity and impose a heavy economic burden on

individuals, societies and health systems within Pakistan [38]. However, this remains largely unrecognized and manifests itself as a disparity in resource allocations: communicable diseases versus NCDs. These diseases have clearly emerge as major contributors to costs of care in a recently reported population-based cross-sectional survey, which has shown that 37.4% of households spend an average of 405 Pakistani rupees on the treatment of communicable diseases whereas 45.2% of households spend an average of 3935 Pakistani rupees on the treatment of NCDs. These data show that a significantly higher percentage of households spend more on treatment of NCDs compared with communicable diseases, which serves as a proxy indicator of the double burden of disease [39]. This calls for a rethinking of the approach to resource allocations.

### Area 2: lack of attention to health systems

Decades of focus on programme-based service delivery and emphasis on infrastructure have led to an inadvertent neglect at the health systems level; ironically, all these lines of service delivery require systems-level solutions. Gaps in meeting programme goals and objectives can, therefore, only be bridged at the health systems level.

#### *Financing issues*

Although spending has been increased recently, issues of fund utilization still prevail and alternate mechanisms of financing health—some of which have the potential to make financing patterns more equitable and efficient—have not been mainstreamed into the delivery of care. Furthermore, disparities in spending patterns have been noted with regard to preventative versus curative allocations, in clear violation of stated policies [1]. Consecutive 5-year plans



show that clinical services have consistently consumed more than 45% of the total health budget [40].

#### *Service delivery challenges*

Pakistan has one of the largest public-sector owned service delivery infrastructures in the world at a primary health care level. However, these remain under-utilized, which questions the validity of investments made in them. Furthermore, public health interventions also suffer from implementation challenges, largely owing to issues at a governance level.

Financing and service delivery challenges have also manifested themselves as rural–urban disparities. Seventy per cent (70%) of Pakistan’s population lives in rural areas; however, health indicators in the rural areas are considerably worse compared with urban areas. Recent surveys have also reported significant rural–urban disparities in child health status. The under-5 mortality rate in rural areas of the province is 117 per 1000 live births compared to 68 per 1000 live births in the urban areas whereas the under-5 mortality rate in the city of Karachi has been reported at 55 per 1000 live births [41]. Stark disparities have also been reported between the rural (45%) and urban (30%) prevalence of malnourished children in various parts of the country [41].

#### *Federal–provincial–district level systems interface*

Over the years, overlapping services have created ambiguities between federal and provincial roles and responsibilities and administrative authority. These issues have been compounded by conflicts over sharing of resources and financial arrangements, a problem that has been complicated further after the passage of the Local Government Act of 2002.

#### *Governance and implementation*

Policies and legislative and regulatory frameworks remain poorly implemented due to generic issues inherent in the implementation of laws. Administrative bottlenecks, decision-making delays and onerous financial and administrative procedures are known to undermine programme implementation.

#### *Human resources*

The country’s focus on producing more doctors has led to marked improvements in the doctor-to-population ratio. Conversely, challenges relating to quality and capacity and the effective and equitable deployment of health-related human resource still loom large. These issues are further exacerbated by poor regulation of the private sector.

### **Area 3: untapped public–private interface**

More than 50% of care is provided by the private sector, and out-of-pocket payments are known to be the major contributor to financing health care within the country [1]. The role of the private sector becomes all the more important in view of the need for alternative service delivery arrangements to make government-owned health facilities viable and sustainable. Mainstreaming the role of the private sector would also necessitate careful attention to a number of other regulatory considerations relating to institutional arrangements, performance assessment, accreditation of doctors, continuing medical education, licensing and accreditation of service delivery facilities and quality assurance mechanisms.

### **Area 4: lack of an intersectoral approach to health**

It is widely recognized that factors that determine health status have a much broader

range than those that are within the realm of the health sector and that modern health care has less of an impact on population health outcomes than do economic status, education, housing, nutrition, sanitation, population dynamics, human development and improvements at a governance level. In contrast to this, health is viewed in a health care system rather than a health systems context.

#### **Area 5: evidence and its use**

Paucity of locally-applicable evidence pertinent to many aspects of decision-making, issues regarding the use of existing evidence, and the lack of commitment to take appropriate policy decisions based on evidence all act as impediments to the use of evidence. This is compounded by limited rational accountability of the decision-making process. Evidence generally points to the need for long-term remedial measures; however, a combination of factors—such as lack of institutional maturity, career structures that foster short-sightedness and orientation around short-term outputs—prevent evidence-based enduring actions from taking root.

#### **Area 6: limited attempts to innovate**

The public sector model in health care delivery does not provide the flexibility to innovate.

### **The way forward to bridge these gaps**

The above-mentioned issues, together with several other questions, are contributing to the current intransigency of key health indicators within the country. However, as bad as these may appear, there is still room for hope if appropriate health reforms are instituted in time. This may also be an op-

portune time for health reforms. Pakistan is experiencing economic growth and has additional fiscal space. This, coupled with the introduction of several parallel reforms related to devolution and privatization and the injection of new resources, makes health reform a viable proposition.

Viable public policy cannot be viewed or treated in isolation from political, technical or administrative processes that define what and how care is delivered. Traditionally, a policy cycle links these processes—coordination, consensus-building, decision-making, policy development, policy implementation, evaluation and identification of issues. Analysis and interpretation again loop into consensus-building, thus completing the policy cycle. However, a review of the policies themselves and the health systems process has shown gaps at various levels.

### **An NGO's contribution to bridging these gaps**

The NGO Heartfile was established in 1998, with an initial focus on cardiovascular diseases prevention and control through public awareness, advocacy and research [42–47]. In 2003 Heartfile lent impetus to, and led the creation of, a tripartite partnership on NCDs within Pakistan at the national level which was aimed at developing and implementing a national strategy for NCD prevention and control. This partnership includes Heartfile, the Ministry of Health and the WHO Pakistan Office. It was during the implementation of this programme that the NGO felt the need for a broader effort for systems strengthening given that the impediments to programme implementation were embedded in systems issues. This realization culminated in the creation of Pakistan's Health Policy Forum, which has the distinction of

being the country's first health sector think tank and the first instance of a civil society-led effort, which is in the process of creating a new health policy within the country [48]. The organization has also played a major role at the international level over the past decade by participating in global advocacy efforts to mainstream cardiovascular diseases and NCDs in global development and health planning, and has developed innovations for this purpose at the health sector level [49].

Over the past 7 years, Heartfile has made contributions to strengthen Pakistan's health systems, which are outlined below in the context of the challenges described earlier.

#### **Area 1: broadening the scope of public health and honing the focus on the double burden of disease**

Public health has had a traditional focus on infectious diseases and maternal and child health in Pakistan. Up until 2003, there was no programme and consequently no dedicated institutional responsibility for the prevention and control of NCDs and for allied health promotion measures. In 2003, Heartfile contributed to the creation of a tripartite partnership with the overall objective of developing and implementing the National Action Plan for Noncommunicable Disease Prevention, Control and Health Promotion in Pakistan (NAP-NCD) [50]. This was the first concerted, integrated, partnership-based approach for the prevention and control of NCDs from within a developing country. Through this initiative, another programme was added to Pakistan's public health interventions. The terms of the agreement stipulated in an official Memorandum of Understanding and programme parameters placed Heartfile in a leading role both in developing and subsequently implementing NAP-NCD [51–53].

The integrated approach to NCDs established through this programme is anticipated to contribute to health systems strengthening in many ways. By integrating diseases for combined actions, integrating actions with existing programmes within the health system and harmonizing interventions, the strategy is envisaged to obviate issues that can lead to fragmentation of the health system by imposing independent vertical lines of intervention. In addition, Heartfile envisages institutionalizing implementation arrangements within the Ministry of Health over the medium term. In line with this approach is the transfer of many implementation responsibilities to counterpart arrangements in the Ministry of Health thereby strengthening existing systems. In the long term, Heartfile sees itself in a technical support role in this partnership arrangement.

Although this programme has encountered implementation challenges, work is currently under way to execute its first phase, which involves establishing an integrated NCD surveillance system, launching a behavioural change communication strategy through the media and Pakistan's field force of lady health workers, and tabling key legislative actions in support of broad-based population strategies for NCD prevention and control [54].

#### **Area 2: attention to health systems strengthening**

##### *Creating a policy level institutional mechanism*

Heartfile lent impetus to the creation of Pakistan's Health Policy Forum [47], which is the country's first health-sector think tank. The Pakistan Health Policy Forum contributes to health systems strengthening by advocating for a new health policy, taking the lead in its development, playing a technical support role, performing advocacy

and watchdog functions, mainstreaming the voice of civil society and the people in the health policy process and synchronizing stakeholder efforts for improving health outcomes.

#### *Spearheading a national health reform agenda*

Within 6 months of its official debut in August 2005, Pakistan Health Policy Forum released its first publication [1]. Entitled *The gateway paper. Health systems in Pakistan: a way forward*, this publication is intended to be a new effort within the country to address the pressing health needs of the country. The intent is to articulate the reasons for health systems reforms within the country, propose a direction for reforms and emphasize the need for an evidence-based approach to reforms. The paper makes a strong case for systems reforms. Linkages have been proposed to help Pakistan's health systems and its policy cycle work better together. The paper reviews issues and proposes solutions for the basic functions of health systems, namely stewardship, financing, service provision and inputs. It also discusses 3 distinct interface areas critical to performing these functions and focuses on several overarching health paradigms. The paper forms the basis of the creation of a new health policy, which is currently in the making.

#### **Area 3: creation of a new health policy**

Based on the gateway paper approach to health systems, a new health policy is currently in the making in Pakistan—a process that is guided by country-wide rounds of post-gateway paper policy roundtables. This is a distinctly novel occurrence, not only because this is the first time a civil society-led effort is spearheading the creation of a “policy” but also because it is based

on an approach that is also civil society-led. The new policy has implications for systems strengthening since it will be focused on systems, rather than programme goals and will factor societal or social measures into the planning process. It will attempt to bridge the gaps in health policy and planning which have been described earlier.

#### **Area 4: fostering an inter-sectoral approach to health**

The gateway paper approach to health systems underscores the need for: (1) developing alternative policy approaches to health within its intersectoral scope with careful attention to the social determinants of health and contemporary considerations that influence health status; (2) redefining targets within the health sector in order to garner support from across various sectors; and (3) setting these targets within an explicit policy framework in order to foster intersectoral action. This approach will also involve creating intersectoral agencies and mechanisms that facilitate their concerted actions.

#### **Area 5: strengthening the evidence-policy linkage**

Heartfile has contributed to strengthening the evidence and policy linkage within the country by developing a sustainable mechanism for evidence generation by producing evidence for policy and by fostering the linkage of evidence with policy. The first two are in the area of NCDs whereas the third is related to health policy and systems in a broader context. With respect to the first two and as part of the first phase of NAP-NCD, Heartfile has developed an integrated population-based surveillance system for NCDs. This model incorporates modules for surveillance of injury and mental health, and the expansion of this module to incorporate elements relevant to programme

evaluation enables it to serve both as a risk factor surveillance tool as well as a programme evaluation instrument. By setting up the surveillance system, a contribution has been made to strengthen sustainable disease surveillance methodologies given that the previous surveillance activities focused on infectious disease surveillance only [55]. A strong case has also been made for institutionalizing public health surveillance in the health reform agenda as set forth in the gateway paper [1].

Heartfile has also made contributions to generating evidence in the policy domain by conducting the first case-control study to determine causal associations for cardiovascular diseases. This has assisted in setting targets for preventive interventions [44]. In the health system domain, evidence forms policy and systems form the basis of the health reforms proposed in the gateway paper. Heartfile has also been conducting pilot and demonstration studies to assess the feasibility and appropriateness of introducing chronic disease as a supplementary education module in the districts, into the work plan of grass-roots level health-care providers and as an additional continuing medical education component for all categories of health-care provider in disadvantaged settings. The empirical evidence yielded through this programme forms the basis of the NAP-NCD programme.

#### **Area 6: fostering contemporary concepts**

Heartfile has generated and or used several contemporary concepts in health-sector planning, programme implementation and evaluation over the past decade. These have contributed to health system strengthening through their application in low-resource settings and through the generation of evidence, which was then used in many instances and in larger projects. These are

particularly important in the area of health education, which involves the use of social marketing, resource mobilization, development of tools such as the integrated framework for action, which has enabled the monitoring of complex processes and the contribution from many sources to impact nationally agreed targets in the NAP-NCD programme. Other innovations involve the array of partnerships Heartfile has developed and the manner in which it has influenced them towards improving health outcomes. These partnerships include those with the largest publication house, state television, pharmaceutical agencies and consumer distribution agencies and national public health programmes. These have contributed to the understanding of partnership dynamics and relationships, and joint governance and operating arrangements for improving health outcomes (Table 1).

Within this context Heartfile has made contributions to bring about changes at the level of health policy and the systems level, particularly with reference to (1) broadening the scope of public health and honing the focus on the double burden of disease, (2) creating a policy level institutional mechanism for systems strengthening and (3) spearheading a national health reform agenda based on health systems strengthening and an intersectoral approach to health. In addition, by setting an example and generating evidence, Heartfile has also assisted in strengthening the evidence-policy linkage, developing several contemporary concepts at a health policy and planning level and service delivery.

#### **Conclusion**

NGOs traditionally suffer from several limitations such as resource constraints, weak institutional bases and issues with sustain-

Table 1 Heartfile's areas of work, programmes and partners

Area	Programme	Partners
Behavioural change communication campaigns	Print media interventions: The News Heartfile Campaign Jang Heartfile Campaign US Heartfile Campaign Heartfile public awareness leaflets [42] Electronic media interventions: <i>Lambi Zindigi Kay Raz</i> (Learn to Live Longer Campaign) [55]	<ul style="list-style-type: none"> <li>• Jang group of newspapers</li> <li>• UDL Distributors</li> <li>• Pakistan Television</li> <li>• Serendip Productions</li> <li>• Mobilink (Pakistan Telecommunications Limited)</li> <li>• Advertising agencies</li> <li>• Government of Pakistan's National Programme for Family Planning and Primary Health Care</li> </ul>
Broadening the scope of public health	NAP-NCD media interventions Integration of noncommunicable diseases in the workplan of lady health workers [37] The National Action Plan for Prevention and Control of Noncommunicable Diseases and Health Promotion in Pakistan (NAP-NCD) [49,50]	<ul style="list-style-type: none"> <li>• Ministry of Health</li> <li>• World Health Organization</li> <li>• The National NCD Forum</li> </ul>
Health systems strengthening	Pakistan's Health Policy Think Tank/Forum	<ul style="list-style-type: none"> <li>• Currently more than 72 partners in this coalition including government agencies, NGOs, private medical academic and service delivery organizations, allied health organizations, development partners, professional associations [48]</li> </ul>
Research	<i>Epidemiological research</i> [44] 1. RISKCORNER Study 2. INTERHEART Study 3. INTERSPIRE Study Health policy and systems research  <i>Operational research</i> [56] 1. PREMISE Study 2. Validation study for the WHO Risk Management Package 3. Global [price of chronic disease medicines] WHO Drug Survey	<ul style="list-style-type: none"> <li>• St Thomas' Hospital, London</li> <li>• McMaster University, Canada</li> <li>• Imperial College, London</li> <li>• WHO Regional Office for the Eastern Mediterranean</li> <li>• WHO Cardiovascular Disease Unit, World Health Organization, Geneva</li> </ul>



Table 1 Heartfile's areas of work, programmes and partners (*concluded*)

Area	Programme	Partners
Research	<i>Surveillance</i>	
	1. Establishing an integrated NCD surveillance system in Pakistan for chronic diseases [53] 2. Strengthening sustainable public health surveillance in Pakistan [57]	<ul style="list-style-type: none"> <li>• World Health Organization STEPs surveillance</li> <li>• Centers for Disease Control and Prevention, Atlanta</li> <li>• World Bank</li> <li>• Ministry of Health</li> </ul>
	<i>Demonstration projects</i>	
	Heartfile–Lodhran Cardiovascular Disease Prevention Project Heartfile JC Project [45]	<ul style="list-style-type: none"> <li>• National Rural Support Programme (NRSP)</li> <li>• District Department of Health and Education in the Districts of Lodhran, Jhelum and Chakwal</li> <li>• National Programme for Family Planning and Primary Health Care (NPFPPHC)</li> <li>• Department for International Development, UK</li> <li>• European Union</li> </ul>

ability. As an NGO, Heartfile is no different and has struggled for its survival. Notwithstanding, its contributions—especially at a process level—to strengthen health systems in Pakistan have been noticeable. During its transition from modest beginnings to its present leading role in chronic disease prevention and control and health policy, systems and planning, its efforts have hinged on intellectual independence, the ingenuity of its indigenous responses to health issues and innovative approaches to promoting health. Its scope of work initially focused on research, advocacy, technical support and health communication. Now, it is also involved in service delivery in the area of chronic disease and it plays a crosscutting role in the overarching policy,

regulatory, structural, management and fiscal parameters within the health sector and beyond. More recently, through its think tank function and by bringing many critical social sector issues to the forefront, Heartfile is now setting its sights on bold objectives. Viewing health in a broader national and international policy context, Heartfile strives to exist as a responsible civil society organization deeply conscious of and committed to playing its role in contributing to improving the lives of millions within the country. This it aims to achieve by providing and supporting solutions both within and beyond the health sector through its own work and through its work in partnerships with others.

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*Invited paper*

# Emergency preparedness and humanitarian action: the research deficit. Eastern Mediterranean Region perspective

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الاستعداد للطوارئ والأعمال الإنسانية: بعض التقصير في إجراء البحوث، من منظور إقليم شرق المتوسط

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**الخلاصة:** يعاني إقليم منظمة الصحة العالمية لشرق المتوسط، الذي يمتد من باكستان شرقاً إلى المغرب غرباً، ويزيد عدد سكانه على 490 مليون نسمة، من نسبة كبيرة من الكوارث الطبيعية وغيرها من الكوارث التي هي من صنع البشر. ومع أن الشركاء في الأعمال الإنسانية في القطاع الصحي قد قاموا بدور رئيسي في تجنب ارتفاع معدلات الوفيات والمراضة في حالات الطوارئ السابقة، فلا يزال هناك الكثير الذي ينبغي عمله من أجل توفير البنى التحتية في هذا الخصوص، من خلال اعتماد أساليب بحثية صارمة ودقيقة، بُعْثَ توحيد العناصر الأساسية الأخرى للاستجابة للمتطلبات الصحية في حالات الطوارئ الإنسانية. وقد خلصت الدراسة إلى أن تعزيز المؤسسات الأكاديمية، وتحديد أولويات البحوث، وتوفير الموارد المالية، وتعزيز الاتصال بالمؤسسات المعنية في البلدان المتقدمة، كل ذلك من شأنه أن يحسّن الوضع في الإقليم.

**ABSTRACT** The WHO Eastern Mediterranean Region, extending from Morocco in the west to Pakistan in the east, with a population exceeding 490 million, suffers a large proportion of both natural and man-made disasters. Humanitarian partners in the health sector have played a major role in averting the excessive mortality and morbidity in response to previous emergencies; nevertheless much remains to be done to provide the evidence through rigorous research methods to standardize other essential elements of the health response to humanitarian emergencies. Strengthening of academic institutions, prioritization of research, financial resources and linkages with institutions in the developed world can ameliorate the situation in the Region.

## **Préparation aux situations d'urgence et action humanitaire : le déficit en matière de recherche - Perspective de la Région de la Méditerranée orientale**

**RÉSUMÉ** La Région OMS de la Méditerranée orientale, qui s'étend du Maroc à l'ouest au Pakistan à l'est, et dont la population dépasse 490 millions d'habitants, connaît une grande proportion de catastrophes d'origine naturelle et humaine. Les partenaires humanitaires dans le secteur de la santé ont joué un rôle majeur pour éviter une mortalité et une morbidité excessives dans les situations d'urgence précédentes ; néanmoins, il reste beaucoup à faire pour fournir les bases factuelles, par des méthodes de recherche rigoureuses, afin de normaliser d'autres éléments essentiels de l'action sanitaire dans les urgences humanitaires. Le renforcement des établissements universitaires, l'établissement des priorités de recherche, les ressources financières et les liens avec des institutions dans le monde industrialisé peuvent améliorer la situation dans la Région.

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## Background

The frequency of natural disasters and impact in terms of human and economic costs has increased alarmingly at global level in the past 2 decades, and this increase has been much greater in developing countries than in developed ones. From 1984 to 2003, more than 4.1 billion people were affected by natural disasters [1]. The number affected grew from 1.6 billion in the first half of this period (1984–93) to almost 2.6 billion in the second half (1994–2003), with yearly estimates of up to 200 million [2]. In constant dollars, disasters between 1990 and 1999 contributed to material losses of US\$ 652 billion [1]. In the years 2004–05 alone, over 160 countries were affected by natural and technological disasters, resulting in over 350 000 deaths and over US\$ 254 billion in related costs [3].

A large proportion of disasters, both natural and man-made, occur in our Region, the Eastern Mediterranean Region (EMR) of the World Health Organization (WHO). War, internal conflict and eruptions of violence increase the vulnerability of populations. Countries such as Afghanistan, Iraq, Palestine, Somalia and Sudan have had, or

are currently experiencing, complex humanitarian emergencies—complex political disasters where the capacity to sustain life and livelihood is threatened, primarily by political factors and in particular by high levels of violence [4]. With respect to natural hazards, Egypt, the Islamic Republic of Iran, Lebanon, Pakistan, Somalia, the Syrian Arab Republic and Yemen have experienced floods, droughts, earthquakes and landslides. Recently the major earthquakes in the Islamic Republic of Iran and Pakistan affected large numbers of people and were responsible for significant material losses.

The public health effects of disasters and complex humanitarian emergencies include direct and indirect mortality, morbidity and trauma resulting in an over-burdening and/or possible collapse of the health system (Table 1). Though no accurate and comprehensive data are available for the EMR on cumulative mortality and morbidity from either natural disasters or complex humanitarian emergencies, nevertheless guesstimates of proportional mortality and disability adjusted life years (DALYs) lost because of war are 12.56 % and 13.25% respectively [5]. The human and societal

**Table 1 Mortality and numbers affected in reported major emergencies in 2004/05 [3]**

Event	Country (most affected)	Reported deaths	Total affected (injured, homeless, etc.)
Hurricane Jeanne, September 2004	Haiti	2 754	315 594
Tsunami, December 2004	Indonesia, Sri Lanka, India, Thailand, Somalia	225 841	2 273 723
Hurricane Katrina, August 2005	United States of America	1 053	500 000
South Asia earthquake, October 2005	Pakistan	73 320	3 269 392



toll that natural and complex humanitarian emergencies exact is, nevertheless, amenable to humanitarian public health response and interventions.

In response to previous emergencies, humanitarian partners in the health sector have played a major role in averting excessive mortality and morbidity, despite the fact that preparedness and risk reduction policies and programmes are not fully evidence-supported and, arguably, leave much to be desired in terms of being sound and effective [6]. The *Humanitarian response review* [7] commissioned by the United Nations also identified serious gaps in current international humanitarian action, and suggested accelerating measures aimed at improving predictability, effectiveness and accountability of humanitarian aid efforts. The establishment of cluster coordination mechanisms with clear accountability to manage a cluster has been suggested as one means of improving humanitarian aid in support of Member States. This mechanism will depend significantly on data and information derived from rapid assessments from the area affected in order to ensure evidence-based actions/interventions are made.

Considerable advances have been made recently in assessment, management, education and training in disaster response. To be both successful and effective in complex emergencies, however, those responding to health needs in humanitarian crises will need to expand their knowledge base and utilize scientific methods to incrementally learn and apply best practices in a complex environment.

### **Current status and research deficit**

The current process through which knowledge of disaster risk is being generated,

transferred and translated into action is increasingly being challenged, in particular by academics and practitioners from developing countries [8]. At a recent meeting of relevant experts convened by WHO, it was agreed that "...in practice, humanitarian actors, including international and national workers, host governments and donors, seldom know whether, and to what extent, their actions have impact on survival, livelihoods and dignity of those affected by crisis" [6].

A critical factor that further compounds this lack of knowledge, especially in complex humanitarian emergencies and large scale natural disasters, is the partial or total collapse of systems for routine information collection and analysis in an event of structural, social and political instability. Compromised information systems at all levels stifle the process of prioritization and the capacity to monitor trends and, as a result, hinder evidence-based shifts in priority setting and resource allocation.

The information available is too often derived from a variety of sources using non-standardized methods. It inherently lacks consistency and is of poor reliability and validity, and is arguably of limited use for establishing baselines, making comparisons or tracking trends. Furthermore, while valuable data may be collected at the level of the individual project/crisis, there is rarely sufficient real-time evidence on whether humanitarian outcomes are improving or deteriorating at the level of crisis situation as a whole. The WHO has been asked on several occasions to address the need to establish baselines as well as demonstrate the overall effectiveness of humanitarian assistance. In particular, during the initial onset of the Darfur crisis in Sudan, many organizations and agencies reported crude mortality rates well beyond the acceptable threshold (generally accepted threshold in

emergency settings being crude mortality rate of 1/10 000 per day) in many camps of displaced populations. The WHO, along with other health partners, conducted 2 retrospective mortality surveys with the aim of identifying the leading causes of mortality as well as assessing the change in health status of displaced persons after 6 months.

Unfortunately it is assumed that all disaster response has been, and will be, based upon “scientific evidence” [9]. However, there is also a lack of researched strategies/practice-based evidence, “assumptions used in emergency preparedness and planning are based on conventional wisdom and stereotypes rather than on systematically collected evidence” [7].

The bulk of knowledge and practice in humanitarian assistance resides with a few time-honoured public health prevention and control measures—communicable disease surveillance [10] and control [11], vaccination [12], nutrition [13,14], safe drinking water, vector control and environmental health in general—all yielding standardized responses [15,16]. However, much remains to be done in order to come up with evidence through rigorous research methods to standardize other essential elements of humanitarian health responses (Table 2).

Mental health and HIV/AIDS have, however, gained increasing focus recently and information and knowledge on short-term mental health effects of disasters as well as remedial response measures continues to grow at a healthy pace [17–22]. This process of generation of knowledge and learning in the field of natural hazards and disaster risk reduction has generally been dominated by academics and research centres from the developed world [8]. Furthermore, the mechanisms (scientific journals) through which research findings are disseminated to end-users of research results, especially those in developing countries, are also un-

suitable. Another aspect that disproportionately affects the humanitarian settings, especially from an EMR perspective, is a lack of applied research evaluating the reasons behind systems successes or failures in humanitarian settings.

This paucity of evidence-based practices and/or practice-based evidence, coupled with a lack of consensus among humanitarian partners, makes the justification for programmatic choices in relief and recovery phases arbitrary, and thus the potential for humanitarian interventions to be inappropriate, inefficient and ineffective. To date, for the same reasons, no global performance standards for accountability exist.

The situation in the EMR is not any different. Many global factors cited earlier, coupled with social and ecological factors that enhance vulnerabilities, continue to pose serious risks. Despite the existence of “lessons learned” exercises [23–26], and epidemiological research that has provided a scientific basis and shaped, to some extent, prevention and intervention strategies [27–29], this research is not a result of a common understanding and systemic effort. Thus, it is subjective, sometimes incoherent and not generalizable. Furthermore, the body of knowledge available at a global level may not always be relevant to this Region: it may be outdated, the threats faced may be of a different nature, or it may be culturally inapplicable [7]. In the recent devastating earthquake in Pakistan, a conservative Muslim region in which many men refuse to allow the female members of their households to be examined by male clinicians, staff members of several organizations reported numerous cases of severely injured women being denied medical care by their families. Anecdotal evidence from the early days indicated that “less than 10% of the patients in some clinics were women” [30]. Hence, it is important to

**Table 2 Operational and institutional status of essential elements of health response programmes (adapted from Burkle) [40]**

Status	Element
Operational and fully standardized	Water Sanitation Nutrition Communicable diseases Essential drugs
Not fully standardized/institutionalized	Collecting and sharing standardized assessment tools Impact assessments Reproductive health Human rights and protection Mental health Education and training (providers)
Seriously deficient	Evaluation methods Long-term physical and emotional consequences Issues of integrated health management Information management Information, communication and technology Logistics Incident command system Civil military coordination Transition (from relief to recovery) Recovery aspects

develop strategies and interventions based on local knowledge and perceptions prior to an emergency situation.

Critical data/information gaps exist in the Region as to how health systems respond to disasters. A clear case in point is the unwarranted primary focus for disaster medical planning on hospital treatment of the critically injured [7], whereas the evidence, barring big earthquakes affecting large urban areas, is to the contrary [31]. Thus, appropriate facility planning needs to be an integral part of overall disaster preparedness plans. Similarly, another critical gap on the subject of health facilities is the lack of a systematic overview of the structural and non-structural integrity of major hospitals—the cornerstone in case of mass casualty management—in key disaster

earthquake-prone metropoli. Certainly a number of major urban centres, such as Cairo, Karachi and Tehran, need to ensure that their secondary and tertiary care hospitals are resilient to natural events and prepared to respond to mass casualty situations.

Similarly, though there is a good understanding of humanitarian issues linked to health information management [32–34], these issues have rarely been addressed explicitly at country level in the Region [5,35]. These include key issues such as information in endemic diseases of concern in emergencies and the impact of the latter on health care availability and access.

Many micro- and macro-level barriers exist to developing applied research in humanitarian emergencies specific to the EMR, e.g. the low priority for applied re-

search in general, lack of end-user-friendly research, limited impact of research on improvement of policies and functioning of health systems, limited use of existing knowledge, limited resources (for example, only 2.7% of total health expenditures worldwide went into research and development [36]), limited research capacities [27], dynamic complexity of humanitarian situations and inability to conduct controlled experiments.

### Research rationale

Strict application of scientific methods has been the mainstay of the great advancements in medicine and public health. Present day double-blind, prospective, randomized control trials and diligent adherence to the protocols is the most reliable way of generating evidence needed to improve health policy and health outcomes [37]. In the normal arena of health care delivery systems, evidence-based health policy has been gaining greatest credence in academic and public health practice-based settings. However, the challenge of applying controlled experiments as a research instrument and generating evidence-based practices creates a paradox in humanitarian settings: dire and immediate needs, coupled with ethical and security concerns, preclude any design, plan or execution of controlled experiments. Humanitarian settings provide naturally-occurring settings affording, at best, opportunities to observe trends, make a positive impact and learn for future application. Nonetheless, repeated occurrence of such events and the response initiated should, in principle, incrementally afford evidence for what works best: evidence-based practices. Unfortunately, most of the evidence available, so far, is not practice-based at global or Regional level. No foundation of applied

research exists in the Region or for Member States to deal with essential elements of response other than perhaps nutrition and communicable disease surveillance and control.

In contrast, the availability of reliable evidence may be a prerequisite, but it does not guarantee learning. The history of health is replete with examples where learning has failed despite evidence. In the era of information technology, where generation of knowledge and its dissemination can occur in real-time, one would expect best practices to converge to optimal levels; many studies, however, document large, persistent differences in performance across organizations [19].

For preparedness planning and mitigation programmes that capitalize upon risk management models [38], research is essential to identify various risks and generate information for risk mitigation and hazard reduction. Furthermore, while crises and ill effects of disaster are felt across all social groups, the evidence clearly shows that the poor are worst affected because of the devastating impact on their livelihoods, bordering on destitution [23]. Research on the post-crisis impact on marginalized groups and community-based and participatory recovery mechanisms can play a vital role in poverty and vulnerability reduction interventions in humanitarian settings. It can also facilitate the much-desired interface with development activities.

### Conclusions

The need for emergency preparedness for humanitarian action and recovery in the EMR is evident. Humanitarian situations are an ideal opportunity to learn and apply international experiences, while respecting and accommodating the specific needs

of the countries of the Region, where the traditional health challenges of poverty, poor nutrition, poor hygiene and lack of sanitation have been compounded by increases in environmental and occupational problems associated with the rapid growth of cities and industries. The risk factors that can compound/contribute to the impact of future disasters (urbanization; health disparities and economic inequities; lack of environmental and ecological safeguards; food and water insecurities; inter- and intra-country population migration due to conflict, food or water insecurities or political, economic and environmental issues) continue to grow unabated in the Region [39]. Epidemiological approaches in priority areas and well-researched, sound, public health interventions that have so far played an important role in normative functions can play a similar mitigating role in priority areas of emergency preparedness and response and would reduce the health impact of humanitarian emergencies of all kinds.

Priority-setting is as critical as conducting research itself [27]. The Millennium Development Goals can provide useful guidance from a developmental perspective, and can be useful in prioritizing research in preparedness and response at the country level: there is evidence for the disproportionate impact of disasters on vulnerable sub-groups in disaster-affected populations: the poor, the politically and socially marginalized, women and children.

## Recommendations

For research capacity strengthening in EMR, the following recommendations are made:

### Resource allocation

- at least 1% of all resources allocated for emergency preparedness and response

must be earmarked for research capacity and strengthening for applied research in priority areas.

## Education and training

- restructuring and enhancing the education of all relevant health professionals in community-based disaster management and emergency preparedness and response, through the incorporation of effective, action-oriented and user-driven approaches to research, learning and knowledge management methods into professional practices and encouraging interdisciplinary collaboration with the delivery of health care services;
- strengthening of academic centres in applied research capacities to close the gap between academic theory and field-level practice;
- development and application of ethical codes and guidelines appropriate to research in humanitarian settings and their instruction and institutionalization through the creation of relevant bodies: institutional review boards.

## Human resources for health

- develop a critical mass of able and qualified scientists and practitioners who can undertake research on priority issues and can suggest ways to translate these into actions.

## Linkages

- establish linkages with international research networks and create public-private partnerships for research capacity strengthening as well as implementation of research findings. Specific areas of collaboration in infectious and chronic disease, diffusion of research based best practices, education and training, and demonstration projects to facilitate

health delivery systems development for emergency preparedness and response.

### Research

Specific priority research areas, with due emphasis given to ethical conduct may include:

- identification of key challenges to the provision of critical, life-saving clinical care and public health interventions in humanitarian settings;
- identification of what integrative and innovative steps may be undertaken in the context of health challenges and opportunities in emergency preparedness and response at Regional and country levels;
- applied research to identify strategic, operational and cultural barriers to the application of research results and best practices;
- identification of health promotion and communication strategies needed to:
  - transform complex, multidisciplinary research results into easy, comprehensible messages for decision makers, practitioners and community members;
  - dispel the myths that are disseminated post-disaster, e.g. the issue of the management of dead bodies as a public health threat;
- documentation and compilation of studies and “lessons learned” exercises to gradually institutionalize best practices, build a foundation of research and advocate the operationalization of key aspects;
- improving information sharing to enhance collaboration between organizations with vertical programmatic mandates;
- identifying the essential elements of humanitarian response and performance indicators;
- measuring and quantifying other subtle/indirect consequences of disasters/complex humanitarian emergencies;
- compiling descriptive case studies of past as well as new disasters;
- evaluation of the effectiveness of health interventions with the aim of achieving incremental improvement in health systems response;
- assessing the relevance of available global best practices to the EMR;
- methods for dissemination of politically sensitive information;
- information priorities and efficient information collection methods/tools;
- application of current risk management and hazard mitigation models for identifying and understanding various risks and hazards to health in high-risk countries for planning and preparedness;
- compilation of case studies on the magnitude of post-crisis recovery among marginalized groups and generation of recommendations for relief-to-recovery-to-development models for the EMR.

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# Perceptions of the condom as a method of HIV prevention in Yemen

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**التصورات حول استخدام العازل الذكري كوسيلة للوقاية من فيروس الإيدز في الجمهورية اليمنية**  
وليام روجرز بوسولوى، محمد يحيى تقي الدين، عزة عبد الله الزبيدي، هاشم علي الزين المساعد، جيهان طويلة، هاني زيادي

**الخلاصة:** تم إجراء تحليل لوضع مرض الإيدز والعدوى بفيروسه والعدوى المنقولة جنسياً في عام 2002، بغية تقييم المعارف والمواقف تجاه العازل الذكري، كوسيلة للوقاية من فيروس الإيدز. وتم تجميع المعطيات من ثلاث مجموعات: جمهور السكان، إحدى مجموعات الأقلية المهمشة، واليمنيين العائدين من العمل بالخارج لفترات طويلة. وثبت أن نحو 51.3٪ فقط قد سمعوا عن العازل الذكري، منهم 45.5٪ فقط يدركون فائدته في الحماية ضد العدوى. ولعل أكبر العراقيل أمام تعزيز استخدام العازل الذكري، يتمثل في الخوف من أنه قد يضر بالقيم الجنسية في البلاد، كما كانت الجوانب المرتبطة بتقليل الإحساس، والشك في فاعليته في الوقاية، من العراقيل الأخرى في هذا المجال، ولو أن 21٪ أيدوا تعزيز استخدام العازل الذكري بين المجموعات العالية الخطر.

**ABSTRACT** An HIV/AIDS situation analysis in Yemen was conducted in 2002 to assess knowledge and attitudes towards the male condom as a means of HIV prevention. Data were collected from 3 groups: the general population, a marginalized minority group and Yemenis returning from extended work abroad. Only 51.3% had ever heard of the male condom; of these, just 45.5% were aware of its protective benefit against infection. The major constraint to condom promotion was concern that it would undermine the sexual norms of the country. Reduction in sensation and doubts about its preventive efficacy were further constraints. Nonetheless, over 21% approved of condom promotion among high-risk groups.

## Perceptions du préservatif comme méthode de prévention du VIH au Yémen

**RÉSUMÉ** Une analyse de la situation relative au VIH/SIDA a été réalisée au Yémen en 2002 pour évaluer les connaissances et attitudes concernant le préservatif masculin en tant que moyen de prévention du VIH. Des données ont été recueillies auprès de 3 groupes : la population générale, un groupe minoritaire marginalisé et des Yéménites rentrant au pays après une longue période de travail à l'étranger. Seuls 51,3 % avaient déjà entendu parler du préservatif masculin ; et parmi ces derniers, seulement 45,5 % étaient conscients de l'intérêt du préservatif dans la protection contre l'infection. La contrainte majeure pour la promotion du préservatif était la crainte qu'il n'affaiblisse les normes sexuelles du pays. La diminution des sensations et les doutes sur son efficacité préventive constituaient d'autres contraintes. Néanmoins, plus de 21 % approuvaient la promotion du préservatif dans les groupes à haut risque.

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## Introduction

Yemen is listed among the 20 least developed countries in the world. Some of the available development indicators for 2001 were as follows: a population of 18.9 million growing at 3.5% per annum, GDP per capita of US\$ 492 and illiteracy rates of 50% and 65% for men and women respectively [1]. Infant and under-5 mortality rates have been reported at 75 and 102 per 1000 live births respectively, with maternal mortality at 365 per 100 000 [2]. Other data indicate only 50% of the population have access to essential drugs, just 22% are attended by skilled health personnel [3], and only 45% have adequate sanitation facilities [4]. A 1998 household budget survey found that 17.6% of the population were living below the food poverty line, and 41.8% were living below the upper poverty line, being unable to obtain both their food and non-food requirements: clothing, shelter, health education and transport [5].

Yemeni culture is strongly influenced by Islamic values, with extramarital sex being considered extremely shameful and stigmatizing for the individual and even the family. Sex between men is also taboo, although the anecdotal indications are that traditional sanctions against it may be less severe than those against extramarital heterosexual relations (for instance, reported instances of "honour killing" mostly in the past, were almost invariably for heterosexual relations). Despite this culture, many health care providers have admitted to seeing increasing numbers of patients with symptoms consistent with sexually transmitted infections (STIs), and the phenomenon of men having sex with men is known to exist in the country. There are no indications of the occurrence of injecting drug use in the country.

The prevalence of human immunodeficiency virus (HIV) infection in Yemen

remains unknown because, to date, no seroprevalence studies have been undertaken. The cumulative number of cases reported to the National AIDS Programme (NAP) was 1379, as of December 2003 [6]. There are indications that because of stigma and harassment, including police arrests in the past, people who know or suspect themselves to be HIV-infected, avoid testing if they can. This fact, together with the still limited capacity to diagnose HIV in the health services, would suggest that the cases notified to the NAP are just the tip of the iceberg.

Globally, condoms are an important option in the fight against HIV/AIDS. Solid epidemiological studies have shown that condoms are effective for HIV prevention, and consistent use can reduce transmission probability by as much as 95% [7]. These include studies carried out among sero-discordant couples [8,9] and studies done in countries such as Uganda where a decline in HIV rates has been well documented and condoms have been an integral part of the success story [10].

A study conducted during 2002, with the joint support of the United Nations Development Programme (UNDP), the World Health Organization (WHO) and the Yemeni NAP provided an opportunity to explore perceptions of this important method of HIV prevention in the Yemeni context. Because of still limited availability and familiarity with the female condom in the country, the study's focus on condoms was limited to the male condom. This paper presents some of the findings of the study.

## Methods

The study was conducted in the 4 governorates of Hodeidah, Taiz, Aden and Hadramawt. The 4 were selected by the NAP because, along with Sana'a city which

was covered by an earlier study, coordination mechanisms for execution of the study existed in these areas. In addition, the increasing numbers of diagnosed cases indicated vulnerability of the population in these governorates to HIV/AIDS. Data were collected during June–August 2002, using both qualitative and quantitative methods. Qualitative findings were factored into modifications of the quantitative survey questionnaire.

### Study population

Respondents were selected from the general population from both rural and urban areas and included married and single individuals as well as students and out-of-school youth. In addition to the general population, other groups recognized as vulnerable or high-risk groups were included in the study. These were returnee families, truck drivers, fishermen, members of the marginalized group *Al Akhdam*, women engaged in commercial sex (CSWs) and men who have sex with men (MSM). For the purposes of the study and this paper, the term “marginalized group” is used to refer to the group name *Al Akhdam*, as this name is considered offensive by some in the group. Returnee family respondents were operationally defined as those who either themselves or at least one of their parents had returned to Yemen after a period of more than 4 years outside the country. This was intended to exclude those who had been out of the country on short visits or for academic courses. Additionally, for the qualitative data, national and governorate level policy-makers and health service providers were also recruited.

Respondents were aged 15 to 49 years and gave verbal consent to participate in the study. In addition, in consideration of local culture, the permission of the responsible male relative, if available, was sought for females and adolescent respondents.

### Qualitative methods

These consisted of 49 key informant interviews and 45 focus group discussions (FGDs). The selection of these respondents was different from that for the quantitative survey, which followed 2 months later. Key informants were interviewed individually and were selected either because they were accessible and representative or because they were very knowledgeable of the groups under study. National and governorate level policy-makers and reproductive health service providers were also selected as key informants. Further categorization of target groups included: in-school and out-of-school young people, and married men and women. Selection was made in such a way as to ensure that, availability permitting, these categories were accessed in all the governorates, in both urban and rural areas. CSW and MSM individuals were selected as key informants through networking with knowledgeable resource persons in the communities, and using individuals identified to establish contact with others of a similar lifestyle.

Key informants were interviewed in a variety of convenient and feasible locations that guaranteed privacy of the discussions and where the informants were at ease. These locations ranged from offices, restaurants, hotels or public parks.

The FGDs consisted of 8–12 participants of similar sex, marital status, rural or urban residence or residence in identified target group communities. In addition, separate FGDs were conducted for in- and out-of-school youth, with different groups for either sex. Local mobilizers helped in identifying participants in each location who were willing to participate in the FGD sessions.

Both key informant interviews and FGDs were moderated using topic guides that covered perceptions of condoms, along



with care and support to people living with HIV/AIDS, observed sexual risk behaviour in the communities, factors related to HIV/AIDS vulnerability, as well as attitudes to potential local HIV/AIDS interventions. The interviews and FGDs were conducted by social science/public health personnel who were selected and trained by the principal investigator. Interviews and discussions were conducted by personnel of the same sex as the key informants, except for the CSWs because the female personnel were reluctant to interview them.

FGD proceedings were recorded in writing by recorder personnel, as well as by audio cassette, with the permission of the participants. Only written notes were taken during key informant interviews. Following the interviews and discussions, the notes were rewritten comprehensively, and submitted to the principal investigator. Audio tape recordings were transcribed and also reviewed by the principal investigator in order to transform the initial FGD recorder notes into session reports that were entered into a word processing program (Microsoft Word) for analysis. Key informant interview reports were similarly entered into the program and all the data were coded, sorted and analysed in terms of the initially conceived themes as well as the ones that emerged as the study proceeded.

### Quantitative methods

This was based on a household survey of 2579 respondents of whom 2534 were Yemeni nationals, categorized into 3 groups—the general population per governorate and 2 vulnerable groups (returnee family group and marginalized group). The remaining 45 respondents were foreign nationals whose number was too small to make any meaningful comparison with the Yemeni population sub-groups. A target minimum sample size for each category overall was derived

from the formula:  $N = Z^2pq/d^2$  with the level of significance set to 5%. A study questionnaire was developed by the principal investigator, also drawing from standard questions used in international studies by an international behavioural surveillance toolkit [11]. The questionnaire was revised to respond to emerging qualitative findings and pre-testing. The questionnaire covered background and demographic data, mass media access, awareness of HIV/AIDS and other STIs as well as known sexual risk behaviour by others in the communities, reported first hand to the respondent by those who had engaged in it. This “third party” determination risk behaviour was done because it did not appear likely that all individuals would correctly report their own risk behaviour in an interviewer-administered questionnaire.

Stratified, multistage random sampling was used for the general population sample, starting by the selection of 2 urban and 3 rural districts (*mudiriyat*) in each governorate, followed by selection of 2 parishes (*oslah*) in each district. Thereafter, in each selected parish 2 villages were taken; 1 at the centre of the parish and another randomly selected at least 1 km away. In the case of large cities, zones and quarters (*ahia*) represented parishes and villages respectively.

Because of their settlement patterns, and the need to execute the study within a narrow time frame, for the marginalized group and returnee family members, purposive sampling was used with known large settlements of the groups being identified and sampled. This resulted in a relative overrepresentation of urban respondents for these groups, something that was borne in mind during rural/urban comparison analysis.

In each selected village or settlement, interviewers travelled in randomly determined but perpendicular directions, in-



interviewing 1 respondent of their sex per household. Where there was more than 1 willing eligible respondent, just 1 was selected by casting lots. After interview, 3 subsequent household(s) were skipped in the general population and 1 was skipped in the returnee and marginalized groups sampling.

The completed questionnaires were reviewed for completeness and subsequently entered into SPSS, which was used in the quantitative analysis.

## Results

### Awareness of HIV/AIDS and other STIs

The vast majority of respondents in the 3 groups sampled in the quantitative survey (general population, returnee family group and marginalized group) had ever heard of HIV/AIDS (84%–92%), but specific knowledge of modes of transmission of HIV was lower (67%–89%). This was further indicated by concurrently high levels of false beliefs such as HIV being transmittable by touch, clothing, sharing a meal and mosquitoes, held by 24%–58% of those who had ever heard of HIV/AIDS. More males, urban residents and those who had ever attended school knew of these diseases than females, rural residents and school non-attenders and the difference was statistically significant ( $P < 0.001$ ) (Table 1).

### Prevailing sexual risk behaviour

There was almost complete consensus among key informants and FGD participants that sexual risk behaviour was on the increase. Reproductive health care service providers were also more or less unanimous that they were witnessing an increase in the frequency of patients with symptoms consistent with STIs.

*“Life has changed. In the past we heard about all these behaviours but not as much as today.... [Now] everything is done openly. Nobody cares if it’s right or wrong.”* Female secondary school student FGD.

From analysis of the qualitative data, growing poverty, a sociocultural transition, variations in the sexual subcultures between sections of the Yemeni population, and population movements including a migrant worker tradition, emerged as the factors underlying sexual risk behaviour.

The quantitative survey indicated that in the general population, 19.2% of males had been told personally by another male that such a male had had extramarital sex (heterosexual) over the preceding 12 months. In addition, 8.8% of males had first-hand knowledge of others who had had sex with other males over the same period. Rates of male-reported third-party risk behaviour were higher among respondents from returnee and marginalized families, although this was only statistically significant for reports of MSM (Figure 1). The quantitative survey also revealed that 6.4% of all males had had an abnormal genital discharge over the preceding 12 months, this rate rising to 24.0% for female respondents, although this would be less specific for STI than for males [12].

### Awareness of male condoms

Apart from the general population, where 51.3% had heard of the male condom, less than half of the respondents in any of the population groups sampled had heard of it. At 36.3%, this awareness was significantly lower among respondents from the marginalized group ( $P < 0.001$ ). Furthermore, in all respondent categories, no more than 45.5% of all those who had ever heard of the condom knew that it could also prevent STIs.

Table1 Distribution of respondents as regards awareness, use and support of condoms by sex, residence and schooling

Variable	Sex (n = 2534)			Residence (general population respondents only) (n = 1607)			Ever attended school (n = 2534)		
	Males %	Females %	P-value	Urban %	Rural %	P-value	Yes %	No %	P-value
<i>Awareness</i>									
Ever heard of HIV/AIDS	94.2	80.5	< 0.0001	90.5	81.0	< 0.0001	93.8	72.5	< 0.0001
Ever heard of the male condom	55.6	41.0	< 0.0001	55.0	45.3	< 0.0001	55.8	31.3	< 0.0001
Heard of the male condom and know it can prevent STIs	44.0	41.3	0.358	39.8	45.2	0.135	44.2	37.1	0.045
Mentioned male condom among known family planning/birth spacing methods	22.9	14.1	< 0.0001	23.1	18.4	0.028	23.3	7.6	< 0.0001
<i>Use in preceding 12 months</i>									
Used a method of family planning/birth spacing in previous 12 months	23.7	35.7	< 0.0001	30.8	28.9	0.276	30.4	29.1	0.347
Used a male condom for family planning/birth spacing in previous 12 months	13.4	9.6	0.256	14.0	7.8	0.156	11.9	8.3	0.225
Used male condom for any reason during previous 12 months (married respondents only (n = 1586))	6.0	6.3	0.913	8.2	3.6	0.004	7.8	3.5	< 0.0001
<i>Support promotion of condom use</i>									
Supported condom promotion for those persisting with extramarital sex	24.2	23.0	< 0.0001	23.4	17.3	0.009	25.5	19.4	< 0.0001

STI = sexually transmitted infection.

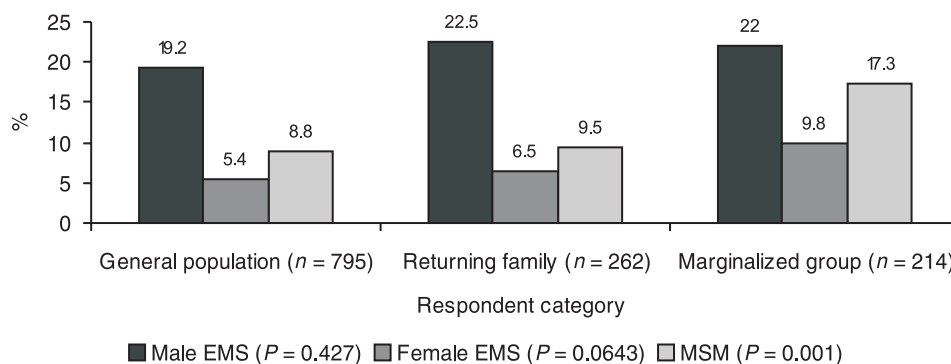


Figure 1 Known sexual risk behaviour by others (third parties), known first hand, and as reported by males (EMS = heterosexual extramarital sex, MSM = men having sex with men)

Overall, therefore, the fact that a condom could prevent STIs was known by less than 23% of all respondents in any respondent category (Figure 2).

Condom awareness was further examined by sex, residence and schooling. Awareness of the male condom, both by having heard of it and by knowing it as a method of family planning was significantly higher among males and those who

had ever been to school. The difference by residence was examined only among general population respondents (to avoid the potential urban over-representation resulting from the purposive sampling of the other 2 population groups sampled). This yielded a significantly higher awareness of condoms among the urban than rural general population respondents, 55.0% and 45.3% respectively ( $P < 0.001$ ) (Table 1).

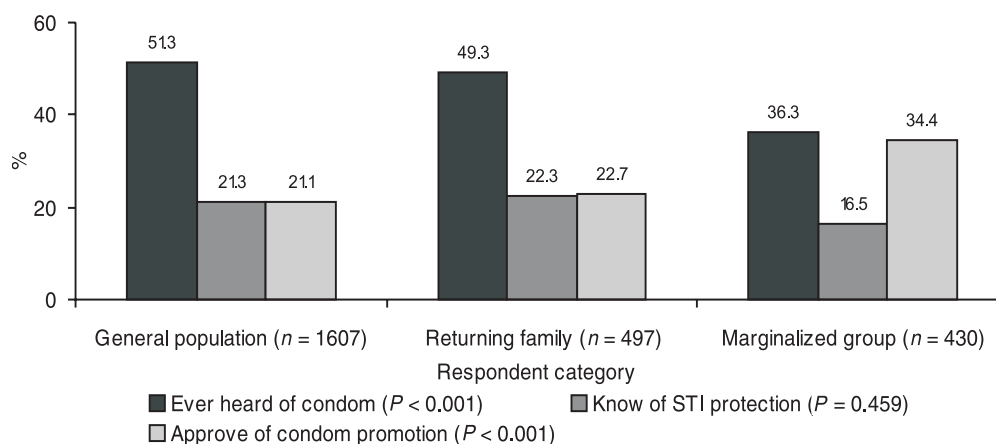


Figure 2 Awareness of condoms and approval for their promotion by respondent category

### Knowledge of sources of and access to condoms

From the qualitative data, most key informants and FGD participants in the urban areas knew where condoms could be obtained. However, there were barriers of cost reported for the poor, as well as the requirement of marital status verification before issue of condoms at some government health facilities. This latter requirement effectively excluded many members of high-risk and vulnerable groups from access to the lowest cost condoms.

Quantitative survey findings indicated that pharmacies were the most widely known source, more often named than all other sources, including various categories of health facilities combined. Despite the higher cost, pharmacies were also the most frequent source of the last condom used, again more often used than all the other sources combined. There were no statistically significant differences in awareness of the various sources by respondent category (Figure 3).

### Use of condoms

Qualitative findings indicated that condom use was rare even among the high-risk groups, with the possible exception of some female sex workers in 1 city.

*"Many people don't like to use the condom. I find myself forced to do it [sex] without a condom."* Female sex worker key informant.

*"No one is using the condom with me because I know my clients very well we trust each other."* Female sex worker key informant.

*"There are some girls who carry condoms in their handbags. I have practised sexual intercourse with one of those girls. She asked me to use it but I refused."*

*I think most people don't use condoms because they don't like [them]."* High risk heterosexual male key informant.

*"I don't use a condom at all. I don't know what it is."* Man who has sex with men key informant.

*"No one is using the condom with me, because people who engage in risk behaviour don't feel enjoyment if they use condom. I never used it and no one has used it with me. .... I never thought about it."* Man who has sex with men key informant.

Despite the indicated low level of use, several health care providers reported a noticeable increase in uptake of condoms for family planning. There were reports that some among the rich and educated were using condoms more readily than the rest of the population.

*"There are a lot of married and educated youth using the condom because they care about their health. It is a good idea to use condoms, and there will be no problem [with the policy] except it doesn't give you enjoyment during sex."* Returnee family male FGD participant.

There was also open demand for a good quality condom supply and condom education from some members of the vulnerable groups such as fishermen in 1 coastal city.

From the quantitative survey, it emerged that only 2% of the total survey sample had used a condom for any reason in the preceding 12 months. This rate rose to 6% of those who had ever been married, and among users of modern family planning methods 9% had used a condom in the previous 12 months. Condom use for family planning or otherwise was reported more frequently by males, those who had ever been to school, and for urban dwellers amongst the general

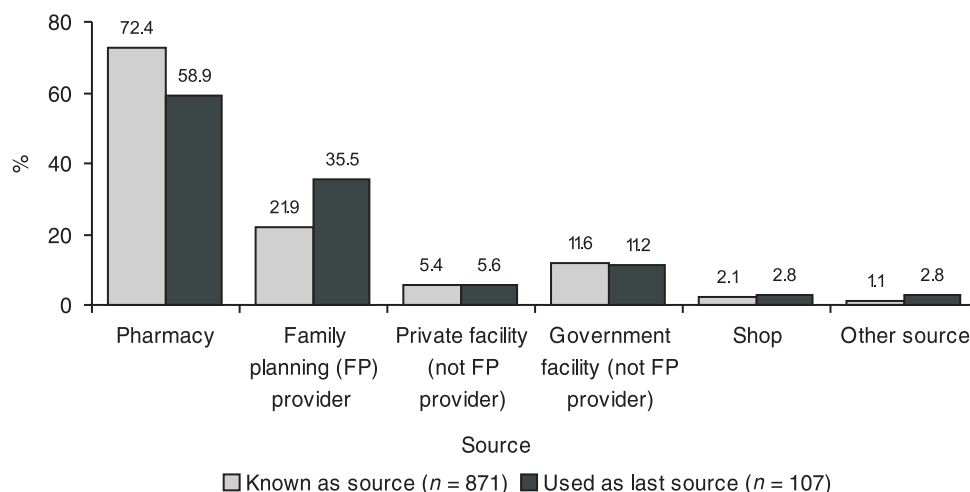


Figure 3 Knowledge of source of condoms (all respondents) and source of last used condom (among those who had ever used)

population respondents. However this was only statistically significant for those living in urban areas and who had ever been to school (Table 1).

#### Overall constraints to condom use

The commonest reported constraint to condom use among high-risk individuals was the experience of reduced pleasure, reported by both male and female informants.

*"Condoms are not being used at all by truck drivers because people are not aware of how to use them, and if they use them they don't feel enjoyment."* Truck driver key informant.

*"People who pay for sex don't normally use the condom. They say 'we pay money to enjoy ourselves, with the condom there is no enjoyment'."* Female sex worker key informant.

More generally, some respondents opposed the promotion of condoms for HIV control because they were not even 100% safe for birth control, let alone HIV prevention.

*"There is no benefit from this condom, because it is not even [fully] safe for family planning. How could it be safe for prevention of AIDS?"* Urban married man FGD participant.

*"If the condom is not safe for family planning how can we use it to protect ourselves from AIDS?"* Rural married woman FGD participant.

Some fishermen also complained of frequent breakage of condoms, raising questions about the quality of the condoms available to end-users in the hot coastal areas. Other respondents occasionally

mentioned the belief that repeated use of condoms would lead to genital irritation, infection and even cancer in women.

### Opposition to condom promotion

Most FGD participants and key informants opposed the idea of promoting the use of the condom for HIV/AIDS and other STI prevention in the country. Dissemination of information on any benefits of condom use was opposed because of the belief that such awareness would remove the fear of the negative consequences of extramarital sex, such as pregnancy and disease, leading to an increase in such behaviour. Dissemination of such information was seen to undermine the traditional deterrents to “illegal” sex, namely the threat of these negative consequences. For some people holding such views, any increase in condom use, even among high-risk groups such as MSM, would be a negative development.

Some respondents, including well educated youth, even believed that condom promotion would result in a net increase, instead of a decrease in STIs.

*“No, we should not encourage the use of condom or the spread of condom because this can cause the spread of diseases and other dangerous behaviours. No, it is forbidden. It is not allowed”* Female university student FGD participant.

*“When someone uses a condom as prevention against AIDS, this indirectly helps in the spread of AIDS and other wrong behaviours”* Urban woman FGD participant.

For a large section of the population that included health care providers, preserving the morals and the traditional sexual norms was of greater importance than preventing the spread of HIV. If HIV reduction interventions reduced the spread of infection

but left the rate of “illegal” sex higher, this would be a negative development, in their view.

*“In our country we don’t need the condom at all. We should not worry about AIDS more than we worry about its cause which is illegal sex. Instead of educating people on condom use, you should educate them to stop “illegal” sexual behaviour... We must not educate people that “illegal” sex is forbidden, then [after that] educate them that you can practise it with a condom.”* Urban married man FGD participant.

*“Socially, we are against this idea of condom use, because you are trying to solve the problem by using its very cause! If AIDS is a result of “illegal” sex behaviours, we [would be] increasing the level of this behaviour by providing condoms. There is no need to open doors that are going to create a lot of problems in the community. With this policy you are calling us to follow the West and forget about our faith, religion and traditions.”* Policy-maker key informant.

*“Those who are engaged in bad behaviour will accept it [the condom], even if there is a poison in it. But why do you make what is haram (sinful) in Islam, halal (acceptable)?”* Health care provider key informant.

The sentiment of the need to “protect” people from condom promotion was such that, in one FGD, it was even recommended that any condom use among couples where 1 partner was already infected with HIV, be kept secret, so that knowledge of such use would not spread to the rest of the community. In several FGDs, stern enforcement of laws against sexual risk behaviour by the government, rather than disseminat-



ing information on the condom's potential protection, was seen as the most important step to take to control the spread of HIV. In another FGD, it was even recommended that the government should punish people promoting condom use for "increasing illegal sex" in the community.

### **Health care providers and condom promotion**

Support for condom promotion was more frequently voiced among health care providers than other respondents, and in all the governorates many of them expressed readiness to participate in educating people about condoms. They saw the obstacles faced as surmountable, just as those against other modern methods of family planning had been overcome in the past. Experienced health care providers, who often saw cases of STI on a regular basis, more readily recognized the necessity for condom promotion.

However, there was a perception that making extramarital sex safer was tantamount to legitimizing it, leading to a conscious decision by some health care providers to withhold information on the STI-protective benefits of condoms from their clients. In one FGD of health sector policy-makers, the group was so sharply divided on this issue that there was danger of the discussion turning violent, and some participants finally walked out in protest.

*"If 'illegal' sex is forbidden in our religious guidelines, how can we encourage condom use? Do you want us to tell people who want to have 'illegal' sex to use the condom in order to prevent AIDS? This is unbelievable."* Health sector policy-maker FGD participant.

Another constraint was that most health care providers had inadequate skills and

lacked the necessary tools (such as dildos) to demonstrate correct condom use. Shyness and fear of the stigma that could be attached to someone promoting or demonstrating details of condom use were also evident.

*"If one goes into details [of steps of proper condom use], the clients will imagine that the provider is not a good person, that she is probably promiscuous, and that she is also encouraging the wives to engage in bad behaviour ['illegal' sex]." Midwife trainer key informant.*

Furthermore, because most of the reproductive health service delivery is done by female providers, information provided on condom use in reproductive health settings would have to be mediated via the females in order to reach their male partners. This indirect route could jeopardize the accuracy of the information that would eventually reach the males.

### **Broader support for condom promotion**

Despite widespread opposition to condom promotion, there was at least a minority of participants in almost all FGDs supporting it, at least for high-risk individuals. Even in FGD sessions where the opposition was very strong, recognition of the difficulty in getting all individuals engaged in risk behaviour to stop it, led to expressions of tolerance for condom promotion, if it was limited to high-risk groups.

*"If the condom is going to be distributed in special places, such as those that deal with commercial sex work, it is no problem because it is not easy to stop them. But giving condoms to those people should be followed by health education on the dangers of these diseases"* Urban married man FGD participant.

*“For those perverts [who have extramarital sex] if we offer the condom, it is good. But more important than the condom is poverty reduction and health education, especially in secondary schools.”* Female reproductive health service provider FGD participant.

In the quantitative survey, respondents were asked whether condom promotion ought to be carried out for individuals who persist with extramarital sex, as is done in some other countries, as part of routine interventions, especially those targeting high-risk and vulnerable groups. Over one-fifth of respondents in each of the 3 main categories supported such condom promotion. At 34.4%, this support was highest among the marginalized group, and overall, was significantly higher among males, those who had attended school and among the urban general population respondents (Table 1, Figure 1).

## Discussion

Globally, constraints to condom use are similar across countries and continents and include factors such as reduced sensation, concerns on reliability, unavailability or inaccessibility, low-risk perception, as well as psychological and social factors including gender relations [13]. Various combinations of these factors have been reported by studies from Jamaica [14], Uganda [15,16], Australia [17], China [18] and the USA [19,20].

Our study reveals a low awareness of the condom in general and of its STI protective benefit in particular, co-existing with low levels of use in a context of consistent reports of increasing occurrence of sexual risk behaviour, even in the general population. The study finding that 19.3% (close to 1 in 5) of general population males had been

told first hand of heterosexual extramarital sex by other participating males over the preceding 12 months indicates a significant occurrence of sexual risk behaviour. Even among those individuals who knew of the condom's STI prevention benefit, knowledge of the correct steps of its proper use was very limited. Given the consistent reports from both key informants and FGDs, that sexual risk behaviour was on the increase, it is important to find a culturally acceptable role for the condom in the prevention of HIV/AIDS and other STIs.

Given the broader scope of the study, full exploration of the effect of socio-economic factors in condom awareness and use was not possible. However, the lower awareness found among women, the less educated and rural residents highlights the need to address this disparity in knowledge and the consequent vulnerability of these groups of the population. That the difference in reported condom use by sex was not statistically significant, suggests that most condom use may be between males and females, even though the method might still be male-driven or male-led.

Pharmacies were the most frequently known source of condoms, and they were the most frequent source of the last condom used. The popularity of pharmacies indicates readiness of the Yemeni population to access condoms through social marketing approaches, and these are already being exploited. The greater degree of anonymity for the buyer and the longer opening hours of pharmacies compared with health facilities are some of the advantages of this source.

The strong sentiments expressed against condom promotion indicate the need for any efforts at promotion to pay due attention to these sensitivities. Nonetheless, considering the conservative cultural context and low awareness, the fact that over one-fifth of the

respondents supported condom promotion indicates potential for increased acceptance with more sensitization. The general increase in acceptance of modern family planning methods over time supports this impression.

The levels of sexual risk behaviour and syndromic symptoms of STIs found by our study indicate that the condom is likely to remain a much-needed weapon in the arsenal against HIV/AIDS in the country, at least in the short and medium term. Opponents of condom promotion include health sector policy-makers and service providers. However, because some members of these groups have already resolved the conflicts in their own minds and come out in favour of condom promotion, it is reasonable to assume that debate and discussion among health professionals could result in the identification of acceptable ways for their participation in condom promotion and distribution activities. This could be enhanced by highlighting that the use of condoms by individuals engaged in risk behaviour would protect the "innocent" spouses of these individuals and their unborn children who are not party to such behaviour. Because the condom has increasingly become accepted as a method of birth control, it

is possible within this context to increase awareness of its proper use, and its STI-protective benefit, without unduly offending cultural sensitivities. Indeed the national HIV/AIDS strategy, approved by the Cabinet in December 2002, takes the approach of "complementing traditional cultural and religious values, such as abstinence and marital faithfulness, with information on the protective benefits of the condom in settings of risk behaviour" [21]. Nonetheless there are significant challenges to the use of the condom for HIV/AIDS prevention in Yemen as illustrated by our study which need to be addressed and any efforts to promote its contraceptive and STI prevention benefits must take account of cultural sensitivities.

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# What do medical students in Alexandria know about female genital mutilation?

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## ماذا يعرف طلاب طب الإسكندرية عن تشويه الأعضاء التناسلية للأنثى؟

سها راشد عارف مصطفى، نادية عبد المنعم الزيني، سلوى السيد عبد الحليم طایل، إيمان إبراهيم مبارك

**الخلاصة:** قام الباحثون باستطلاع معارف ومعتقدات ومواقف 330 طالباً بالسنة الخامسة بكلية الطب، في جامعة الإسكندرية، حول تشويه الأعضاء التناسلية للأنثى. وأظهرت الدراسة قصوراً واضحاً في المعارف الأساسية للطلاب بشأن ممارسات تشويه الأعضاء التناسلية للأنثى، حيث يتبين أنهم لا يدركون مدى انتشار هذه الممارسة في مصر، وما تنطوي عليه من ممارسات وإجراءات، فضلاً عن ضعف معلوماتهم حول مضاعفات تشويه الأعضاء التناسلية للأنثى، والجوانب الأخلاقية والقانونية المرتبطة بها في البلاد. ونتيجة لذلك أيدَّ 52.0% من الطلاب مواصلة هذه الممارسة، في حين أيدَّ 73.2% منهم ضرورة «إضفاء الطابع الطبي عليها» من خلال قيام الأطباء بإجرائها كاستراتيجية لتقليل مخاطرها. معظم الطلبة (86.9%) إدراج موضوع تشويه الأعضاء التناسلية للأنثى في مناهج الطب الجامعية.

**ABSTRACT** We explored the knowledge, beliefs and attitudes of 330 5th year medical students in Alexandria University towards female genital mutilation (FGM). The students' basic knowledge about the practice of FGM was unsatisfactory. Students were unaware of the prevalence of FGM in Egypt and the practices and procedures of FGM. They were also poorly informed about the complications of FGM, and the ethical and legal aspects of FGM in the country. As a result, 52.0% of the students supported the continuation of the practice and 73.2% were in favour of its "medicalization" as a strategy for reducing the risks of FGM. Most students (86.9%) thought that the issue of FGM should be incorporated into the undergraduate medical curriculum.

## Quelles sont les connaissances des étudiants en médecine d'Alexandrie concernant les mutilations sexuelles féminines ?

**RÉSUMÉ** Nous avons étudié les connaissances, croyances et attitudes de 330 étudiants de cinquième année de médecine à l'Université d'Alexandrie concernant les mutilations sexuelles féminines. Les connaissances de base des étudiants sur la pratique des mutilations sexuelles féminines étaient insuffisantes. Les étudiants ne connaissaient ni la prévalence des mutilations sexuelles féminines en Égypte, ni les pratiques, ni les méthodes utilisées pour les mutilations sexuelles féminines. Ils étaient également mal informés des complications des mutilations sexuelles féminines, et des aspects éthiques et légaux qui y sont liés dans le pays. En conséquence, 52,0 % des étudiants se prononçaient pour la poursuite de cette pratique et 73,2 % étaient en faveur de sa « médicalisation » en tant que stratégie visant à réduire les risques associés aux mutilations sexuelles féminines. La plupart des étudiants (86,9 %) pensaient que la question des mutilations sexuelles féminines devrait être intégrée au programme d'études de médecine de premier cycle.

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## Introduction

According to the World health Organization (WHO), “female genital mutilation (FGM), or female circumcision as it is sometimes known, constitutes all procedures which involve partial or total removal of the external female genitalia or other injury to the female genital organs whether for cultural or any other non-therapeutic reasons” [1,2]. The 3 main forms of FGM are:

- Type I - Excision of the prepuce with or without excision of part or all of the clitoris;
- Type II - Excision of the prepuce and clitoris together with partial or total excision of the labia minora;
- Type III - Excision of part or all of the external genitalia and stitching/narrowing of the vaginal opening (infibulation).

Worldwide some 130 million women are affected, and every year another 2 million girls and young women suffer mutilation of this sort [1,2]

Despite the battle over FGM that followed the 1994 International Conference on Population and Development (ICPD) held in Cairo, several national surveys and community-based studies have revealed that FGM remains a highly challenging public health problem in Egypt [3,4]. The Egypt Demographic and Health Survey published in 2001 revealed a nationwide prevalence of 97% among ever-married women. In addition, the survey indicated widespread support for the practice and claimed 81% of women supported its continuation. It is practised at all levels of Egyptian society irrespective of social class, educational background or religious affiliation [4].

The complications of FGM are numerous and women subjected to the more severe forms of FGM are particularly likely

to suffer from health complications requiring medical attention throughout their lives. Some complications may occur immediately or shortly after the practice is performed while others may occur years after the event. Furthermore the physical, psychosexual and psychological complications of FGM are sizeable and constitute in some countries a serious public health problem which endangers the life and health of women and children [5–7].

Over the past decade, the issue of FGM has become one of global concern. Health organizations and other advocacy groups in the countries concerned are increasingly active in trying to overcome a traditional practice that threatens the health and violates the human rights of millions of women [8].

WHO “strongly condemns the medicalization of female genital mutilation, that is, the involvement of health professionals in any form of female genital mutilation in any setting, including hospitals or other health establishments”. WHO has recognized the need for special attention to be given to the training of health workers at all levels, including health professionals (primary care providers, obstetricians/gynecologists, paediatricians, midwives and nurses) on how to deal with the complications of FGM and how to advise and prevent families from seeking FGM for their daughters [9–11].

Health workers are confronted with the issue of FGM in various ways and can have an important role to play eliminating this practice [12]. However, in order to solicit the active involvement of health workers as advocates against FGM, they should be equipped with appropriate knowledge and skills to enable them to work for its prevention and elimination and to provide clinical and psychological care and support for girls and women who have undergone the procedure, taking due account of sociocultural



and personal sensitivities [11–13]. Despite this, there are still many countries, including Egypt, where FGM is rarely mentioned or covered in detail in the training curricula of health professionals, nurses, midwives and other health workers.

The present study was conducted to explore the knowledge, beliefs and attitudes of medical students in Alexandria (future physicians) about FGM. The study also aimed to explore students' opinions about the medicalization of FGM, how the issue of FGM is dealt with in the existing undergraduate curriculum, and their suggestions concerning the content of future FGM training curricula. Perceptions of students about their future professional responsibility for combating FGM, and factors associated with support of the continuation of this practice (or being against its abolition) were also investigated.

## Methods

We conducted a cross-sectional survey of 5th year male and female medical students (Faculty of Medicine, University of Alexandria) during the university year 2003/2004. These students are supposed to have basic knowledge of medical ethics, anatomy, obstetrics and gynaecology and preventive medicine.

The total number of 5th year medical students during the university year 2003/2004 was 1091. Out of the 10 tutorial student groups (which include about 110 students), 3 were selected randomly. Thus 330 students were selected.

Data were collected through an anonymous structured questionnaire given to the study participants. The questionnaire was developed after thorough literature review of available information. The format and wording and accuracy of the translations were revised by the authors in addition

to 3 professors of community medicine at the University. Most of the questions were close-ended and precoded. Responses to open-ended questions were sorted and coded during data processing. Incomplete questionnaires were excluded from the analysis. The questionnaire was given during tutorial classes and took about 45 to 60 minutes for the student to complete.

From the questions related to knowledge, the following rating was applied:

- 0–< 50% correct answers denoted poor knowledge
- 50%–< 70% correct answers denoted fair knowledge
- 70%–100% correct answers denoted good knowledge.

For other subjective parameters (attitudes, beliefs and opinions) about FGM and its sociocultural correlates, a 3-point Likert scale was used (agree, disagree, undecided).

Data entry was conducted using Microsoft Excel spread sheets. Statistical analysis was carried out using *SPSS*, version 10. Descriptive statistics and the chi-squared test were used for analysis. Logistic regression was used to identify significant predictors of supporting the continuation of FGM (or being against its abolition). The 5% level of significance was chosen.

The objectives and purposes of the study, and the expected benefits were explained to the study participants and informed consent to participate was obtained. Approval for the study was obtained from the University.

## Results

### Personal characteristics of the medical students

Of the 330 questionnaires distributed, 298 were completed giving a response rate of 90.3%: 32 were either not completed at

all or were only partially completed and hence discarded. There were 193 for male students (64.8%) and 105 for female students (35.2%). Of these, 290 (97.3%) of the responders were Muslims, while 8 (2.7%) were Christians. The mean age (standard deviation) of the students was 21.31 (0.81) years (age range: 20–24 years). About three-quarters of the students were urban residents (77.2%). Urban slum residents (of rural origin) and rural dwellers constituted the rest (11.7% and 11.1% respectively).

### **Knowledge about FGM**

#### *Knowledge about structure and functions of female external genitalia*

The majority of students (83.6%) gave correct answers about the function of each of the five structures of the female external genitalia asked about (vaginal opening, urethral opening, clitoris, labia minora and labia majora). Out of a total score of 5, the mean (SD) knowledge score was 4.58 (1.05) denoting a good knowledge level.

#### *Definition of FGM*

Only a minority of students (5.7%) were able to define correctly what is meant by FGM (i.e. all procedures that involve partial or total removal of the female external genitalia and/or injury to the female genital organs for cultural or any other non-therapeutic reasons).

### **Opinions about FGM practices in Egypt**

#### *Magnitude of the FGM problem*

Of all students, 49.3% ranked it as a priority health problem in Egypt, 29.9% thought that it is of minor importance, while the remaining 20.8% did not have any information about its magnitude. Students tended to underestimate the extent of the problem; their estimates about its prevalence ranged

from 1% to 100%, with a mean (SD) of 65.6% (28.3%).

#### *Procedures and practice of FGM*

The most widely identified cutting instrument or tool for performing FGM was the scalpel (65.8%), followed by razor blade (47.7%), scissors (41.3%); only 12.4% mentioned metal knives.

With regard to cleaning the wound, 42.6% and 37.9% of the students thought that those who performed the procedure usually used antiseptics or alcohol respectively. Other traditional topical preparations were also mentioned, including coffee (20.5%), herbal mixtures (16.1%), ash (13.1%), lemon juice (7.0%), cow dung (6.0%), and cooking oil (5.4%). Forty-one students (13.8%) mentioned that the wound would be sutured, and 18.8% thought that nothing would be done for the wound.

Only 51.7% and 29.9% of students recognized that Type I and Type II respectively are the most common forms of FGM practised in Egypt. A minority of students (5.4%) mentioned that Type III (infibulation) is also commonly practised.

The majority of students (85.6%) believed that FGM is practised mainly by Muslims. Only 22.1% and 14.4% of students believed that that both Christians and Jews respectively also practised FGM.

Concerning the educational level and residence of those who practise FGM, nearly 73.8% of the students thought that uneducated and rural populations more likely practised FGM compared to educated (34.9%) or urban (33.9%) populations.

Over half (55.7%) of the students believed that the operation is performed by the village barber, a traditional birth attendant (53.7%), a traditional female excisor (49.3%) or a licensed midwife (41.6%). On

the other hand, 28.2% thought that physicians and nurses performed this practice.

Concerning the origin of FGM, 43.6% of the students believed that it started in sub-Saharan Africa, prior to the arrival of Islam. Others believed that the practice started in ancient Egypt (26.2%). Some believed that FGM began with the arrival of Islam in some parts of sub-Saharan Africa (22.1%).

### Knowledge about complications of FGM

Only 185 (62.1%) of the students were aware that FGM in general can cause complications, while 53 (17.8%) believed that it did not have any complications. About a fifth of the students (20.1%) did not know whether it could cause complications or not.

When complications of FGM were categorized into 4 main groups (Table 1), only 48.0% of students knew that it could cause short-term physical complications, while 38.9% knew that FGM had long-term physical complications. Psychosocial and sexual complications were reported by

62.1% and 59.1% of the students respectively. Students' knowledge was generally poor regarding different categories of FGM complications.

### Attitudes about the "medicalization" of FGM

Although over half of the students (51.3%) knew that there were no medical reasons to perform FGM, 73.2% were in favour of its medicalization. Several reasons were cited by the students to defend this opinion. The majority (90.6%) thought that it reduced the pain as the procedure could be carried out under anaesthesia. They also believed that the procedure would be carried out under hygienic conditions, thus reducing risks to the girl's health (89.9%). Half of the students (50.0%) thought that it could be a first step towards the prevention of the practice. Another 49.0% stated that if health professionals refuse, people would resort to the traditional circumciser, thus allowing more unhygienic and painful practices to be conducted. Only 43.0% of students believed that it would be unethical for a health professional to damage a healthy body in order

Table 1 Distribution of medical students according to their awareness and knowledge of the complications of female genital mutilation (FGM)

Complications of FGM	Students' response (n = 298)			Knowledge level (mean proportion of correct answers) <sup>a</sup>
	Yes No. (%)	No No. (%)	Don't know No. (%)	
Short-term physical complications (9 items)	143 (48.0)	36 (12.1)	119 (39.9)	Fair (55.3%)
Long-term physical complications (11 items)	116 (38.9)	53 (17.8)	129 (43.3)	Poor (30.8%)
Psychosocial complications (9 items)	185 (62.1)	26 (8.7)	87 (29.2)	Poor (44.3%)
Sexual complications (4 items)	176 (59.1)	23 (7.7)	99 (33.2)	Poor (43.7%)
All complications (33 items)				Poor (42.7%)

<sup>a</sup>Rating of knowledge scale: 0–< 50% correct answers denotes poor knowledge, 50%–< 70% correct answers denotes fair knowledge, and 70%–100% correct answers denotes good knowledge.

to prevent the potential of more damage if the practice were carried out within the community.

### Knowledge and attitudes about the ethical and legal aspects of FGM

The majority of the medical students had little knowledge about the ethical and legal aspects of FGM. Only 27.9% of the students recognized that performing FGM by a physician or a nurse violates the medical and nursing ethical principles of “do no harm” and “do not kill”. Furthermore, only a minority (16.8%) were aware that the Egyptian law does not permit the performing of FGM by non-physicians.

Regarding the prevention of FGM by law, 22.8% considered that a specific law was enough to protect girls from the practice, while 24.5% thought that laws alone would not stop the practice. More than half of the students (52.7%) thought that laws must go hand-in-hand with community

education about FGM in order to stop the practice.

### Knowledge and attitudes about the religious aspects of FGM

Students were asked to give their opinions about 13 statements giving different views about the religious aspects of FGM. The average percentage of correct answers (for the 13 items) was 55.6% denoting a “fair” level of knowledge. Although 43.6% of the students knew that FGM is a pre-Islamic tradition, a considerable proportion of the students still had some confusion about the religious basis of FGM.

### Knowledge and attitudes about human rights and FGM

Only 44.6% of the students considered FGM a violation of human rights of girls and women. Table 2 reveals that there were no significant differences between the opinions of male and female students on FGM

Table 2 Medical students' opinions on how female genital mutilation (FGM) violates the human rights of girls and women by sex

Statement <sup>a</sup>	Affirmative responses (those who agreed) (n = 298) No. (%)	Male students (n = 193) No. (%)	Female students (n = 105) No. (%)	$\chi^2$ (P-value)
FGM damages the health of girls and women (physical, sexual and mental health)	130 (43.6)	84 (43.5)	46 (43.8)	0.002 (0.962)
FGM is associated with gender inequalities	101 (33.9)	64 (33.2)	37 (35.2)	0.131 (0.717)
FGM is a form of discrimination against girls and women	81 (27.1)	57 (29.5)	24 (22.9)	1.532 (0.216)
FGM is torture, a cruel, inhuman, or degrading treatment of girls and women	136 (45.6)	81 (42.0)	55 (52.4)	2.972 (0.085)
FGM is an abuse of the physical, psychological and sexual health of girls and women	133 (44.6)	82 (42.5)	51 (48.6)	1.019 (0.313)

<sup>a</sup>Students' responses were categorized into: agree, disagree, undecided.

as a violation of the human rights of girls and women.

### Sources of knowledge about FGM

A total of 40.6% of the students reported that no specific source of knowledge and information about FGM was available to them. On the other hand, 59.4% of the students cited the mass media (television, radio, newspapers, magazines, etc.) as the

source of information, 39.3% cited the Internet, 38.6% cited relatives and 37.6% immediate family members. Existing medical curricula were mentioned as a source of information by only 21.5% of students.

### Students' personal beliefs and attitudes toward FGM

As shown in Table 3, considerable proportions of students had favourable attitudes

Table 3 Medical students' personal beliefs and attitudes regarding female genital mutilation (FGM) by sex

Statements <sup>a</sup>	Affirmative responses (those who agreed) (n = 298) No. (%)	Males (n = 193) No. (%)	Females (n = 105) No. (%)	$\chi^2$ (P-value)
FGM:				
prevents a baby's death	17 (5.7)	15 (7.8)	2 (1.9)	4.352 (0.037)*
ensures a girl's virginity	61 (20.5)	44 (22.8)	17 (16.2)	1.824 (0.177)
increases chances of marriage	48 (16.1)	36 (18.7)	12 (11.4)	2.626 (0.105)
is an essential part of our culture	101 (33.9)	74 (38.3)	27 (25.7)	4.840 (0.028)*
prevents the external genitalia from growing	72 (24.2)	39 (20.2)	33 (31.4)	4.673 (0.031)*
helps the genitalia to be kept clean	105 (35.2)	74 (38.3)	31 (29.5)	2.317 (0.128)
makes a girl more beautiful	59 (19.8)	47 (24.4)	12 (11.4)	7.153 (0.007)*
prevents promiscuity in girls	147 (49.3)	98 (50.8)	49 (46.7)	0.460 (0.498)
maintains a girl's chastity	141 (47.3)	101 (52.3)	40 (38.1)	5.529 (0.019)*
is a religious obligation	91 (30.5)	60 (31.1)	31 (29.5)	0.078 (0.779)
is performed to please a husband	53 (17.8)	42 (21.8)	11 (10.5)	5.923 (0.015)*
improves the fertility of a woman	33 (11.1)	26 (13.5)	7 (6.7)	3.198 (0.074)
in its mild form (cutting only the clitoris) does not lead to any complications; it is therefore acceptable	153 (51.3)	95 (49.2)	58 (55.2)	0.985 (0.321)
In its severe form (cutting all external genitalia) is harmless; people should be allowed to continue	32 (10.7)	15 (7.8)	17 (16.2)	5.028 (0.025)*
is not a health issue	193 (64.8)	57 (29.5)	144 (41.9)	4.645 (0.031)*
is a violation of human rights	133 (44.6)	78 (40.4)	55 (52.4)	3.941 (0.047)

<sup>a</sup>Students' responses were categorized into agree and disagree.

\*Significant at  $P < 0.05$ .

toward FGM in general. More than half of the students (55.4%) did not believe that FGM violated the human rights of girls and women, 51.3% believed that mild forms of FGM (cutting only the clitoris) did not lead to any complications and was therefore acceptable. Nearly half of the students (49.3%) believed that FGM prevented promiscuity in girls, 47.3% believed it maintained the chastity of girls and 35.2% believed that it helped the genitalia to be kept clean. Another 33.9% believed that FGM was an essential part of our culture, and a religious obligation (30.5%). On the other hand, 64.8% the students did not consider FGM a health issue but rather a sociocultural issue deeply rooted in our community and hence doctors have no role in its prevention or elimination.

In most of the statements inquiring about students' personal beliefs, female students significantly expressed a more negative attitude toward FGM compared to their male colleagues (Table 3).

### **Opinions on FGM within the medical curricula**

A considerable proportion of the medical students admitted that the existing curricula do not provide them with adequate basic knowledge and skills related to FGM. Hence they lack sufficient knowledge and information about: FGM procedures and complications (66.8%), the underlying sociocultural beliefs behind this tradition (62.1%), and the ethical and legal aspects of FGM (66.8%).

They also mentioned that the existing curricula do not provide them with: sufficient clinical training to manage girls and women with physical complications of FGM (72.5%), sufficient clinical skills to identify psychosocial and sexual complications of FGM (68.1%), sufficient communication skills to counsel girls and women suffering

from psychological and sexual problems related to FGM (66.4%), nor sufficient communication skills to educate families and community members against this harmful practice (61.7%).

The majority of students (86.9%) agreed that the issue of FGM should be incorporated into the undergraduate medical curriculum. Out of all the students, 86.6% thought that this would inform future physicians about the complications of FGM and how to manage them. More than two-thirds (67.1%) also believed that incorporating FGM into the curriculum would contribute to the eradication of FGM by providing doctors with the knowledge and skills necessary for educating families and communities, and would motivate future physicians to oppose medicalizing FGM (53.7%). In order to fulfill their role properly as opinion leaders and agents of change, 78.2% of students considered that health workers at all levels should receive appropriate training on the issue of FGM adapted to their specific needs.

### **Attitudes toward behaviour change**

Of the 298 students interviewed, 48.0% supported abolishing FGM, while the remaining 52.0% supported its continuation. As shown in Table 4, the percentage of female medical students who were against this custom was insignificantly higher than that of males (52.4% compared to 45.6%,  $\chi^2 = 1.556$ ,  $P = 0.456$ ).

As future physicians, just over half the students (52.3%) thought that they could contribute to abolishing this harmful practice. However, 31.9% intended (as future fathers/mothers) to subject their daughters to FGM. While still students, 41.9% said they would object to a family member subjecting their daughter to FGM and 46.6% would actively advise them against it.



Table 4 Medical students' attitudes of toward behaviour change by sex

Statements <sup>a</sup>	Affirmative responses (those who agreed) ( <i>n</i> = 298)	Males ( <i>n</i> = 193)	Females ( <i>n</i> = 105)	$\chi^2$ ( <i>P</i> -value)
	No. (%)	No. (%)	No. (%)	
FGM should be abolished	143 (48.0)	88 (45.6)	55 (52.4)	1.254 (0.263)
Medical students (future physicians) can contribute to the abolition of this harmful practice	156 (52.3)	93 (48.2)	63 (60.0)	3.805 (0.051)
I intend (as a future father/mother) to subject my daughters to this practice	95 (31.9)	65 (33.7)	30 (28.6)	0.817 (0.366)
I would object if family members intended to subject their daughters to this practice	125 (41.9)	69 (35.8)	56 (53.3)	8.633 (0.003)
I would advise my relatives not to perform the practice	139 (46.6)	83 (43.0)	56 (53.3)	2.915 (0.088)

<sup>a</sup>Students' responses were categorized into: agree, undecided and disagree.

### Statistical analysis

Twenty-eight variables were tested for association with supporting the continuation of FGM (or being against its abolition). Of these, 20 were significantly associated with supporting the continuation of FGM (Table 5).

The 20 variables significantly associated with supporting the continuation of FGM in the bivariate analyses were entered into a multivariate logistic regression analysis. From this, 5 variables were found to be significant predictors of supporting the continuation of FGM (Table 6). These included: not believing that medical students (future physicians) could contribute to the abolition of the practice (OR = 21.28), disagreeing that FGM was a violation of the human rights of girls and women (OR = 9.49), believing that FGM prevented promiscuity in girls (OR = 9.53), denying that mild forms of FGM (type I) could lead to complications and was therefore acceptable (OR = 7.01), and believing that FGM helped the genitalia to be kept clean (OR = 2.12).

### Discussion

Our findings show that students' basic knowledge about the practice of FGM was unsatisfactory. Students were unaware of the prevalence of FGM in Egypt, types of FGM commonly practised in Egypt, who practises FGM, who are the circumcisers, the procedures of FGM, and the age at which FGM is performed.

Prior to the 1995 and 2000 Egyptian Demographic and Health Surveys, it was believed that FGM was on the decline, prevailing mainly among illiterate populations and the lower and lower-middle classes [14–16]. However, the 2000 Egyptian Demographic and Health Survey (DHS) found that the practice was nearly universal among women of reproductive age (15–49 years) in Egypt. Preliminary analysis of the 2000 findings showed that 97% of women surveyed had been subjected to FGM, which represented no change from the 1995 DHS findings [4, 14–16]. However, in 2000, there was some decline in support for the practice,

**Table 5 Variables significantly associated with students' opinions supporting the continuation of female genital mutilation (FGM) (bivariate analysis)**

Significantly associated variable	$\chi^2$ (P-value)	Odds ratio	95% confidence intervals
Medical students (future physicians) cannot contribute to the abolition of FGM	93.66 (< 0.001)*	21.28*	10.18–44.46
FGM prevents promiscuity in girls	70.90 (< 0.001)*	9.53*	5.44–16.71
FGM is not a violation of the human rights of girls and women	64.48 (< 0.001)*	9.49*	5.23–17.22
FGM maintains a girl's chastity	60.53 (< 0.001)*	7.53*	4.41–12.86
Mild forms of FGM (type I) do not lead to any complications; it is therefore acceptable	54.78 (< 0.001)*	7.01*	4.07–12.07
FGM is a religious obligation	47.17 (< 0.001)*	6.06*	3.41–10.86
FGM is performed to please a husband	21.65 (< 0.001)*	4.16*	2.22–7.81
FGM does not cause psychosocial complications	32.46 (< 0.001)*	4.12*	2.50–6.80
FGM makes a girl more beautiful	19.21 (< 0.001)*	3.61*	1.99–6.53
FGM increases chances of marriage	14.69 (< 0.001)*	3.35*	1.77–6.37
FGM ensures a girl's virginity	16.84 (< 0.001)*	3.27*	1.83–5.84
For physicians or nurses, performing FGM does not violate their professional ethics	12.88 (< 0.001)*	2.86*	1.59–5.14
FGM improves the fertility of a woman	8.11 (0.004)*	2.85*	1.35–5.98
Original family residence (rural and urban slum <sup>a</sup> )	16.60 (< 0.001)*	2.72*	1.67–4.43
Current residence (rural and urban slum <sup>a</sup> )	12.08 (0.001)*	2.62*	1.51–4.55
FGM does not cause sexual complications	14.60 (< 0.001)*	2.53*	1.57–4.10
FGM is an essential part of our culture	11.94 (0.001)*	2.37*	1.44–3.88
FGM helps the genitalia to be kept clean	9.27 (0.002)*	2.12*	1.30–3.46
FGM does not cause long-term complications	5.98 (0.014)*	1.85*	1.13–3.04
FGM is not a health issue	28.86 (< 0.001)*	0.21*	0.12–0.39

<sup>a</sup>Urban slum dwellers refer to those residents of rural origin.

\*Significant at  $P < 0.05$ .

where 75% of surveyed women thought that the practice should continue compared to 82% in 1995 [4,17].

According to the 2000 DHS findings, the most commonly given reason (58%)

for supporting the practice was the belief that this was a “good tradition”. Almost three-quarters of Egyptian women felt that husbands would prefer their wives to undergo the procedure. More than one-third

**Table 6 Significant predictors of students' opinions supporting the continuation of female genital mutilation (FGM) (multiple regression analysis)**

Variable	B	P-value	R	Exp (B)
Medical students (future physicians) cannot contribute to the abolition of FGM	3.1346	< 0.001	0.2769	22.9800
FGM is not a violation of the human rights girls and women	1.7627	0.0006	0.1561	5.8284
FGM prevents promiscuity in girls	1.5808	0.0049	0.1223	4.8591
Mild forms of FGM (type I) do not lead to any complications; it is therefore acceptable	1.1629	0.0134	0.1020	3.1993
FGM helps the genitalia to be kept clean	-1.3399	0.0460	-0.0708	0.261
Constant	-4.1258	(< 0.001)		

Model  $\chi^2 = 222.138$ ,  $df = 21$ ,  $P < 0.001$ .

cited cleanliness as a reason, while a smaller number saw it as a way to prevent promiscuity before marriage and unfaithfulness within the marriage [4,17].

The most common forms of female genital mutilation still widely practised throughout Egypt are type I and type II. The 2000 DHS survey also indicated that two-thirds of girls had undergone the procedure when they were between the ages of 7 and 10 years. Fewer than 5% were under the age of 5 years and fewer than 3% were over the age of 13 years [4].

Recently, the growing recognition of the many potential adverse health consequences of the practice has resulted in people increasingly enlisting doctors rather than traditional birth attendants to perform the procedure [4,17]. According to the 2000 DHS survey, the use of medical practitioners (doctors or trained midwives) has tripled to 55% in recent years, with a concomitant drop in the use of traditional birth attendants [4,17].

To understand fully the health consequences of the different types of FGM, it is important to have a basic understanding of the functional anatomy of the female genitals [11]. In the present study, although

the students' awareness of the anatomical structure and function of the female external genitalia was satisfactory, they were poorly informed about the complications of FGM. This lack of awareness was reflected in their support of continuation of the practice (52.0%), and having an encouraging attitude toward its medicalization as a risk reduction strategy (73.2%).

In the present study, a considerable proportion of students supported FGM in general. Students' personal beliefs, values and attitudes toward FGM were consistent with their attitudes toward reasons cited by the community for performing this procedure. Family members and relatives were a major source of information about FGM for the students. The latter finding denotes that the traditionalist society, in which these students live, played an important role in shaping their attitudes toward FGM. This could mean that the pressure from religious, cultural, and social beliefs to continue the tradition is stronger than any perception of danger caused by the practice of FGM.

The majority of medical students were in favour of medicalization of FGM (73.2%) as it could reduce the risk of health complications. Medicalization of FGM presents a

moral dilemma. Should we protect women's health, and risk legitimizing a destructive practice, or should we focus on the elimination of the practice which may push the practice underground and result in women dying from preventable conditions [18,19]? In Egypt, physicians now undertake more than half of all FGM procedures and girls now are 3 times more likely to be excised by physicians (55%) than were their mothers (17%) [20].

WHO has consistently and unequivocally advised that no form of FGM should be practised by health professionals in any setting, including hospitals or other health establishments. WHO's position rests on the basic ethics of health care whereby unnecessary bodily mutilation cannot be condoned by health providers. Genital mutilation is harmful to girls and women and medicalization of the procedure does not eliminate the harm. Furthermore, medicalization is also inappropriate as it reinforces the continuation of the practice by seeming to legitimize it [1,2,9,11]. Medical ethical standards should make it clear that the practice of FGM on children or non-consenting women violates professional standards. Medical practitioners who engage in the practice should be subject to disciplinary proceedings and should lose their licence to work in the medical field [20].

Our results show that our medical students were poorly informed about the ethical and legal aspects related to FGM. Egypt does not have a specific law prohibiting the practice of FGM. However, performance of FGM is a violation of Act 240, a law that prohibits any individual from injuring another person or beating him/her in a way that leads to cutting or severing, or impairing the function of any body part [2,17]. For doctors, the right of medical intervention, which allows them to injure or cut body parts in surgery, is inapplicable to FGM

because it is not an intervention to diagnose or treat a disease or stop pain. In addition, FGM cannot be legally justified by parental approval, since parental custody does not involve the right to mutilate the child. The legislative background has, however, changed over the years. In 1959, a ministerial decree forbade the practice and made it punishable by fine and imprisonment. A series of later ministerial decrees allowed certain forms but prohibited others. Doctors were also prohibited from performing the procedure in government health facilities. Non-medical practitioners were forbidden from practicing any form [2,3,17].

In 1994, due to public outcry over a *CNN* television broadcast of the procedure performed on a 9-year old girl by a barber, the Minister of Health decreed that the procedure should be performed one day per week in government facilities but only by trained medical personnel and only if they failed to persuade the parents against it. He rescinded his decision in 1995, however, after various protests and international outcry deploring the "medicalization" of the practice [2,3,17].

Then in 1996, the Minister of Health issued a decree that banned all medical and non-medical practitioners from performing FGM in either public or private facilities, except for medical reasons certified by the head of a hospital's obstetric department. Medical practitioners carrying out FGM would lose their medical licence and could face criminal prosecution, as could non-medical practitioners. In cases of death, they could also face charges of manslaughter [17]. In December 1997, the Court of Cassation (Egypt's highest court of appeal) upheld this government ban.

While the impact of this last ruling is positive and empowers those working to end FGM, bringing about behavioural change is not guaranteed. The decision to subject a

daughter to FGM is not likely to be affected by a ministerial decree. Furthermore, while the ban could be enforced in government hospitals and health units, most excisions in Egypt are currently performed in homes and private clinics by male doctors, traditional birth attendants or in some cases by barbers [14].

Passing laws is not enough on its own to protect girls and women from FGM. There is a danger that the fear of prosecution will inhibit people from seeking help for complications. Thus laws must go hand in hand with community education to raise awareness of the harmful effects of FGM, its implications on human rights and to change attitudes.

Although 43.6% of the students believed that FGM was a pre-Islamic tradition, our findings show the students' knowledge about the religious background of FGM is confused. Although high officials in both the Muslim and Christian religious establishments have voiced opposition to the practice, it is still supported by some local religious authorities. Moreover, many Egyptians believe that it is an important part of maintaining female chastity, which is part of religious tradition [17].

There is no strong evidence in Islamic texts to suggest that Islam favours the practice of FGM. People often confuse traditions rooted in local culture with religious requirements [21–23]. Unfortunately, individual interpretation in various places has turned this cultural tradition into a religious doctrine that commands FGM as a basic element of religious faith [24,25]. To ensure the abolition of the practice, government, educationalists and religious leaders have a moral obligation to address these issues.

Not recognizing that FGM violates human rights was a significant contributing factor behind students' support for the continuation of FGM. In fact, FGM violates

a number of human rights of women and girls. Since FGM involves the removal of healthy sexual organs without medical necessity and is usually performed on adolescents and young girls, often with harmful physical and psychological consequences, it violates the rights to non-discrimination, health and bodily integrity. Although FGM is not undertaken with the intention of inflicting harm, its damaging physical, sexual and psychological effects make it an act of violence against women and girls. FGM sometimes threatens the lives of girls and women, thereby violating their human right to life, liberty and security [1].

The present study revealed that the issue of FGM is not adequately covered in the undergraduate curricula of our medical students. The majority of students agreed that the issue of FGM should be incorporated into their curriculum and such action could contribute to the elimination of the practice.

However currently, a large proportion of the students supported the continuation of FGM and the 2 factors most significantly associated with this were the students' perception that they could not contribute (as future physicians) to the abolition of the practice and their denial that FGM is a violation of the human rights of girls and women. A variety of sociocultural myths, religious misbeliefs, hygienic and aesthetic concerns, as well as psychosexual reasons were cited by students to defend their opinions.

The proportion of students in favour of abolishing female circumcision (48.0%) is a hopeful sign that the situation may change in the future. However, the opposing opinions of the other 52.0% of students and the lack of basic knowledge about FGM, especially concerning its complications, suggest that action is needed. Thus medical students (future physicians) should receive appropriate training on the issue of FGM

within the medical curriculum in order to raise their awareness, and solicit their active involvement as advocates against FGM. Training should equip the students with the appropriate knowledge and skills to enable them to work for the prevention and elimination of FGM and to provide clinical and psychological care and support for girls and women who have undergone the procedure, taking due account of cultural and personal sensitivities, as well as ethical and

legal aspects. In our community, as FGM is closely associated with culturally entrenched values, it is vital to provide clear, accurate and consistent information on the practice and its physical and psychological consequences in ways that will be culturally acceptable.

Through further education, students' beliefs about FGM can be changed and its medicalization will be opposed, thus helping to bring an end to this custom in Egypt.

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# Women's perception and experience of menopause: a community-based study in Alexandria, Egypt

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تصورُ النساء عن الإياس وتجربتهن معه: دراسة مجتمعية أُجريت في الإسكندرية، مصر  
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**الخلاصة:** أجرى الباحثون دراسة مستعرضة شملت نحو 450 سيدة من الإسكندرية، بُعِثَ تحديد الأعراض التي تحدث للنساء اللاتي تتراوح أعمارهن بين سن 50 و59 عاماً، عقب بلوغ مرحلة الإياس الطبيعية. وكان أكثر الأعراض شيوعاً: الإجهاد (96.0%) والصداع (95.1%) والفورات الحارة (90.7%) وتغضُّن الجلد (90.7%) وتناقص الرغبة الجنسية (89.1%). وتبيَّن أن 91% من النساء لم يكن لديهن فكرة عن المعالجة بالمعاوضة الهرمونية؛ كما تقوم نحو 42.7% بتعريض أجسادهن لأشعة الشمس؛ كما كانت 12.4% من النساء يمارسن أنشطة معتدلة في العام السابق للإياس. وقد أظهر تحليل التحوُّف المتعدد أن معارف النساء حول الإياس ترتبط بالوضع الزواجي، والتعليم، والحالة الوظيفية، في حين ترتبط الممارسات بنمط الإياس، وطول مدته، وبدخل المرأة.

**ABSTRACT** To determine symptoms, perceptions and practices after natural menopause by women aged 50–59 years, we conducted a cross-sectional study of 450 women from Alexandria. The most frequently recalled symptoms were tiredness (96.0%), headache (95.1%), hot flushes (90.7%), skin wrinkles (90.7%) and decreased sexual desire (89.1%). About 91% of women had never heard about hormone replacement therapy; 42.7% would expose their body to the sun; 12.4% were moderately active the year before menopause. Multiple regression analysis indicated that women's knowledge about menopause was related to marital status, education and employment status; practices were related to pattern of menopause, age of menopause and income.

## Perception et expérience des femmes concernant la ménopause : étude communautaire à Alexandrie (Égypte)

**RÉSUMÉ** Afin d'identifier les symptômes, les perceptions et les pratiques après la ménopause naturelle chez les femmes âgées de 50 à 59 ans, nous avons réalisé une étude transversale auprès de 450 femmes originaires d'Alexandrie. Les symptômes les plus fréquemment évoqués étaient la fatigue (96,0 %), les céphalées (95,1 %), les bouffées de chaleur (90,7 %), les rides (90,7 %) et la diminution de la libido (89,1 %). Environ 91 % des femmes n'avaient jamais entendu parler du traitement hormonal de substitution ; 42,7 % déclaraient penser à s'exposer au soleil ; 12,4 % avaient une activité modérée l'année précédant la ménopause. L'analyse de régression multiple a indiqué que les connaissances des femmes concernant la ménopause étaient liées à la situation matrimoniale, à l'instruction et à la situation par rapport à l'emploi ; les pratiques étaient liées à la physiologie de la ménopause, à l'âge au moment de la ménopause et au revenu.

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## Introduction

In 1990 there were an estimated 467 million women aged  $\geq 50$  years in the world. This number is expected to increase to 1200 million by the year 2030 [1]. Not only is the population growing, but life expectancy is slowly and progressively increasing. The life expectancy for females in the Eastern Mediterranean Region was 68.2 years for 2000–2005; it is estimated that this will rise to 78.7 years for 2045–2050. In the year 2000 women aged  $\geq 50$  years constituted 14.03% of the female population. This figure is estimated to rise to 20.9% of the female population by the year 2025 [2]. These figures suggest increases in the proportion of postmenopausal women in the future.

Menopause is an inevitable milestone in the reproductive life of every woman. Technically, it refers to a woman's last menstrual period: a woman can be said to have reached menopause when she has had 1 year without menstruating. The climacteric, or climacterium, is used to refer to the wide variety of physiological changes occurring in the years immediately surrounding menopause [3].

Throughout history, menopausal women faced various challenges, from coping with hot flushes and night sweats to dealing with the discomfort of vaginal dryness. Over-the-counter remedies and hormonal treatments focus on stabilizing unsteady nerves and eliminating vasomotor symptoms [3].

Every woman's experience of the menopausal is unique: she may experience all of the symptoms or none of them. Some women find the transition barely noticeable while others find it life altering [4–7]. Menopausal women who experience no symptoms at all may be less inclined to consider hormone use if they believe hormone replacement therapy (HRT) is only for the relief of symptoms and are not aware of its preventive health care benefits [8].

The objective of our investigation was to study knowledge and practices related to menopause of women in Alexandria, and to explore their experience of menopausal symptoms in terms of prevalence, pattern and clustering.

## Methods

The target population was menopausal women aged 50 to  $< 60$  years living in Alexandria governorate who had had a natural menopause, defined as cessation of menstruation for  $\geq 1$  year at the end of their reproductive years [3]. The study included a qualitative and a community-based, quantitative, cross-sectional survey. The study period was June 2002–August 2002.

### Qualitative analysis

From the study population, 70 menopausal women from the 3 strata in Alexandria governorate (urban, rural and informal/unplanned areas) were recruited to share in focus group discussions (FGDs). The recruitment process was voluntary, there was no predetermined selection. Participant groups were urban working, urban non-working, rural working, rural non-working, squatter working and squatter non-working. These women did not participate in the quantitative analysis. Two FGDs were conducted for each group, a series of 12 FGDs in all. Each FGD included 4–8 women. Women were encouraged to talk informally in a relaxed, friendly manner following prearranged guidelines about their expectations, concerns and beliefs about menopausal issues. An isolated quiet place (a room in one of the mother and child health centres in each area) was chosen for the FGDs. Data were collected by the moderators and the observers of the FGD using structured, prepared guidelines. Consent for recording was taken; about 40 women refused to give their

consent, so recruitment continued till the required number was reached. Discussions were recorded on audiotapes. Respondents were assured that their personal views would be dealt with confidentially and only members of the research team would listen to the tapes.

### **Quantitative analysis**

Using an arbitrary estimate of 50% of those women complaining of symptoms related to menopause, an accepted error of 5% and 95% confidence level, the minimum sample size was 384 women. Taking non-responders into consideration, a sample of 450 menopausal women was chosen for the present study [9]. This number was divided equally over 30 clusters (15 women in each).

### *Sampling*

A 2-stage cluster sample of 30 clusters was selected from Alexandria. In the first stage, 30 clusters were selected from the whole population with probability of selection proportional to size of cluster from a frame containing all districts, villages and informal/unplanned areas in Alexandria. The second stage included the selection of households. The interviewers started at the centre of the target cluster area and randomly selected a direction. The team would start at the nearest dwelling then through house-to-house survey, they visited the houses consecutively until they reached the target sample size.

The objectives of the study were explained to respondents and their consent to participate was taken. All women fulfilling the inclusion criteria were interviewed. We excluded those who had artificial menopause. There were around 40 refusals.

### *Data collection*

All participants were interviewed using pretested data forms written in Arabic. The

field staff comprised 8 interviewers and 3 field supervisors. Interviewers were university graduates and had previous experience in similar field research. They participated in a 5-day training course which included theoretical, role-playing and practical sessions in performing interviews and completing the questionnaire properly. The questionnaire included sociodemographic data, age of menopause, pattern of menopause and self-reporting of menopausal symptoms. Physical activity was assessed using a single question about daily and weekly activities during the year preceding menopause. Activity was then classified into 3 categories, sedentary, moderate and active, as described by Mattiasson-Nilo et al. [10].

### *Statistical analysis*

Data were analysed using *SPSS* software, version 10.0. *P*-value < 0.05 was taken as a cutoff for statistical significance and all tests were 2-sided. Proportion, arithmetic mean, standard deviation and median were used as summary statistics. Cramer's V was used to test the association between qualitative variables. Multiple regression analysis was used to explore factors affecting women's knowledge and practices related to menopause. Principal components factor analysis was used to explore the pattern of clustering of menopausal symptoms among the study sample. Varimax rotation with Kaiser normalization was used [11,12].

## **Results**

### **Qualitative analysis**

Participants of the different FGDs were aware of the normal changes around menopause. Irregularity, oligomenorrhoea and excessive bleeding were the most common changes mentioned by the women.

The FGDs revealed a common view that menopause is a personal issue that should not be discussed with anybody else. Few participants believed that the advice of older women who had been through the same experience could help. Although some participants believed that during the perimenopausal period, a woman should seek medical advice, very few had actually gone for an examination. Some denied decreased sexual desire, while others declared that this was a problem for themselves and their partners. Participants agreed that the overall health status of a woman was generally better before menopause, compared to the postmenopausal period. The effect of age was clear to most of them, while the hormonal effect was mentioned by quite a few.

During the discussions, it was clear that most participants had never heard about HRT. Among those who had heard of it, some believed that HRT postponed menopause for a couple of months. Concerns about risks and side-effects of HRT were mentioned by some participants while others were concerned about its cost.

Generally, there was proper nutritional awareness among women with access to mass media, TV and radio being the main sources of their information. All the non-working women we studied were illiterate whereas the working women were of varying education. In spite of the awareness about the nutritional importance of some food items (e.g. milk products, vegetables), there were some who could not afford such items.

### Quantitative analysis

The present study included 450 menopausal women (after excluding the 5 who had had surgical menopause); 66.4% from urban areas, 20.0% from squatter areas and 13.6% from rural areas (Table 1). Mean age was 54.42 (standard deviation 3.15) years. The

Table 1 Characteristics of the study sample

Variable	No.	%
<i>Time since last menstruation (years)<sup>a</sup></i>		
< 4	118	26.2
4–5	112	24.9
≥ 6	220	48.9
<i>Parity<sup>b</sup></i>		
0	17	3.8
1–2	78	17.3
3–4	150	33.3
≥ 5	205	45.6
<i>Age at menopause (years)</i>		
< 48	129	28.7
48–49	142	31.6
≥ 50	179	39.8
<i>Residence</i>		
Urban	299	66.4
Squatter	90	20.0
Rural	61	13.6
<i>Education<sup>c</sup></i>		
Uneducated	355	78.9
Educated	95	21.1
<i>Work status</i>		
Non working	425	94.4
Working	25	5.6
<i>Married before menopause</i>		
Married	360	80.0
Unmarried	90	20.0
<i>Income sufficiency</i>		
Sufficient	175	38.9
Insufficient	275	61.1
<i>Pattern of menopause</i>		
Sudden	88	19.6
Recurrent amenorrhoea	276	61.3
Recurrent bleeding	86	19.1

<sup>a</sup>Mean 6.20; standard deviation 4.03; median 5.

<sup>b</sup>Mean 5.54; standard deviation 3.08; median 5.

<sup>c</sup>Uneducated = illiterate; educated = can read and write.

majority (78.9%) were uneducated (could not read or write) and not employed outside the home (94.4%). The menopause occurred suddenly in 19.6% of the women

and the rest had a gradual menopause, either with recurrent amenorrhea (61.3%) or recurrent bleeding (19.1%). About half of the women were menopausal  $\geq 6$  years prior to the interview. Mean age at menopause was 48.22 (standard deviation 3.30). Median age of menopause among the participants was 49 years: only 28.7% became menopausal before 48 years of age. Other sociodemographic data are shown in Table 1.

Almost 40% of the women in the study had prior knowledge of menopausal symptoms (Table 2). The great majority, 90.7%, had never heard about HRT. When asked about beneficial practices after menopause, 60.7% of the women mentioned taking vitamins and 55.3% reported exposure to sunlight. Fruits and vegetables were mentioned by 62.2% of women as being suitable food for menopausal women.

Regarding practices related to menopause, 88.9% had not consulted a physician (Table 2). Activity was reported as mild or moderate for 86.0%.

The strongest predictors (indicated by the value of the standardized regression coefficient) of women's knowledge about menopause were marital status before menopause ( $\beta = -0.189$ ), employment status ( $\beta = 0.119$ ) and education ( $\beta = 0.105$ ). Better knowledge was found among women who were married before menopause, women who were working and educated women (Table 3). The strongest predictors of good practices in relation to menopause were pattern of menopause ( $\beta = 0.358$ ), income sufficiency ( $\beta = 0.185$ ) and age at menopause ( $\beta = -0.130$ ). Good practices were observed among women with sudden menopause, sufficient income and younger age at menopause.

The most frequently reported menopausal symptoms (Table 4) were tiredness (96.0%), headache (95.1%), hot flushes (90.7%) and skin wrinkles (90.7%).

Prevalence of symptoms was significantly associated with pattern of menopause for most of the recalled symptoms. The strongest associations as indicated by the value of Cramer's V was that of night sweats, decreased sexual desire and increased facial hair (all were characteristic of gradual menopause). Other strong associations were between sudden onset of menopause and vaginal discharge, feelings of loss of attractiveness, irritability, numbness, anxiety and flatulence. Prevalence of depressed mood % was correlated with sudden menopausal onset.

Principal components analysis (Table 5 for married women and Table 6 for unmarried women) indicated that menopausal symptoms aggregated into 7 clusters. There were some differences between the 2 models. There was a sexual component and a clear vasomotor component among the married group. For the unmarried women, vasomotor symptoms were dispersed among the somatic symptoms. Urinary symptoms were clustered with psychological symptoms for the married women but stood almost alone for the unmarried women. Somatic symptoms were clustered with inconsistent patterns in the 2 groups. The gastrointestinal component was clear in unmarried women, and headache, blurred vision and drowsiness were clustered together in married women.

## Discussion

The purpose of this study was to address questions concerning women's perception of menopause, and women's experience of menopausal symptoms.

It was clear that many of the women in this study, in both the qualitative and the quantitative part, perceived menopause as a normal event in their lives that does not



**Table 2 Distribution of women according to knowledge and practices related to menopause**

<b>Variable/Scoring</b>	<b>No.</b>	<b>%</b>
<b>Knowledge<sup>a</sup></b>		
<i>Previous knowledge of menopausal symptoms</i>		
Yes (1)	173	38.4
No (0)	277	61.6
<i>Awareness about HRT</i>		
Yes (1)	42	9.3
No (0)	408	90.7
<i>Woman must consult a physician</i>		
Yes (1)	55	12.2
No (0)	334	74.2
Don't know (0)	61	13.6
<i>What practices are beneficial after menopause?</i>		
Taking vitamins (1)	273	60.7
Exposure to sun (1)	249	55.3
Good food (1)	151	33.6
Nothing (0)	40	8.9
<i>What foods are suitable for a menopausal woman?</i>		
Fruits and vegetables (1)	280	62.2
Roasted meats (1)	228	50.7
Dairy products (1)	172	38.2
Proteins (1)	126	28.0
No specific food (0)	125	27.8
Low starch, low fat diet (1)	63	14.0
<b>Practices<sup>b</sup></b>		
<i>Did you consult a physician?</i>		
Yes (1)	50	11.1
No (0)	400	88.9
<i>Are you interested in exposing your body to sun?</i>		
Yes (1)	192	42.7
No (0)	258	57.3
<i>Are you a smoker?</i>		
Yes (0)	7	1.6
No (1)	443	98.4
<i>Physical activity during the year preceding menopause</i>		
Sedentary (0)	63	14.0
Mild (1)	331	73.6
Moderate (2)	56	12.4
<i>Did you discuss menopausal symptoms with others?</i>		
Yes (1)	314	69.8
No (0)	136	30.2

HRT = hormone replacement therapy.

<sup>a</sup>Median (range) knowledge score = 4 (1–11).

<sup>b</sup>Median (range) practice score = 3 (0–6)

Table 3 Knowledge and practices of menopausal women according to sociodemographic factors

Independent variable	Knowledge		Practice	
	$\beta$	P	$\beta$	P
Marital status before menopause (married = 0; unmarried = 1)	-0.189	< 0.001	0.102	0.022
Education (uneducated = 0, educated = 1)	0.105	0.031	–	–
Employment status (not working outside the home = 0; working outside the home = 1)	0.119	0.013	0.086	0.043
Age at menopause	0.098	0.030	0.130	0.002
Income (sufficient = 1; insufficient = 0)	0.101	0.032	0.185	< 0.001
Pattern of menopause (gradual onset = 0; sudden onset = 1)	–	–	0.358	< 0.001
	$R^2$	F	$R^2$	F
	0.109	10.82	0.208	23.38
		P		P
		< 0.001		< 0.001

$\beta$ = Standardized regression coefficient.

Values in parentheses are codes of dummy variables.

Excluded variables of both models are residence, duration since last menses and parity.

necessitate medical consultation; it is a personal issue that should not be discussed with others. In contrast, a study in Mauritius in 2001 revealed that one fourth of the participants said that they had not heard of the term menopause, and the majority believed in herbal remedies to treat menopausal symptoms [13].

The level of awareness about HRT was not surprising as in a study of 40–60 year old Chinese women only 23.5% realized that HRT could relieve menopausal symptoms and only 3.4% were aware that HRT was protective against osteoporosis [8]. In the same study, it was found that those with a higher education level and higher family income had better knowledge about HRT, which is consistent with the findings of our study. In a study in Mauritius, 85.5% of women had never heard about HRT and of the 14.5% who said that they had heard about it, over 30% said that they had “no idea” what it was [13]. Lack of awareness of HRT could be partly attributed to the

considerable variation in attitudes towards HRT among physicians. One extreme is the view that HRT is the universal remedy for almost all postmenopausal women [14]. The other being that HRT is unnecessary for the majority of women, and may even be harmful [15].

Our findings are in agreement with many other studies on women’s perception of menopause. In a population-based survey of women in Scotland aged 45–54 years, only 22% had found menopausal symptoms a problem [4]. In another study, Thai women, perceived menstruation to be an indicator of health [16], a perception which was also reported by women in the FGDs of the present study. At the other extreme, a cross-sectional community-based study of 589 Caucasian women revealed that at the time of menopause, 55% of the women reported that they felt life was getting better and 57% were more cheerful [17].

More than two thirds of menopausal women in a Danish study had discussed

Table 4 Prevalence of menopausal symptoms according to pattern of menopause (*n* = 450)

Menopausal symptom	Slow onset		Rapid onset	Overall	Cramer's V
	Recurrent amenorrhoea	Recurrent bleeding			
	%	%	%	%	
Tiredness	95.7	96.5	96.6	96.0	0.022
Headache	96.0	91.9	95.5	95.1	0.074
Hot flushes	91.7	95.3	83.0	90.7	0.139*
Skin wrinkles	87.3	97.7	94.3	90.7	0.149**
Decreased sexual desire <sup>a</sup>	93.3	74.6	89.7	89.1	0.237***
Dry/sore vagina <sup>a</sup>	91.9	76.2	79.5	87.2	0.205**
Night sweats	90.9	91.9	70.5	87.1	0.245***
Decreased breast size	87.3	86.0	86.4	86.9	0.016
Disturbed concentration	83.0	70.9	92.0	82.4	0.173**
Blurred vision	82.2	72.1	87.5	81.3	0.126*
Hair loss	82.2	79.1	79.5	81.1	0.037
Anxiety	75.7	84.9	93.2	80.9	0.178**
Feelings of loss of attractiveness <sup>a</sup>	79.5	61.9	94.9	77.9	0.228***
Drowsiness	76.1	75.6	83.0	77.3	0.066
Loss of skin elasticity	73.9	76.7	79.5	75.6	0.052
Sleep problems	68.1	84.9	77.3	73.1	0.152**
Propensity to gain weight	75.4	64.0	73.9	72.9	0.099
Muscle or joint pain	69.2	69.8	84.1	72.2	0.131*
Numbness	61.6	77.9	81.8	68.7	0.194***
Loss of appetite	61.2	75.6	70.5	65.8	0.125*
Difficult breathing	69.2	59.3	52.3	64.0	0.144**
Depressed mood	59.4	48.8	76.1	60.7	0.177**
Irritability	53.6	53.5	87.5	60.2	0.275***
Tinnitus	55.4	46.5	71.6	56.9	0.162**
Nausea	49.6	66.3	67.0	56.2	0.167**
Increased facial hair	59.1	52.3	14.8	49.1	0.343***
Flatulence	32.2	43.0	64.8	40.7	0.256***
Incontinence	36.2	54.7	37.5	40.0	0.146**
Burning micturition	35.9	46.5	21.6	35.1	0.164**
Palpitations	29.7	37.2	21.6	29.6	0.107
Vaginal discharge <sup>a</sup>	19.5	36.5	56.4	27.6	0.286***

<sup>a</sup>Only currently (i.e. at the time of the survey) married women (*n* = 312).\**P* < 0.05; \*\**P* < 0.01; \*\*\**P* < 0.001.

Table 5 Principal components analysis of menopausal symptoms for married (at the time of the interview) women ( $n = 312$ )

Variable	Factors and loadings						
	1	2	3	4	5	6	7
<b>Menopausal symptom</b>							
Incontinence	0.69	–	–	–	–	–	–
Burning micturition	0.64	–	–	–	–	–	–
Depressed mood	0.75	–	–	–	–	–	–
Anxiety	0.47	–	–	–	–	–	–
Irritability	0.69	–	–	–	–	–	–
Disturbed concentration	0.43	–	–	–	–	–	–
Palpitations	–0.53	–	–	–	–	–	–
Tinnitus	0.61	–	–	–	–	–	–
Sleep problems	–	0.57	–	–	–	–	–
Nausea	–	0.67	–	–	–	–	–
Loss of appetite	–	0.73	–	–	–	–	–
Flatulence	–	0.36	–	–	–	–	–
Numbness	–	0.32	–	–	–	–	–
Difficult breathing	–	0.52	–	–	–	–	–
Decreased breast size	–	–0.32	–	–	–	–	–
Muscle or joint pain	–	0.38	–	–	–	–	–
Decreased sexual desire	–	–	0.80	–	–	–	–
Dry/sore vagina	–	–	0.84	–	–	–	–
Vaginal discharge	–	–	–0.58	–	–	–	–
Feelings of loss of attractiveness	–	–	0.43	–	–	–	–
Headache	–	–	–	0.53	–	–	–
Blurred vision	–	–	–	0.75	–	–	–
Drowsiness	–	–	–	0.59	–	–	–
Loss of skin elasticity	–	–	–	–	0.89	–	–
Propensity to gain weight	–	–	–	–	0.82	–	–
Skin wrinkles	–	–	–	–	–	0.74	–
Hair loss	–	–	–	–	–	0.62	–
Increased facial hair	–	–	–	–	–	0.60	–
Tiredness	–	–	–	–	–	0.49	–
Hot flushes	–	–	–	–	–	–	0.67
Night sweats	–	–	–	–	–	–	0.65
<b>Statistical analysis</b>							
Eigenvalue	3.3	2.7	2.5	2.1	2.0	1.9	1.8
Cumulative % of explained variance in symptoms	10.8	19.4	27.5	34.2	40.6	46.7	52.4

Table 6 Analysis of principal components of menopausal symptoms for unmarried (at the time of the interview) women ( $n = 138$ )

Variable	Factors and loadings						
	1	2	3	4	5	6	7
<b>Menopausal symptom</b>							
Depressed mood	0.69	—	—	—	—	—	—
Irritability	0.76	—	—	—	—	—	—
Disturbed concentration	0.66	—	—	—	—	—	—
Anxiety	0.57	—	—	—	—	—	—
Tinnitus	0.64	—	—	—	—	—	—
Loss of skin elasticity	—	0.71	—	—	—	—	—
Hot flushes	—	0.46	—	—	—	—	—
Headache	—	0.47	—	—	—	—	—
Skin wrinkles	—	0.64	—	—	—	—	—
Tiredness	—	0.65	—	—	—	—	—
Blurring of vision	—	—	0.51	—	—	—	—
Numbness	—	—	0.78	—	—	—	—
Decreased breast size	—	—	0.47	—	—	—	—
Sleep problems	—	—	0.44	—	—	—	—
Drowsiness	—	—	0.63	—	—	—	—
Flatulence	—	—	—	0.62	—	—	—
Nausea	—	—	—	0.83	—	—	—
Loss of appetite	—	—	—	0.82	—	—	—
Muscle or joint pain	—	—	—	—	−0.42	—	—
Incontinence	—	—	—	—	0.76	—	—
Burning micturition	—	—	—	—	0.79	—	—
Sweating	—	—	—	—	—	−0.61	—
Propensity to gain weight	—	—	—	—	—	0.55	—
Hair loss	—	—	—	—	—	0.68	—
Palpitations	—	—	—	—	—	0.33	—
Increased facial hair	—	—	—	—	—	—	0.56
Difficult breathing	—	—	—	—	—	—	0.63
<b>Statistical analysis</b>							
Eigenvalue	2.9	2.6	2.4	2.2	1.9	1.6	1.6
Cumulative % of explained variance in symptoms	10.6	20.3	29.0	37.1	44.2	50.2	56.0

the menopause with a doctor: the more problematic the symptom, the greater the likelihood that the woman had done so [18].

In contrast, only 11.1% of the women in our study had consulted a physician.

The prevalence of hot flushes associated with the menopause varies widely between different cultures and countries. It has been reported as 0% in Mayan women [14], 10% in China [19], 23.3% in Hong Kong [8], 45% in the United Arab Emirates [20], 74% in the United States of America [17], 80% in Dutch women [14] and up to 87.2% in Denmark [18]. In our study, prevalence of hot flushes (90.7%) was higher than all of these. The higher prevalence of vasomotor symptoms may be attributed to the hot environment in our country [21] or it may be methodology dependent. We chose to use self-reporting of symptoms as it is known that using a checklist of symptoms can introduce bias since many will respond positively to symptoms on a checklist, but the reporting rate decreases if frequency or troublesomeness of symptoms are included [22].

It is now generally agreed that the incidence of depression does not increase during menopause [23,24]. The prevalence of depressed mood in the present study is relatively high (60.7%). It was, however, correlated with sudden menopausal onset, indicating that the women may not have been prepared for the occurrence of menopause and not that depression was a menopausal entity.

Cross-sectional reports have shown that menopause transition is related to modest increases in body mass index, although not all studies found significant effects [25]. Some researchers believe that weight gain is not associated with menopause and the associated hormonal changes but rather with the natural decrease in metabolic rate that occurs with age and a more sedentary life style [26]. Menopause does, however, appear to be associated with redistribution of weight from the hip and upper thigh area to the abdominal area [26]. Reported prevalence of propensity to weight gain was high in our study.

The present study revealed association between menopause and urinary incontinence and burning micturition. Some studies reported an association between menopause and increased prevalence of urinary incontinence [27,28], whereas others did not [29,30,31].

The prevalence of sexual activity in a sample of 875 American women was decreased at menopause (70% among those aged 45–54 years and 60% among those aged 55–64 years) [27] which agreed with our findings that sexual desire decreased (89.1%) in the majority of the study women. Whether the reduction in sexual behaviour is related to menopause per se is uncertain, but there is a reason to believe that some menopause-related symptoms interfere with sexuality. For example, vaginal atrophy can lead to vaginal dryness and fragility, which causes dyspareunia, and in some women reduced arousal during sex [27]. The high proportion of women reporting dry/sore vagina in the present study strengthens this view.

A large number of other somatic and psychological symptoms were reported (Table 4). These symptoms were considered to be non-specific to the menopause and they are presumed to be psychological and sociocultural in origin. In several studies, the occurrence of these symptoms is not highly correlated with menopausal status, but they are strongly correlated with each other [14,32].

In recent years, research on menopausal symptomatology has focused on identifying symptom groupings experienced by women as they progress from premenopausal to postmenopausal status [33]. In an analysis based on a large cross-sectional survey of women aged 40–55 years among various racial/ethnic groups in the United States of America (Caucasian, African-American, Chinese, Japanese, and Hispanic) using



factor analysis it has been shown that 2 consistent factors emerged among the 5 racial/ethnic groups: first, hot flushes and night sweats and, secondly, consisting of psychological and psychosomatic symptoms. The pattern of results argues against a universal menopausal syndrome [33]. In another study of 2000 Australian menopausal women aged 45–55 years, factor analysis revealed 7 common factors from 22 symptoms [6]. In a third study, *The Women's Health Questionnaire*, which was based on factor analysis of 36 symptoms reported by a general population sample from south east England, each rated on a binary scale 0/1, there were 8 subscales. The results of our study are consistent with factor analysis in other studies: the vasomotor component and the somatic components emerged as separate factors. However, in the married women model, the urinary symptoms emerged together with psychological symptoms as one factor, which suggest a mediating effect of urinary symptoms to psychological symptoms among married women. The headache factor comprised headache, blurred vision and drowsiness, which may be confused by the participants. For the unmarried women

model, the gastrointestinal symptoms were separate from the other somatic symptoms, and the vasomotor symptoms were dispersed among somatic symptoms. This diversity of components strengthens the view that there is not a universal menopausal syndrome for all women [33].

## Conclusions and recommendations

Generally, menopausal women in Alexandria were aware of peri-menopausal changes. Most women believed that menopause is a personal issue and this influences their health-seeking behaviour during that period. The most commonly experienced symptoms were hot flushes, tiredness, headache and skin wrinkles. The majority of women were lacking in knowledge about healthy lifestyles and approaches of self-care during the menopausal transition. There is a definite need for dissemination of information about menopausal symptoms and healthy practices related to menopause, especially through radio, television and general practitioners.

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#### **EMRO Reproductive Health Research Network**

In view of the importance of reproductive health research as an area of strategic priority for programme and policy development, the World Health Organization Regional Office of the Eastern Mediterranean (EMRO) has created a network for reproductive health research. This network aims to facilitate exchange of information and research related experiences in the field of reproductive health between and within countries.

The reproductive health research network has 2 components: a comprehensive *directory* of governmental, private, nongovernmental institutes, scientific bodies, research agencies, advocacy groups, and organizations concerned with and involved in reproductive health research in countries of the Region; and a searchable *database* about research activities conducted over a specified period of time (1995 to present).

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# Psychiatric morbidity and its sociodemographic correlates among women in Irbid, Jordan

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المراضة النفسية وتربطاتها الاجتماعية والديموغرافية بين النساء في إربد بالأردن  
توفيق درادكة، علاء علوان، رويدا المعاينة، سمير العتوم

**الخلاصة:** تم تقدير معدل المراضة النفسية وتربطاتها الاجتماعية والديموغرافية لدى 2000 سيدة، يراجعن ثلاثة مراكز للرعاية الأولية في إربد، بالأردن. وقد قامت السيدات باستكمال أدوات تشخيصية معيارية أمكن من خلالها التعرف على تشخيص الأمراض النفسية لديهن، وعلى تفاصيل اجتماعية وديموغرافية، فضلاً عن محراز score الكرب لديهن، حيث بلغ معدل المراضة النفسية 26.3٪، والضائقة السيكلوجية 39.0٪. وقد تبين وجود ارتباط كبير بين مقدار الكرب وشدة وبين المراضة النفسية. وقد ثبت أن الوضع العائلي بعد انفصام الزواج (بسبب الانفصال، أو الطلاق، أو الترميل)، وأمية المرأة، والعنف الأسري، والعلاقات الزوجية العنيفة، والوحدة، والزواج من غير ذوي القرى، وكون المرأة زوجة ثانية، وتدني مستوى المساكن، وعدم وجود نظام للدعم الاجتماعي، شكّلت عوامل مهمة تتربط مع حدوث المراضة النفسية لدى هذه المجموعة من النساء.

**ABSTRACT** The rate of psychiatric morbidity and its sociodemographic correlates was estimated in 2000 women attending 3 primary care centres in Irbid, Jordan. Women completed standardized diagnostic tools that yielded psychiatric diagnoses, a stress scale and sociodemographic details. The rate of psychiatric morbidity was 26.3% and psychological distress 39.0%. A significant association was found between the amount and severity of stress and psychiatric morbidity. Post-marital status (separated, divorced, widowed), woman's illiteracy, family violence, violent marital relationship, living independently, being in a non-cousin marriage, being a second wife, poor housing and absence of a social support system were significantly associated with psychiatric morbidity in this group of women.

## La morbidité psychiatrique et ses corrélats sociodémographiques chez les femmes à Irbid (Jordanie)

**RÉSUMÉ** On a estimé le taux de morbidité psychiatrique et ses corrélats sociodémographiques chez 2000 femmes consultant dans 3 centres de soins de santé primaires à Irbid (Jordanie). Pour ce faire, l'étude a utilisé des instruments diagnostiques normalisés qui ont permis d'établir les diagnostics psychiatriques, une échelle du stress et des données sociodémographiques. Le taux de morbidité psychiatrique était de 26,3 % et la détresse psychologique s'élevait à 39,0 %. On a trouvé une association significative entre la quantité et la sévérité du stress et la morbidité psychiatrique. La situation post-matrimoniale (séparée, divorcée, veuve), l'analphabétisme de la femme, la violence familiale, des relations de couple violentes, l'indépendance de vie, l'union sans lien de cousinage, le statut de deuxième femme, les mauvaises conditions de logement et l'absence de système de soutien social étaient significativement associés à la morbidité psychiatrique dans ce groupe de femmes.

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## Introduction

It is gradually becoming recognized that mental disorders are a public health problem throughout the world [1]. In order to institute policies and strategies to control mental disorders, their prevalence must be determined [2]. Psychiatric epidemiological studies are, therefore, crucial for the planning and development of psychiatric services. Such studies are also helpful in examining the sociodemographic correlates of mental disorders.

It has been reported that women are at higher risk for the development of mental disorders, especially for depressive and anxiety disorders [3–5]. It has been argued that women's multiple roles in society and heavier burden of social and household responsibilities puts them at higher risk for developing common mental disorders such as anxiety and depression [6,7]. Patel et al. identified a particular effect of rising income inequality on women's risk of common mental disorders [8]. More so, in many traditional societies women bear additional burden in the form of gender discrimination and gender violence [7]. Abused women are more likely to suffer from anxiety and depression than non-abused women [9]. Indirect evidence points to the presence of pronounced gender inequality in the Eastern Mediterranean Region, where there are mainly Islamic traditional societies [10]. Psychiatric morbidity among Arab women has not been extensively investigated [11]. This is unfortunate, since identifying the correlates of psychiatric morbidity in a society enables women and members of their communities to improve their control over their mental health.

The main aim of this World Health Organization collaborative study, therefore, was to estimate the prevalence of mental disorders and their sociodemographic cor-

relates among women attending primary care centres in one city in Jordan.

## Methods

### Subjects

The study was undertaken from March 2002 to April 2002. The participants were women aged 18 years and over visiting 3 health centres in Irbid, Jordan. The health centre at Jordan University of Science and Technology (JUST) provides medical services for students of JUST and Yarmouk University as well as for the employees of the 2 universities and their dependents. The other 2 health centres belong to the Ministry of Health and provide health services for citizens of the city of Irbid and its suburbs. Nine primary care physicians were selected to take part in this study. They were familiarized with the objectives and instruments of the study.

A convenience sample of 2000 women was selected. The first 20 patients attending the morning and afternoon sessions were approached. Women who were not attending for a consultation were excluded. If a woman refused to participate the next was chosen. Informed consent was obtained from all participants.

The protocol was approved by the World Health Organization (WHO) regional office in Jordan and by the research and ethical committee of the Faculty of Medicine of JUST.

### Instruments

#### *Patient Health Questionnaire*

The Patient Health Questionnaire (PHQ) was the first mental health diagnostic test that could be entirely self-administered by the patient and is 85% effective in suggesting the presence of a mental health problem [12]. The physician applies algorithms to

make the final diagnosis and the PHQ simplifies the differential diagnosis by assessing only 8 disorders. These are divided into “threshold disorders” corresponding to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) diagnoses (e.g. major depression, panic disorders, other anxiety and bulimia nervosa) and “subthreshold disorders” (e.g. other depressive disorders, probable alcohol abuse, and somatoform and binge-eating disorders). If a patient scores positive for any problems they are asked: “How difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?” Before making a final diagnosis, the clinician or interviewer rules out physical causes of depression, anxiety and physical symptoms. As the prevalence of alcohol use is very rare or absent among the female population in Jordan, the section on alcohol use was replaced by a corresponding section on nicotine use.

#### *Self-Reporting Questionnaire*

The Self-Reporting Questionnaire (SRQ-20) was developed primarily as a screening tool to suit primary health care settings of developing countries [13]. The SRQ consists of 20 questions answered yes or no. It may be used either as a self-administered or interview-administered questionnaire. Various additional questions have been used with the SRQ-20 to screen for psychotic disorders and substance abuse. The validity of the SRQ-20 was examined by several groups of investigators using the same cut-off point (7/8), and validity of the SRQ compared to a level of 90% for sensitivity, and 80%–95% for specificity [14–16].

#### *Perceptions of general health*

A single-item scale was constructed for self-perception of general health on a 4-point scale (“excellent”, “very good”, “acceptable” and “poor”).

### **Statistical analysis**

Data were expressed as mean and standard deviation (SD) for continuous variables. The chi-squared test was used to elicit associations between dichotomous variables. Continuous variables were compared using t-tests and 1-way analysis of variance. Variables that were examined for their association with morbidity were: age (3 levels), marital status (3 levels), employment status (5 levels), age difference from husband for married women (3 levels), polygamy for married women (3 levels), blood relatedness with husband for married women (2 levels), living with husband’s family for married women (2 levels), housing size (3 levels), major life events (2 levels), violent marital relationship (2 levels), educational status (3 levels) and evidence of drug- and alcohol-related problems in the household (2 levels each). Self-perception of general health was expressed in frequencies and percentages. The prevalence of psychiatric morbidity was calculated for the whole sample and specific rates were also estimated for subgroups of subjects as defined by the severity of stress. Subjects were categorized into 2 groups by severity of stress. Those who rated themselves as being exposed to stress all the time over the past 4 weeks were labelled as being exposed, the remainder were non-exposed along the 11 stress items on the PHQ.

*SPSS*, version 9.0 for Windows was used for statistical analysis.

## **Results**

### **Demographic characteristics**

A total of 2000 women participated in the project. Their ages ranged from 18 to 85 years with a mean of 32.1 years (SD = 9.1). Table 1 shows the sociodemographic characteristics of the studied sample: 78%



**Table 1 Prevalence of mental disorders of the sampled women by sociodemographic variables**

<b>Variable</b>	<b>Total women<sup>a</sup> No.</b>	<b>Women with mental disorders</b>	
		<b>No.</b>	<b>%</b>
<i>Age (years)</i>			
≤ 29 years	689	184	26.7
30–39 years	628	185	29.5
≥ 40 years	624	200	32.1
<i>Marital status</i>			
Single	382	133	34.8
Married	1549	418	27.0
Post-marital <sup>b</sup>	46	25	54.3
<i>Polygamy</i>			
First wife	453	34	7.5
Second wife	83	37	44.6
Third wife	8	2	25.0
Only wife	947	340	35.9
<i>Educational level</i>			
Illiterate	74	35	47.3
1–6 years	167	48	28.7
7–12 years	712	214	30.1
≥ 13 years	1036	287	27.7
<i>Employment</i>			
Unemployed	181	39	21.5
Employed (official)	399	134	33.6
Private business	29	9	31.0
Student (university)	294	101	34.4
Housewife	1084	301	27.8

<sup>a</sup>Data missing in some categories.

<sup>b</sup>Includes separated, divorced or widowed.

were married; 19% were single and the rest were separated, divorced or widowed (post-marital). Approximately 4% were illiterate, 8% had 1–6 years in formal education, 36% had 6–12 years in formal education, and 52% had 13+ years in formal education. Approximately 21% were employed, 69% were housewives or students, and 9% were unemployed.

For 35% of married subjects their husband was a blood relative and about 80% of married couples lived independently from

the husband's family. Only 5% of married women had a similar age to their husband (i.e. up to 5 years different). There was an age difference of 10 years in nearly 52% of married couples and > 10 years in 8% of married couples. Approximately 6% of married women lived in polygamous marriages (91 out of 1491 responding to this question). Of them, 83 were a second wife (where the husband had 2 wives) and 8 were a third wife (where the husband had 3 wives). Nearly 52% of subjects lived in

houses of 3–4 rooms, 17% in houses of 4+ rooms, and 25% in houses of  $\leq 2$  rooms.

Of the married women, 45% described their marital relationship as excellent, 24% as normal, 20% as having some problems, 9% with intermittent quarrels and 3% as violent. Approximately 8% of the women reported a previous history of emotional and psychiatric disorders, but only 44% of them had sought help (8% were treated by general practitioners, 30% by psychiatrists, and 6% by faith healers).

### Prevalence of mental disorders (distress)

The point prevalence of mental disorders as measured by the SRQ-20 (cut-off  $\geq 7$ ) was 36.0% and as measured by the PHQ was 29.3%. Table 2 shows the DSM-IV diagnoses of all subjects. The most common diagnoses among the studied sample were depressive disorders (9.8%), major depressive disorder (7.1%) and nicotine dependence/withdrawal (5.4%). Women living in single-room houses showed higher rates of mental disorder compared with women living in houses of 3+ rooms (34.3% versus 26.6%).

**Table 2 Primary diagnosis of the sampled women by Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) categories**

Diagnosis	No.	%
Other depression	196	9.8
Major depressive disorder	141	7.1
Nicotine dependence/ withdrawal	107	5.4
Panic disorder	47	2.4
Other anxiety	32	1.6
Eating disorder	32	1.6
Somatoform disorder	31	1.6
No diagnoses	1414	70.7
Total	2000	100.0

### Self-perception of general health

Table 3 reveals that only 75.4% of subjects reported their general health as very good or excellent, 22.7% acceptable or poor.

### Specific stressors (present all the time over past 4 weeks)

Table 4 shows the proportion of women exposed persistently to stressors and reveals that financial problems (18.1%), problems with husbands (11.9%), work-related problems (7.9%) and problems with weight and or shape (7.4%) were the commonest hardships that the women were exposed to during the study period. The prevalence of mental disorders among women exposed to different forms of stressors ranged from 53.8% to 74.0%.

### Specific predictors of morbidity

Table 5 shows that violent marital relationships, post-marital status (separated, divorced, widowed), women's illiteracy, polygamy (being a second wife) and age difference from husband were significantly associated with psychiatric morbidity among this group of women.

## Discussion

To the best of our knowledge this is the first report on women's mental health problems in Jordan. The report addresses mental health

**Table 3 Self-perception of general health of the sampled women**

Self-perception of health	No.	%
Excellent	456	22.8
Very good	1052	52.6
Poor or acceptable	453	22.7
Missing	39	2.0
Total	2000	100.0

**Table 4 Proportion of sampled women exposed to continuous stress over the past 4 weeks and the prevalence of mental disorders**

Specific stressors	Total women		Women with mental disorders	
	No.	%	No.	%
Problems with husband (married only)	208	11.9	154	74.0
Traumatic events (severe)	79	4.1	57	72.2
Extreme concern about health	120	6.1	85	70.8
Work-related problems	151	7.9	100	66.2
Absence of social support	114	5.9	75	65.8
Financial problems	353	18.1	232	65.7
Recent unpleasant events	111	5.7	72	64.9
Taking care of children or elderly parents	134	7.5	86	64.2
Sexual dysfunction	51	3.1	30	58.8
Shape/weight problems	145	7.4	78	53.8

problems, quality of life and the sociodemographic correlates of psychiatric morbidity among women attending health facilities

and living in urban and rural areas in Jordan. The strengths of this study include its large sample size, the heterogeneity of the

**Table 5 Variables found to be significantly associated with psychiatric morbidity of the sampled women**

Predictor	Total women No.	Women with mental disorders No.	%	P-value
Violent marital relationship	11	6	54.5	0.0001
Post-marital (separated, divorced, widowed)	45	25	55.6	0.0001
Age difference $\geq 10$ years from husband	27	13	48.1	0.001
Illiteracy	74	35	47.3	0.0001
Being the second wife	83	37	44.6	0.0001
Physical violence	49	21	42.9	0.021
Recent unpleasant events	1032	401	38.9	0.001
Absence of social support	372	124	33.3	0.032
Non-cousin marriage	1027	304	29.6	0.022
Living independently	1264	376	29.7	0.022

sample in terms of age and education and the comprehensive set of measures.

One of the aims of this study was to explore the social origins of distress among women. The finding of a high rate of psychiatric morbidity and mental distress among our participants is consistent with the previous observations in this regard. The prevalence of women with potential psychiatric distress (36.0%) in our sample was lower than that reported by Maziak et al., who found that 55.6% of low-income women in Aleppo, Syria, were labelled as cases according to the SRQ-20 using the same cut-off point (7/8) [17]. However, Table 4 shows that the rate of mental disorders among women with poor financial status is nearly double the rate found in the sample as a whole. The rate is lower than that reported by Al-Subaie et al., who found that 76% of women attending a health facility in Saudi Arabia were mentally distressed using a more lenient cut-off point (6/7) on the SRQ-20 [18].

Comparison of empirical studies of mental disorders reveals a consistent picture across diverse societies and social contexts that depression and anxiety disorders are more prevalent among women. The disability-adjusted life years data recently tabulated by the World Health Organization reflect the size of the problem [19]. While the high rates of mental disorder in women is not a new finding [20], we have been able to substantiate this high prevalence in a primary care population, with documentation by a brief, validated diagnostic instrument that can detect the categories of mental disorders most prevalent in primary care. The high rate of mood disorders in women is particularly well known [21–23]. Biological and sociological causes have been postulated. Women are particularly likely to experience depression during certain vulnerable periods of their lives, and

specific life events (divorce) have special meaning for women and are correlated with depressive symptoms. Our study confirms previous observations that women have a high risk of common mental disorders [23,24].

The economic status of women in our study (as assessed by education status, size of house and financial difficulties) was found to be a significant correlate with psychiatric morbidity. This accords with previous reports that link psychiatric morbidity with low socioeconomic class [17,25,26]. Another predictor of psychiatric morbidity in our study was the woman's illiteracy. Data from developed countries show that educational qualifications are good predictors of women's health and that there is a link between low educational level and the risk of common mental disorders [27–29]. Lack of education represents a diminished opportunity for people to access resources to improve their situation [30]. The significant association between psychiatric morbidity and indices of poverty such as low education and financial difficulties seems to be a robust finding, and is a universal one, occurring in all societies irrespective of their levels of development [17,31–34]. Poor women have more stressful lives than other women in terms of a higher risk of severe life events [35,36] and violence [37,38] and the stresses of living in poor housing and dangerous neighbourhoods [39,40]. They face more problems with parenting and child care [40], personal relationships [41] and social networks [37].

Our findings with regard to the prevalence of mental disorders in polygamous marriages showed an interesting pattern. Overall, 42.9% of women in polygamous marriages suffered mental disorders compared with 26.7% of first and only wives. Further analysis suggested that polygamous marriage was a significant protective factor

against poor mental health for first wives, while it has a very deleterious effect on mental health for second wives. We have no clear explanation for such observations. We speculate that the psychiatric distress in women with strained marital relationships is somehow lessened by further marriages, but becomes deleterious for the new coming wives. Our results provide strong evidence for the deleterious effect of this practice on women consenting to be the second wife in already established marriages.

There is a wealth of evidence from around the world linking physical abuse to common mental disorders such as depression and anxiety [7]. Having violent marital relations and suffering physical violence were both significant predictors of mental disorders in our group of women. Recent studies have also shown that a prior history of abuse may be correlated with mental disorders later in life, which is consistent with our findings [42]. In this regard, the clinician evaluating the depressed woman needs to pay particular attention to these potential causative factors.

The sociodemographic correlates of psychiatric morbidity in our study are of interest because of their positive associations with psychiatric morbidity. The positive findings of higher psychiatric morbidity among post-marital (separated, widowed, divorced) than among single and married women might be explained in part by the loss of social support of the family system. This is in accordance with the findings from an Ethiopian survey [2]. Our results provide evidence that living in an extended family system and cousin marriages are protective factors against psychiatric morbidity. The role of the extended family system in providing support has been highlighted in studies conducted by WHO [43]. The availability of other family members may attenuate the burden of child care. It is in

line with the findings from community psychiatric surveys from Mediterranean countries, where the burden of child care is lower [44,45]. The findings that women within cousin marriages have lower psychiatric morbidity than those of non-cousin marriages may in part be explained by the observation that living independently from the extended family system is more likely among non-cousin marriages. It seems that cousin marriages and remaining within the extended family system play a protective role against psychiatric morbidity.

The relationship of adversity and undesirable life events and psychiatric morbidity is well documented. Each of the 11 psychosocial stressors assessed with the PHQ was associated with a high rate of psychiatric morbidity. In this regard, our findings are in line with the results of Bebbington et al., who explored the relationship between adversity and psychiatric morbidity among women in Dubai [46]. Because our study design was cross-sectional, however, we cannot conclude that stressors were etiologically related to mental disorders. Indeed, it is possible that in some instances, the stressors were a consequence rather than a cause of mental disorders.

## Conclusion

Our findings provide further support to previous reports of a high rate of psychiatric morbidity in women attending health facilities. The other interesting finding of this study is the positive association between psychiatric morbidity and potentially modifiable sociodemographic factors, such as low education, poverty, isolation, violence and lack of social network support system. It would be of interest to find out whether modifying such factors would indeed result in ameliorating psychiatric morbidity in women.

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### **A practical guide for health researchers**

*A practical guide for health researchers*, by Mahmoud F. Fathalla and Mohamed M.F. Fathalla, is intended for health researchers, who are not limited to scientists pursuing a research career. They include health professionals, administrators, policy-makers and nongovernmental organizations, among others, who can and should use the scientific method to guide their work for improving the health of individuals and communities. This comprehensive guide covers, among others, the areas of ethics in research, choice of research, preparing for research, conducting research, analysing and interpreting results, disseminating research and writing a scientific paper. It is highly readable and easy to understand.

The guide can be obtained from: Distribution and Sales, World Health Organization Regional Office for the Eastern Mediterranean, Abdul Razzak Al Sanhoury Street, PO Box 7608, Nasr City, Cairo 11371, Egypt. Telephone: (202) 670 25 35; Fax: (202) 670 24 92/4. It is also available free online at: [http://www.emro.who.int/publications/pdf/healthresearchers\\_guide.pdf](http://www.emro.who.int/publications/pdf/healthresearchers_guide.pdf)

# Post-traumatic stress disorder among survivors of Bam earthquake 40 days after the event

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الاضطرابات الكربية التالية للرضح بين الناجين من زلزال "بام" بعد مرور 40 يوماً من وقوعه  
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**الخلاصة:** تم إجراء دراسة شملت نحو 145 مشاركاً (83 سيدة و62 رجلاً) باستخدام لقاءات منظمة، وفقاً لمقياس الاضطرابات الكربية التالية للرضح وبنود المقياس المنقح لتأثير الحدث (R-IES)، لاستقصاء مدى انتشار هذه الاضطرابات الكربية بين مجموعة من الناجين من الزلزال الذي ضرب بام في عام 2003. وقد بلغ متوسط عدد أفراد الأسرة من الدرجة الأولى والثانية، الذين لقوا حتفهم في الكارثة نحو 75.7. مجال يتراوح بين صفر و350 شخص. وكان نحو 81٪ من المشاركين مؤهلين لإجراء تشخيص الاضطراب الكربي التالي للرضح وفقاً لمعايير الدليل التشخيصي والإحصائي للاضطرابات النفسية (DSM-IV أو DSM-IV-TR). ولم يشاهد ترابط يُعتدُّ به إحصائياً بين المتغيرات السكانية أو سوابق مرض نفسي وبين قياسات الضائقة النفسية.

**ABSTRACT** To investigate the point prevalence of post-traumatic stress disorder (PTSD) in a group of survivors of the Bam 2003 earthquake, 145 participants (83 females and 62 males) were studied using structured interviews according to PTSD Symptom Scale (PSS) and Revised Impact of Event Scale (R-IES) items. The mean number of first and second order family members who had died in the disaster was 75.7, range 0 to 350 persons. About 81% of the participants were eligible for PTSD diagnosis according to *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV or DSM IV-TR) criteria. No significant correlation was found between demographic variables or history of psychiatric illness and measures of psychological distress.

## État de stress post-traumatique chez des survivants du tremblement de terre de Bam 40 jours après la catastrophe

**RÉSUMÉ** Afin de déterminer la prévalence ponctuelle de l'état de stress post-traumatique dans un groupe de survivants du tremblement de terre de Bam de 2003, 145 participants (83 femmes et 62 hommes) ont fait l'objet d'une étude au moyen d'entretiens structurés d'après les items du PTSD Symptom Scale (PSS) et du Revised Impact of Event Scale (R-IES). Le nombre moyen de membres de la famille de premier et second degrés qui étaient décédés dans la catastrophe était de 75,7 (extrêmes 0 - 350 personnes). Environ 81 % des participants remplissaient les conditions pour qu'un diagnostic d'état de stress post-traumatique puisse être posé selon les critères du Manuel statistique et diagnostique des troubles mentaux (DSM-IV ou DSM IV-TR). Aucune corrélation significative n'a été trouvée entre les variables démographiques ou les antécédents de maladie psychiatrique et les mesures de la détresse psychologique.

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## Introduction

On the morning of 26 December 2003 at 05:28 (local time) a major earthquake measuring 6.5 on the Richter scale struck the city of Bam in Kerman province in the southeast of the Islamic Republic of Iran. According to seismologists, the earthquake was one of the shallowest recorded, with a focal depth of only 10–12 km and the epicentre directly underneath Bam city. Bam is located on a main earthquake fault line.

The Islamic Republic of Iran is ranked as the fourth most disaster-prone country in the world, and this was the worst earthquake to hit the country in more than a decade. According to the latest estimates, about 30 000 people were killed, approximately 30 000 injured (of whom about 10 000 were sent to other cities), and approximately 45 000 people were made homeless in Bam (this figure might increase to 75 000 if we consider those people who returned to the area, the injured people released from hospitals outside the area, and the return of an anticipated 10 000 who have sought refuge with relatives in neighbouring villages and districts). Approximately 1850 children have been registered as unaccompanied and homeless, but this number is expected to increase.

In Bam itself, more than 85% of the buildings were completely destroyed, with damage varying from 95% in the old texture of the city (i.e. the 2500 year-old historic city) to 0.5% in the new texture of the city. Although most of the casualties occurred in Bam itself, the impact on surrounding rural areas was also severe. According to a recent survey, more than 18 000 houses across 250 villages were completely destroyed and will have to be rebuilt.

Based on the lessons learned from the last earthquake that struck the northern

provinces of the Islamic Republic of Iran in 1990, this earthquake will possibly cause a high incidence of post-traumatic stress disorder (PTSD), and there is an urgent need for post-trauma counselling especially for unaccompanied children and other distressed children [1].

The point prevalence (i.e. the prevalence at a particular point in time) of PTSD will clearly depend on what traumatic events have occurred and how many people were exposed to them. The proportion of those who go on to develop PTSD varies in part according to the nature and severity of the traumatic event. People who are more severely exposed are more likely to develop a disorder. In a mass disaster like the sinking of the cruise ship *Jupiter*, over 50% of the survivors developed PTSD and the remainder developed other psychopathology [2,3]. About 15%–50% of people exposed to a high level of combat later develop PTSD [4]. A recent survey published about the Bam earthquake survivors revealed that 58% of the respondents suffered from severe mental health problems as measured by the general health questionnaire (GHQ-12) and this was three times higher than the reported psychological distress among the general population [5]. Many scholars feel that the prevalence of PTSD and trauma exposure is higher in the developing world, in part due to the lack of resources to prevent disasters and alleviate their aftermath [6]. Although the National Comorbidity Survey (a mental health survey) in the United States of America found that the male population is more prone to exposure to traumatic events (60%) than females (50%), women were more likely to develop PTSD than were men (12% versus 6%) [7].

The present study was designed to investigate the prevalence of PTSD among survivors of the Bam earthquake.

## Methods

The data were collected at least 40 days (range 40 to 52 days) after the traumatic event.

### Sample

According to the available census, the population of Bam (residents, excluding aid workers) was about 100 000 people before the earthquake. The National Health Ministry divided Bam after the earthquake into 13 separate zones for management of health service delivery. Three zones were selected randomly for sample collection (zones number 5, 6 and 9). Each zone has 1 to 3 main streets. Sampling was carried out using 1 main street selected randomly (if more than 1 street was available) and taking 10 participants and then moving to the opposite side of the street and taking another 10 participants, then selecting the first sub-street on the left or the right of the street for the remaining sample. Only 1 person from each tent or house was selected for the interview. The person whose birth month number was nearest to the time of interview (month number) and his or her age was above 18 years was requested to take part in the interview. A total of 150 interviews were carried out with this procedure. Final data from 145 participants were entered into the analyses (5 were dropped from analysis due to incomplete or unreliable data, according to the clinical judgement of the interviewers).

### Questionnaires

Three questionnaires were utilized as follows:

- A demographic questionnaire was filled, covering information about the resident's name, age, sex, place of residence at the time of earthquake, marital status and past history of medical and psychiatric

problems. Participants were asked about their condition of consciousness during the disaster, whether they had any opportunity for escape or not and the type of action they carried out at the time of the disaster. Data were collected about the number of people in their house at the time of the earthquake and the number of first and second order family members known to the interviewee who died in the earthquake.

- The Revised Impact of Event Scale (R-IES) [8] is a 15-item self-report questionnaire that measures 2 elements of PTSD: event-related intrusion and avoidance. The frequency of these elements is indicated on a 4-point scale. The scale was first translated to Farsi independently by two of the authors and then presented to a professor of English language who was requested to compare the translation to the original form. The final corrected version was utilized for the study. For the entire sample the split-half reliability for the total scale was 0.68; internal consistency (Cronbach's alpha) of the intrusion subscale was 0.82 and that of the avoidance subscale was 0.66. Test-retest reliability (over 1 week) was 0.85 ( $n = 30$ ).
- The PTSD Symptom Scale (PSS) [9] contains 17 items that diagnose PTSD according to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R) criteria [10] and assess the severity of PTSD symptoms. The severity of each symptom is measured on a 4-point scale (score 0 for none; score 1 for  $\leq 1$  time per week; score 2 for 2–4 times per week; score 3 for 5+ times per week). The Farsi version of the scale was prepared by the same procedure as the R-IES. In addition to the original items, an item describing significant distress

or impairment in social, occupational or other important areas of functioning was added to the scale to be rated by interviewers. This item was added to the scale in order to find the cases that were eligible for PTSD diagnosis according to DSM-IV-TR criteria [11]. For the entire sample, the split-half reliability for the total scale was 0.79; internal consistency (Cronbach's alpha) for the intrusive thoughts, avoidant behaviours and physiological hyperarousal subscales were 0.80, 0.76, and 0.83 respectively for the total sample ( $n = 16$ ). Test-retest reliability after a 1-week interval was 0.88 ( $n = 30$ ).

All participants were examined in their camp or place of temporary residence. An expert clinical psychologist or psychiatrist carried out the interviews on a one-on-one basis and filled in the questionnaires after establishing therapeutic neutral rapport.

### Analysis

Descriptive statistics, chi-squared tests, multivariate analysis of variance and Pearson correlation coefficient were used for analysing the data.

## Results

### Demographic characteristics

The demographic characteristics of participants are shown in Table 1. There were 83

females and 62 males. Males were 8 years older than females (mean age for males was 36.4 years and for females was 28.3 years) but they had about the same years of formal education. All participants were interviewed at about 6 weeks after the disaster. There were more single women (72.3%) in the sample than single men (27.7%). The mean number of first and second order family members who had died in the disaster was 75.7, with a minimum of 0 and maximum of 350 persons.

### Post-traumatic Stress Disorder Symptom Scale and Revised Impact of Event Scale

Table 2 shows the statistics for PSS and R-IES scores for men, women and the entire sample. A multivariate analysis of variance model was used for the analysis of the data for PSS and R-IES separately. The results showed no difference between men and women in scores of the PSS subscales (intrusive thoughts, avoidant reactions, and physiological hyperarousal) [ $F(3, 141) = 0.45$ ;  $P = 0.71$ ]. The same result was also found for R-IES subscales (intrusive thoughts and avoidant reactions) [ $F(2, 142) = 0.45$ ;  $P = 0.32$ ].

The mean score on the PSS was 25.6 (standard deviation = 10.0) for the entire sample ( $n = 145$ ). The subjects were classified according to their scores as no PTSD (i.e. PSS scores  $\leq 5$ ), low PTSD (6–16), moderate PTSD (17–36) and severe PTSD

Table 1 Demographic characteristics of the study sample

Variable	Men ( $n = 62$ )	Women ( $n = 83$ )	Test	P-value
Years of age [mean (SD)]	36.4 (12.0)	28.3 (13.9)	$t = 3.72$	$< 0.0001$
Years of education [mean (SD)]	9.0 (4.1)	8.7 (4.2)	$t = 0.44$	NS
Days after disaster [mean (SD)]	43.3 (3.2)	42.9 (3.0)	$t = 0.80$	NS
Married /single (No.)	48/13	49/34	$\chi^2 = 6.18$	0.019

NS = not significant.



**Table 2 Mean and standard deviation for Post-Traumatic Stress Disorder Symptom Scale (PSS) scores and Revised Impact of Event Scale (R-IES) scores by respondents' sex**

Sex	PSS, intrusion	PSS, avoidance	PSS, physiological arousal	PSS, total	R-IES, intrusion	R-IES, avoidance
Men ( <i>n</i> = 62)	6.27 (3.12)	9.39 (4.01)	8.98 (4.27)	24.6 (9.91)	18.4 (4.97)	19.0 (4.60)
Women ( <i>n</i> = 83)	6.85 (3.27)	9.69 (4.46)	9.77 (4.47)	26.3 (10.1)	19.3 (4.88)	19.9 (4.34)
Total ( <i>n</i> = 145)	6.60 (3.21)	9.56 (4.26)	9.43 (4.39)	25.6 (10.0)	18.9 (4.92)	19.5 (4.46)

(37+). Table 3 shows the frequency of different categories of PTSD among men and women.

The result of the chi-squared analysis showed that men and women were not significantly different in the frequency of severity of degrees of PTSD symptoms. Of the 145 people in the sample, 97.9% scored > 5 and were eligible for a diagnosis of PTSD according to DSM-III-R criteria.

By including the impairment in social functioning criteria of the DSM-IV-TR, 117 subjects (81% of the entire sample) were eligible for a diagnosis of PTSD at the time of interview.

### Correlation between PSS and R-IES scores and other demographic factors

Table 4 shows the correlation coefficients between PSS and R-IES scores and other

trauma-relevant factors. There were positive and significant correlations between measures of intrusive thoughts and avoidance behaviours, and total scores of the PSS and R-IES scales. Age of the participants, marital status (single or married), years of formal education, positive or negative history of psychiatric illness and being asleep or awake at the beginning of the disaster did not show significant correlations with scores of PSS scales. The number of family members dying in the disaster showed a positive correlation with all scores of PSS and R-IES.

### Discussion

The present study was designed to screen a group of Bam earthquake survivors for PTSD symptoms. An earlier report on the

**Table 3 Frequency of scores on the Post-Traumatic Stress Disorder Symptom Scale (PSS), showing the severity of Post-Traumatic Stress Disorder (PTSD) by respondents' sex**

Sex	Non-PTSD (PSS ≤ 5)		Low PTSD (PSS 6–16)		Moderate PTSD (PSS 17–36)		Severe PTSD (PSS 37+)		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Men	1	1.6	12	19.4	39	62.9	10	16.1	62	100.0
Women	2	2.4	9	10.8	55	66.2	17	20.5	83	100.0
Total	3	2.1	21	14.5	94	64.8	27	18.6	145	100.0

$\chi^2 = 2.31$ ; not significant.

**Table 4 Correlation coefficients (r) between Post-Traumatic Stress Disorder Symptom Scale (PSS) scores and Revised Impact of Event Scale (R-IES) scores and other trauma-relevant factors**

Factor <sup>a</sup>	PSS, intrusion		PSS, aversion		PSS, physiological arousal		PSS total	
	r	P-value	r	P-value	r	P-value	r	P-value
R-IES, intrusion	0.73	< 0.0001	0.42	< 0.0001	0.69	< 0.0001	0.71	< 0.0001
R-IES, avoidance	0.17	0.04	0.47	< 0.0001	0.16	NS	0.32	< 0.0001
Age	0.09	NS	0.04	NS	0.20	0.016	0.13	NS
Marital status	0.0001	NS	0.12	NS	0.08	NS	0.09	NS
Years of education	-0.013	NS	-0.032	NS	-0.14	NS	-0.054	NS
History of psychiatric illness	0.002	NS	-0.048	NS	-0.027	NS	-0.031	NS
Alertness during trauma	0.003	NS	-0.105	NS	-0.011	NS	-0.049	NS
No. of family members dead	0.27	0.001	0.32	< 0.0001	0.19	0.021	0.31	< 0.0001

<sup>a</sup>Factors: age (years); marital status (1 = single; 2 = married); history of psychiatric illness (1 = positive; 2 = negative); alertness during trauma (1 = asleep; 2 = awake).  
NS = not significant.

prevalence of psychological distress in this population showed that 58% of the respondents suffered from severe mental health as measured by the GHQ-12 [5]. The results of the present study revealed a high proportion of people eligible for the diagnosis of PTSD. More than 81% of the sample were experiencing moderate to severe PTSD symptoms at the time of interview (about 40 days after the disaster) and received PTSD diagnosis according to the DSM-IV diagnostic criteria. The frequency of PTSD found by this study is higher than earlier reports from different disasters in Asian countries. The frequency of clinical and subclinical diagnosis of PTSD in the 1999 Taiwan earthquake were 10.3% and 19.0% respectively [12]; and the rate of onset of earthquake-related PTSD within 9 months in 2 rural areas in China was 24.2% using DSM-IV criteria and 41.4% using DSM-III-R criteria [13].

There are few reports on the prevalence of PTSD among adult survivors of natural disasters utilizing a longitudinal research

design. MacFarlane used a prospective study with firefighters involved in the 1983 Australian bushfires [14]. About 32%, 27% and 30% of the participants of his study were eligible for a PTSD diagnosis at 4, 11 and 29 months after the disaster. In a retrospective study on a group of survivors 14 years after Buffalo Creek flood in 1972, Green et al. reported a drop in PTSD diagnosis in his sample from 44% in 1974 to 28% in 1986 [15]. Shore et al. reported an exposure-related onset of PTSD, generalized anxiety disorder and depression after the 1980 Mount St. Helen's volcanic eruption [16]. They reported that symptoms of depression and anxiety had abated by 3 years, while symptoms of PTSD tended to persist longer. Finally, Duggan and Gunn reported on a group of adults exposed to different types of disasters [17]. They found 39% of the participants met the criteria for PTSD within a year after the events, with 23% still meeting such criteria after 26 months.

Several factors may account for the higher frequency of PTSD diagnosis reported here. First, the data were collected at the site of the accident. Many survivors of the Bam earthquake left the city immediately after the disaster, although a recent report is available about the higher incidence of psychological distress in a sample of people who left the scene of disaster in contrast to those remaining at the site [18]. Secondly, the data were collected very shortly after the disaster (only 40 days). The average number of family members who died was about 76 people in this sample. Factors that may account for such massive family death in Bam are the people's lifestyle (families living together in the same area; rural lifestyles) and the characteristics of the earthquake (a focal depth of only 10–12 km; the epicentre directly underneath the city). Accordingly, the disaster induced a heavy toll of grief and mourning on survivors and it would be expected that there would be a large number of people with severe symptoms including PTSD. Thirdly, a lack of social and economic support for the survivors makes them more vulnerable to psychological distress. Some of the victims may also be eligible for other diagnoses such as factitious disorder (i.e. patients intentionally produce signs of medical disorders and misrepresent their histories and symptoms in order to gain the sympathy of others [11]). In fact, the PTSD symptoms may be a form of cry for help for

those who remained bereaved, homeless and jobless, bereft of objects of attachment and loved ones.

The present study suffers from a number of methodological problems that limit the generalization of the findings. Future research in the area is necessary to follow the changes in the course of PTSD in the Bam earthquake survivors. A larger sample with greater geographical distribution may be selected for the study. A comparison may be carried out in PTSD symptoms and severity between those who were living in the centre of the earthquake and those who were apart from it and felt the earthquake with lesser degrees, as well as those who have higher level of social support in contrast to those with lower level of social support.

Nevertheless, the data presented here represent the magnitude of the human disaster and the urgent need of the survivors for psychiatric help to control post-traumatic effects. These people also need economic and social support in order to help them to rebuild their houses and their businesses and give them some hope for the future.

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# Depressive symptoms among high school adolescents in Oman

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أعراض الاكتئاب لدى المراهقين من طلبة المدارس الثانوية، في سلطنة عُمان  
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**الخلاصة:** قام الباحثون بالاعتماد على القائمة التفقدية الإبلاغ التي تشمل 27 بنداً لأعراض الاكتئاب لدى الأطفال، بغرض دراسة معدل وترايط الأعراض الاكتئابية لدى 5409 مراهقاً من طلبة المدارس الثانوية في سلطنة عُمان. وتبين أن مجرد كون الطالبة أنثى يُعدُّ مؤشراً هاماً لاكتئاب المراهقات وفقاً للتحليل الثنائي المتغيرات، ولكنه يفقد أهميته كعامل اختطار مستقل، إذا ما تم تضبيطه مع المؤشرات الأخرى للتحليل المتعدد المتغيرات. وشملت المؤشرات التي تساعد بشكل كبير في التنبؤ بأعراض الاكتئاب في نموذج التحوُّف اللوجستي كلاً من: وجود سابقة مرض نفسي، وتسجيل نقاط مرتفعة ضمن النتائج السلبية لاختبار المعتقدات الشخصية، أو نقاط منخفضة ضمن النتائج الإيجابية لهذا الاختبار، أو عدم تناول وجبة الإفطار، أو تردُّد العلاقة مع أفراد الأسرة والرفاق والمعلمين، أو الانتهاك البدني خلال فترة المراهقة. كما أن وجود هواية لدى الطالب والمواظبة على حضور الدروس تُعدُّ من المتغيرات الوقائية.

**ABSTRACT** We used the self-reported 27-item Child Depression Inventory to investigate the rate and correlates of depressive symptoms among 5409 secondary school adolescents in Oman. Being female was a significant predictor of adolescent depression in bivariate analysis, but adjusting to other predictors in multivariate analysis, it was no longer a significant independent risk factor. History of mental illness, high score in negative health locus of control, low score in positive health locus of control, not taking breakfast, poor relationship with family members, friends and teachers and physical abuse during adolescence significantly predicted depressive symptoms in the logistic regression model. Having a hobby and never dropping a class were protective variables.

## Symptômes dépressifs chez des adolescents du secondaire à Oman

**RÉSUMÉ** Nous avons utilisé l'inventaire de dépression chez l'enfant à 27 items auto-administré pour étudier le taux et les corrélats des symptômes dépressifs chez 5409 adolescents du secondaire à Oman. Le fait d'être de sexe féminin constituait un facteur prédictif significatif de dépression de l'adolescent dans l'analyse bivariée, mais après ajustement sur d'autres facteurs prédictifs dans l'analyse multivariée, cela ne constituait plus un facteur de risque indépendant significatif. Des antécédents de maladie mentale, un score élevé pour les croyances négatives en fonction du lieu de contrôle de la santé, un score faible pour les croyances positives en fonction du lieu de contrôle de la santé, le fait de ne pas prendre de petit déjeuner, de mauvaises relations avec les membres de la famille, les amis et les enseignants et des violences physiques pendant l'adolescence prédisaient significativement les symptômes dépressifs dans le modèle de régression logistique. Avoir un passe-temps et ne jamais avoir abandonné de matière à l'école étaient des variables constituant des facteurs de protection.

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## Introduction

A significant body of research has shown that major depression is one of the most common psychiatric disorders of adolescence, and has also indicated the comorbidity of depression in adolescents and several health risk behaviours or mental conditions, including tobacco use [1], substance use [2], sexual activity [3], obesity [4,5], intention to use violence [6], conduct disorder, anxiety and attention deficit/hyperactivity disorder [7]. However, a 2004 study also demonstrated the comorbidity of sub-threshold depression with other mental disorders [8]. Other studies have concluded that diagnosable clinical depression exists on a continuum with sub-threshold depressive symptoms [9,10]. Lewinsohn et al. pointed that the clinical significance of depressive symptoms does not depend on crossing the major diagnostic threshold of depression [9]. They also concluded that the results of their studies suggest that clinical depression is not categorically distinct from other degrees and patterns of depressive symptoms. Their data also showed that the greater the level of depressive symptoms among adolescents, the greater the risk of developing problematic patterns of substance abuse. Lewinsohn et al. [10] stated “the fact that sub-threshold depressive symptoms predicted future major depressive disorders is consistent with findings reported in previous studies” [11,12].

Hence, the investigation of depressive symptoms among Omani adolescents is as important as studying major depression among this dynamic age group. Our aim in this study was to estimate the rate and investigate the correlates of depressive symptoms among high school adolescents in a national representative sample of 5409 students in Oman.

## Methods

### Sample

The sample size was determined for males and females separately using *EpiInfo*, assuming a prevalence rate of 1% for depressive disorders among adolescents and a confidence interval of 99%. Accordingly, 2885 male adolescents and 2731 female adolescents, 5616 students in total were randomly selected (about 5% of the 111 849 secondary school students for the academic year 2004); these covered 43 *wilayat* (districts) (73% of the 59 *wilayat* in Oman). Of these, 5409 (2739 boys and 2670 girls) were screened and entered in statistical analysis (response rate 93% overall, 95% for boys, 97% for girls). The 207 missing students were absent at the time of screening, had dropped classes or had transferred to another school.

We used a multi-stage, stratified random sampling technique. All the regions of the country were selected at the first stage and sample size for each sex was determined in proportion to the total number of adolescent students aged 14–20 years. Then, in each region, male and female sub-samples were selected in proportion to the secondary school adolescent population in each of the 5 grades (I; II and III Arts and II and III Science) in Omani secondary schools. In the next stage,  $\geq 1$  schools were chosen randomly from each region, and then from each school  $\geq 1$  classes were randomly selected to cover the number of adolescents needed for the sample.

### Questionnaire and measurements

The total sample completed the 27-item Child Depression Inventory and a questionnaire including demographic data, health locus of control and other factors associated with depression. The self-reported



questionnaire covered sociodemographic data, chronic physical illness (e.g. diabetes, cardiovascular disease) and mental disorders (e.g. depression, schizophrenia) diagnosed by a doctor. Relationships with father, mother, siblings, friends and school-teachers were assessed on a 5-item scale with a score ranging from 1–5 where 5 represents an excellent relationship. It took around 40–50 minutes for each student to complete the whole questionnaire (around 1 class session).

The questionnaire also included a group of questions adapted from Takakura and Sakihara on health practices such as sleeping habits and hours of sleep, eating breakfast regularly, smoking and physical activities [13]. Each of the following was considered a positive health practice: sleeping 7–8 hours/night; eating breakfast every day; not currently smoking; and doing physical activity outside school premises  $\geq 3$  times per week.

The students were also asked about their health locus of control beliefs, whether internal or chance external, adapted from the multi-dimensional Health Locus of Control form A [14]. The first 2 subscales: internal health locus of control and chance health locus of control were translated into Arabic by the author who also calculated Cronbach's  $\alpha$  to assess the internal consistency as reliability in a previous study. Both subscales showed an accepted level of internal consistency i.e.  $> 0.4$  (0.5111 and 0.4636 for the 2 subscales respectively). Each subscale contained 6 questions and for each question study participants chose 1 of 6 answers ranging from strongly agree (= 6) to strongly disagree (= 1). The scores for each subscale ranged from 6–36 [14].

The Arabic translation of the 27-item Children's Depression Inventory [15] has been used in previous studies [16,17]. Each of the 27 items of the inventory assesses 1

symptom by presenting 3 choices ranging from 0–2 in the direction of increasing psychopathology and total score ranges from 0–54. Those who scored  $\geq 20$  were considered as having at least mild depressive symptoms. The cut-off score of 20 is suggested for screening in a general population, such as in a school setting, in which the prevalence of depression is likely to be low [18]. Reliability of Cronbach's  $\alpha$  was 0.8.

### Training and piloting

Three days training was tailored to the school health doctors who would undertake the screening process. In addition, a medical officer (regional coordinator) was recruited in each health region of the country to manage the administration and logistics of the survey and to ensure the implementation of all phases of the survey according to plan. During training a pilot study was conducted in Muscat by school health doctors on 400 secondary school students from both sexes in 2 randomly selected secondary schools (1 boys and 1 girls) not included in the study sample.

### Data processing and statistical analysis

Data coding, entry and management were done using *EpiInfo* followed by data analysis using *SPSS* for Windows, version 9. Data are given as counts, percentages and means. Group means were compared using analysis of variance and chi-squared test was used to examine the distribution of data using the likelihood ratio  $\chi^2$ . After doing bivariate analysis between the dependent variable and its predictors, all variables were then entered in a logistic regression model to determine the most significant variables adjusted for the others. The dependent dichotomous variable was coded to 0 = normal and 1 = having depressive symptoms (Child Depression Inventory

score  $\geq 20$ ). The odds ratio which shows the change in the odds of dependent variable(s) when the independent variable changed from 0 to 1 in the case of binary variables, or the next category or score in the case of categorical or continuous variables adjusted for age, sex and all other variables in the model.  $P$ -value  $\leq 0.05$  was considered significant in all statistical tests.

### Ethical issues

The study was approved by the Ethical Committee in the Ministry of Health before commencing the training and fieldwork. Confidentiality for the study participants was maintained as no direct or indirect identification was used. Verbal consent was obtained from the adolescent participants as well as the school headmasters.

### Results

The age of the study group ranged between 14 and 20 years with about 75% aged 16–18 years (Table 1). Less than 8% reported having had a chronic physical illness (diagnosed by a doctor) and 2.3% reported having had a mental disorder (diagnosed by a doctor). The majority had parents whose education was below secondary level (84.1% for fathers and 92.2% for mothers). The mean [standard deviation (SD)] for birth order was 4.87 (SD 2.9). Around 25% of the sample was subjected to physical abuse during adolescence by their parents or those who raised them and 7.5% the sample were also physically abused during their childhood (Table 1).

The mean (SD) score for the Child Depression Inventory was 13.16 (6.69).

In bivariate analysis, all 25 independent variables were significantly associated with the dependant variable, having depressive symptoms, except for 3 variables: age, birth order and mother's education.

**Table 1 Characteristics of the study sample (n = 5409<sup>a</sup>)**

Variable	Overall sample No.	Valid %
<i>Age (n = 5389)</i>		
14–	39	0.7
15–	415	7.7
16–	1291	24.0
17–	1562	29.0
18–	1208	22.4
19–	622	11.5
20–	252	4.7
<i>Sex</i>		
Male	2739	50.6
Female	2670	49.7
<i>Region</i>		
Muscat	1118	20.7
Dhofar	575	10.6
Al Dakhliya	789	14.6
North Sharqiya	437	8.1
South Sharqiya	426	7.9
North Batinah	1132	20.9
South Batinah	582	10.8
Al Dhahira	350	6.5
<i>Grade</i>		
First	2150	39.6
Second Arts	762	14.1
Second Science	931	17.2
Third Arts	726	13.4
Third Science	840	15.5
<i>Father's education (n = 4634)</i>		
Illiterate	1236	26.7
Can read and write	1332	28.7
Primary school	650	14.0
Preparatory school	682	14.7
Secondary school	326	7.0
Diploma	111	2.4
University +	297	6.4
<i>Mother's education (n = 4789)</i>		
Illiterate	2412	50.4
Can read and write	867	18.1
Primary school	773	16.1
Preparatory school	363	7.6
Secondary school	191	4.0
Diploma	59	1.2
University +	124	2.6

**Table 1 Characteristics of the study sample (n = 5409<sup>a</sup>) (concluded)**

Variable	Overall sample No.	Valid %
Personal history of mental illness	125	2.3
Personal history of physical illness	411	7.6
Having a hobby (n = 5333)	4866	91.2
Ever dropped a class (n = 5345)	1817	34.0
Has breakfast daily (n = 5361)	3223	60.1
Sleeps 7–8 hours/night (n = 5350)	2318	43.3
Physical activity outside school $\geq 3$ times/week (n = 5329)	1025	19.2
Current smoker (n = 5327)	161	3.0
Physical abuse during adolescence (n = 5345)	397	7.6
Physical abuse during childhood (n = 5260)	1324	24.7
Recites Quran daily (n = 5389)	1717	31.9
<b>Mean score (SD)</b>		
Relationship (range 1–5)		
With father	4.08 (1.26)	
With mother	4.36 (0.99)	
With siblings	3.91 (1.25)	
With friends	3.93 (1.09)	
With teachers	3.02 (1.16)	
Locus of control (range 6–36)		
External	22.25 (5.06)	
Internal	24.32 (5.12)	

<sup>a</sup>Many of the variables had values missing; total is indicated where appropriate.  
SD = standard deviation.

Overall, 17.0% of our sample had depressive symptoms, 19.4% of girls and 14.7% of boys ( $\chi^2$  21.58;  $P < 0.01$ ). Those with a personal history of mental illness were

more likely to have depressive symptoms (39.2%) than those who did not (16.5%) ( $\chi^2 = 35.56$ ;  $P < 0.01$ ). Similarly, those with a personal history of chronic physical illness were more likely to have depressive symptoms (27.0%) than those with no history (16.2%).

Having a hobby, taking breakfast regularly, not smoking, enough hours night sleeping, doing physical exercises  $\geq 3$  times/week and having a high score in relationships with social contacts protected against having depressive symptoms (Tables 2 and 3).

All variables, including the 3 non-significant variables, were entered into a forward stepwise logistic regression model. This was done because of the importance of adjusting for age and because education of parents is a proxy for social class. Birth order was also introduced in the model due to its demonstrated importance as a predictor of adolescent mental health [19]. Only 13 variables were significantly found to predict having depressive symptoms in the multivariate analysis. These could be grouped into a protective variables group and a risky variables group. The protective variables group comprised those with healthy practices: taking breakfast daily; sleeping 7–8 hours a night; having a hobby; and having good relationships with social contacts. The risky variables group comprised those who scored high for external health locus of control, those who scored low for internal health locus of control, those with a positive personal history of mental illness, those who ever dropped a class, and those who were abused by their parents during adolescence (Table 4).

## Discussion

The current study spotlights the rates and correlates of adolescent depressive symp-

Table 2 Association of sociodemographic variables with having depressive symptoms (score  $\geq 20$  on the Child Depression Inventory, Arabic version)

Variable	Depressive symptoms				Total <sup>a</sup>	Likelihood $\chi^2$	P
	Yes		No				
	No.	%	No.	%			
<i>Age (years)</i>							
14–	32	82.1	7	17.9	39	10.48	0.11
15–	343	83.3	69	16.7	412		
16–	1095	85.4	187	14.6	1282		
17–	1286	82.4	274	17.6	1560		
18–	999	82.7	209	17.3	1208		
19–	496	79.7	126	20.3	622		
20–	207	82.5	44	17.5	251		
Total	4458	83.0	916	17.0	5374		
<i>Sex</i>							
Male	2332	85.3	401	14.7	2733	21.58	< 0.01
Female	2136	80.6	515	19.4	2651		
Total	4468	83.0	916	17.0	5384		
<i>Region</i>							
Muscat	920	82.7	193	17.3	1113	52.88	< 0.01
Dhofar	516	89.7	59	10.3	575		
Al Dakhlia	667	86.2	107	13.8	774		
North Sharqiya	361	82.6	76	17.4	437		
South Sharqiya	365	85.7	61	14.3	426		
North Batinah	888	78.6	242	21.4	1130		
South Batinah	454	78.4	125	21.6	579		
Al Dhahira	297	84.9	53	15.1	350		
Total	4468	83.0	916	17.0	5384		
<i>Grade</i>							
First	1742	81.7	389	18.3	2131	19.01	< 0.01
Second Arts	655	86.1	106	13.9	761		
Second Science	781	84.0	149	16.0	930		
Third Arts	622	85.9	102	14.1	724		
Third Science	668	79.7	170	20.3	838		
Total	4468	83.0	916	17.0	5384		
<i>Father's education</i>							
Illiterate	1008	81.8	225	18.2	1233	15.77	0.02
Can read and write	1126	84.9	200	15.1	1326		
Primary school	549	84.6	100	15.4	649		
Preparatory school	575	84.4	106	15.6	681		
Secondary school	248	76.5	76	23.5	324		
Diploma	92	82.9	19	17.1	111		
University +	246	82.8	51	17.2	297		
Total	3844	83.2	777	16.8	4621		

Table 2 **Association of sociodemographic variables with having depressive symptoms (score  $\geq 20$  on the Child Depression Inventory, Arabic version)** (continued)

Variable	Depressive symptoms				Total <sup>a</sup>	Likelihood $\chi^2$	P
	Yes		No				
	No.	%	No.	%			
<i>Mother's education</i>							
Illiterate	2011	83.6	394	16.4	2405	6.77	0.34
Can read and write	737	85.3	127	14.7	864		
Primary school	629	81.5	143	18.5	772		
Preparatory school	295	81.5	67	18.5	362		
Secondary school	154	81.1	36	18.9	190		
Diploma	51	86.4	8	13.6	59		
University +	101	81.5	23	18.5	124		
Total	3978	83.3	798	16.7	4776		
<i>Personal history of mental illness</i>							
No	4392	83.5	867	16.5	5259	35.56	< 0.01
Yes	76	60.8	49	39.2	125		
Total	4468	83.0	916	17.0	5384		
<i>Personal history of physical illness</i>							
No	4168	83.8	805	16.2	4973	28.03	< 0.01
Yes	300	73.0	111	27.0	411		
Total	4468	83.0	916	17.0	5384		
<i>Having hobby</i>							
No	351	75.6	113	24.4	464	17.76	< 0.01
Yes	4063	83.7	792	16.3	4855		
Total	4414	83.0	905	17.0	5319		
<i>Ever dropped a class</i>							
No	3005	85.5	511	14.5	3516	46.19	< 0.01
Yes	1415	78.0	400	22.0	1815		
Total	4420	82.9	911	17.1	5331		
<i>Has breakfast daily</i>							
No	1628	76.3	506	23.7	2134	111.2	< 0.01
Yes	2811	87.5	403	12.5	3214		
Total	4439	83.0	909	17.0	5348		
<i>Hours of sleep/night</i>							
< 7 or > 8 hours	2357	77.9	667	22.1	3024	128.06	< 0.01
7–8 hours	2070	89.5	244	10.5	2314		
Total	4427	82.9	911	17.1	5338		
<i>Physical activity outside school</i>							
None or < 3 days/week	3532	82.3	761	17.7	4293	8.62	< 0.01
≥ 3 days/week	881	86.0	143	14.0	1024		
Total	4413	83.0	904	17.0	5317		
<i>Current smoker</i>							
No	4300	83.4	853	16.6	5153	16.76	< 0.01
Yes	113	70.2	48	29.8	161		
Total	4413	83.0	901	17.0	5314		

Table 2 Association of sociodemographic variables with having depressive symptoms (score  $\geq 20$  on the Child Depression Inventory, Arabic version) (concluded)

Variable	Depressive symptoms				Total <sup>a</sup>	Likelihood $\chi^2$	P
	Yes		No				
	No.	%	No.	%			
<i>History of physical abuse during adolescence</i>							
No	4132	85.2	717	14.8	4849	186.51	< 0.01
Yes	218	54.9	179	45.1	397		
Total	4350	82.9	896	17.1	5246		
<i>History of physical abuse during childhood</i>							
No	3495	87.2	515	12.8	4010	180.2	< 0.01
Yes	930	70.4	391	29.6	1321		
Total	4425	83.0	906	17.0	5331		
<i>Recites Quran</i>							
Daily	1489	87.0	222	13.0	1711	30.51	< 0.01
Not regularly	2971	81.1	694	18.9	3665		
Total	4460	83.0	916	17.0	5376		

<sup>a</sup>Values differ as missing values did not match for each variable in the cross tabulation.

toms in Oman; 17.0% of the adolescents we surveyed had depressive symptoms indicating that depressive symptoms is a public health problem among Omani adolescents.

Fergusson et al. investigated the association between extent of depression

(asymptomatic, sub-threshold, and major depression) and rates of subsequent mental health problems [20]. They found that adolescents with sub-threshold depression had elevated risk of later depression and suicidal behaviours. Depressive symptoms

Table 3 Association of some sociodemographic variables with having depressive symptoms by analysis of variance

	Depressive symptoms				<i>F</i> statistic	<i>P</i>
	No		Yes			
	Mean	(SD)	Mean	(SD)		
Birth order	4.88	(2.89)	4.84	(2.98)	0.11	0.74
External locus of control	22.04	(4.95)	23.27	(5.48)	45.14	< 0.01
Internal locus of control	24.40	(5.01)	23.96	(5.63)	5.68	0.017
Relationship with father	4.24	(1.13)	3.29	(1.53)	465.80	< 0.01
Relationship with mother	4.51	(0.83)	3.63	(1.37)	662.29	< 0.01
Relationship with siblings	4.11	(1.10)	2.93	(1.47)	769.49	< 0.01
Relationship with friends	4.06	(0.99)	3.27	(1.34)	433.65	< 0.01
Relationship with teachers	3.16	(1.07)	2.31	(1.30)	445.38	< 0.01

SD = standard deviation.



**Table 4 Odds ratios for predictors of having depressive symptoms in adolescents by logistic regression**

Variable	Overall sample	
	OR	95% CI
Personal history of mental illness <sup>a</sup>	2.48	1.41–4.34
External locus of control	1.04	1.02–1.06
Internal locus of control	0.98	0.96–0.99
Having a hobby <sup>a</sup>	0.65	0.46–0.90
History of dropping classes <sup>a</sup>	1.26	1.02–1.56
Taking breakfast daily <sup>a</sup>	0.62	0.51–0.76
Sleep 7–8 hours/night <sup>a</sup>	0.57	0.45–0.71
Relationship with father	0.77	0.71–0.74
Relationship with mother	0.76	0.68–0.83
Relationship with siblings	0.69	0.63–0.75
Relationship with friends	0.69	0.63–0.76
Relationship with teachers	0.75	0.69–0.81
Physical abuse during adolescence <sup>a</sup>	1.43	1.20–1.69

OR = odds ratio; CI = confidence interval.

<sup>a</sup>No (reference category) = 0; yes = 1.

range from none to severe, and those meeting diagnostic criteria for major depression represent the extreme of a continuum rather than a distinct group of individuals suffering from a specific disorder [20]. Lewinsohn et al. argued whether to treat persistent sub-threshold depression or not by mentioning the possible iatrogenic risks such as stigmatization and financial hardship. They also mentioned the “stepped care” model in which clinicians should strive to provide the least aggressive and least costly treatment to resolve clinical symptoms and any underlying vulnerability to depression [8]. Investigating the factors associated with depressive symptoms would help in early management of adolescents with such symptoms and would reduce future risk of undesirable mental health outcomes.

The rate of depressive symptoms in adolescents in this study was not comparable with rates in previous studies in Oman [16] or other Arab countries. Shaaban and Baashar [21] in Sudan used the Beck Depression Inventory (BDI) to screen for depressive symptoms in 1107 girls aged 12–19 years; 11% reported severe depression. Daradkeh et al. used the Composite International Diagnostic Interview on 1394 participants from Al Ain in the United Arab Emirates: the lifetime prevalence of major depression was significantly higher among females than males, 10.3% and 2.8% respectively [22]. Using the 13-item Beck Depression Inventory for screening, a similar depression rate was found in a Finnish study: 17.2% of 16 464 adolescents aged 14–16 years had at least mild depression [23].

Some studies have shown that frequency of depression in children and adolescents increased with age [24]. Our study did not show the same results. Female preponderance has been found in a previous study as well as in our study [23], although in multivariate analysis we did not find being female was a significant predictor. There could be a number of explanations for this; it could be related to the weak (or lack of) association of sex with depressive symptoms, as indicated in a previous study in Oman [25]. It could also be attributed to the significant independent variables in the model which explain or mediate sex differences in adolescent depression. Depression among adolescents results in impaired cognitive, interpersonal and academic functioning [26] and that could explain the significant association with both poor relations with the teacher and ever dropping a class with having depressive symptoms in this study.

There was a strong positive association between current smoking and having depressive symptoms in our study as well

as other studies. Depressed adolescents are more likely to begin smoking, to smoke more and to continue smoking as young adults. Smokers with mild or major depression find it hard to quit smoking [27,28].

The association between health locus of control and depressive symptoms was significant. Adolescents who were oriented toward chance locus of control were more likely to report having depressive symptoms in the bivariate and multivariate analysis. The same has been found in other studies. A high score for external locus significantly increased the risk for behavioural problems in general [29,30].

Adolescents with past history of physical abuse during childhood have also been found to be more likely to score higher on external chance locus of control [30]. Both externality and child abuse are risk factors for depression. Psychopathology coexisting with history of physical abuse in adolescents has been encountered in a number of studies. Abused adolescents showed significantly higher prevalence rate of depression and conduct disorder [31]. It has also been shown that they have significantly greater exposure to risk factors for adolescent suicide, including family disintegration, diagnosis of depression, disruptive behaviour disorders and substance abuse and dependence [32].

The negative association of depressive symptoms with healthy practices and social support, evidenced by good relationships with social contacts in our study, has also been demonstrated [13]. It seems that social support and healthy practices could have a buffering effect on depressive symptoms.

Finally, we would like to mention the study limitations. The dearth of research on adolescent depression in the Arab world published in PubMed-indexed journals and the diversity of tools used to screen depres-

sive symptoms and its correlates limited the chances for comparison of results. In addition, the use of self-reported questionnaires might elicit inflated or false responses, especially in such a sensitive age group. Self-reported questionnaire are easy to apply, however, and it is difficult logistically to conduct structured interviews for such a big sample. Another limitation was the cross-sectional design of our study where causality and/or temporal association could not be established and hence we could not determine why adolescents present with sub-threshold depressive symptoms.

Another limitation was the difficulty in demonstrating how representative this student sample in Oman was to Omani adolescents in general. Although education is universal in the country the possibility that some adolescents with depressive symptoms may have already dropped out of school should be always be taken into consideration. However, to the best of our knowledge, this was the first large, national study to investigate adolescent depressive symptoms and their correlates in Oman.

## Conclusion

To conclude, depressive symptoms in children can be subtle and varied. Diagnosis in adolescents is often complicated by behavioural manifestations associated with hormonal changes, but evidence suggests secondary prevention can significantly reduce future psychosocial problems [33].

We recommend using the findings of the current study by taking into consideration the protective factors as well as the risk factors of adolescent depression in a future prevention programme, along with strengthening the mental health component of the school health programme.

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# Validation of the Arabic Strengths and Difficulties Questionnaire and the Development and Well-Being Assessment

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التحقق من صحة النسخة العربية للاستبيان الخاص بقياس أوجه القوة والمصاعب، وتقييم حالة النماء والمعاودة

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**الخلاصة:** قام الباحثان باختبار صحة النسخ العربية للمقياسين الأساسيين المستخدمَين في قياس الباثولوجيا النفسية للطفل، وهما: الاستبيان الخاص بقياس أوجه القوة والمصاعب (SDQ)، وتقييم حالة النماء والمعاودة (DAWBA). وقد تم توزيعهما على أولياء أمور ومعلمي عيّنَين من الأطفال اليمنيين، تتراوح أعمارهم بين 5 و12 عاماً، إحداهما من عيادات نفسانية (العدد 87) والأخرى من المجتمع بصفة عامة (العدد: 100). وقد تمايزت درجات الاستبيان الخاص بقياس أوجه القوة والصعوبات (SDB) تمايزاً كبيراً بين العيّنتين، وكذلك بين الأطفال المشخصين بحالات نفسانية متفاوتة. وقد أظهر تقييم حالة النماء والمعاودة (DAWBA) اتفاقاً كبيراً مع تشخيص العيادات المستقلة. وعلى هذا فإن الإيجاز الذي يتسم به استبيان قياس أوجه القوة والمصاعب، واللقاءات التي أُجريت لتقييم حالة النماء والمعاودة المعتمدة بطبيعتها على ردود المستجيب، تجعل هاتين الأداتين مناسبتين تماماً للاستخدام في البلدان التي تعاني من نقص شديد في القوى البشرية المدربة.

**ABSTRACT** We examined the validity of the Arabic versions of 2 main measures of child psychopathology: the Strengths and Difficulties Questionnaire (SDQ) and the Development and Well-Being Assessment (DAWBA). They were administered to the parents and teachers of 2 samples of 5–12-year-old Yemeni children, one from psychiatric clinics ( $n = 87$ ) and the other from the community ( $n = 100$ ). The SDQ scores distinguished well between the 2 samples and also between children with different psychiatric diagnoses. The DAWBA showed substantial agreement with independent clinic diagnosis. The brevity of the SDQ and the respondent-based nature of the DAWBA interview make these tools feasible for use in countries where there is a severe shortage of skilled manpower.

## Validation de la version arabe des questionnaires *Strengths and Difficulties Questionnaire* et *Development and Well-Being Assessment*

**RÉSUMÉ** Nous avons examiné la validité de la version arabe de 2 instruments de mesure de la psychopathologie infantile : *Strengths and Difficulties Questionnaire* (SDQ) et *Development and Well-Being Assessment* (DAWBA). Ces instruments ont été utilisés avec les parents et les enseignants de 2 échantillons d'enfants yéménites âgés de 5 à 12 ans, l'un issu des consultations psychiatriques ( $n = 87$ ) et l'autre de la communauté ( $n = 100$ ). Les scores au SDQ établissaient une nette distinction entre les 2 échantillons et aussi entre les enfants ayant des diagnostics psychiatriques différents. Le DAWBA montrait une grande concordance avec le diagnostic clinique indépendant. Le SDQ est un questionnaire bref et l'entretien DAWBA est de type structuré, ce qui rend ces instruments utilisables dans les pays où il y a une grave pénurie de personnel qualifié.

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## Introduction

There is growing recognition of the importance of child psychiatric disorders in developing countries. These disorders are important not only because they result in suffering for children and those around them, but also because they interfere with social and educational development, and can lead to life-long social and psychiatric problems [1]. There is a pressing need, particularly in developing countries with very limited access to child mental health professionals, to develop simple screening mechanisms to help ensure that referrals to child mental health services are appropriate. It would be unrealistic to develop screening mechanisms that depend on complex or expensive measures and have to be administered by highly trained staff [2].

The Strengths and Difficulties Questionnaire (SDQ) is a brief tool that could be a relatively cheap and easy screening measure. It was originally published in English [3], and has subsequently been translated into over 60 languages. The fact that the SDQ is predictive of psychiatric diagnoses in many developed and developing countries [4] raises the possibility that it might be useful as a screen for psychiatric disorders in community settings, primary health care or paediatric clinics in Yemen.

The Development and Well-Being Assessment (DAWBA) is a package of questionnaires and structured interviews that also collects answers to open-ended questions for clinical review. In developing countries, where there is a severe shortage of skilled manpower, use of structured interviews is the most cost-effective and feasible way of carrying out community surveys [5]. The DAWBA was initially designed for a nationwide epidemiological survey of common emotional and behavioural disorders in Britain [6]. Previous studies have provided

evidence for the validity of the DAWBA in a developed country [6] as well as in a developing country [7].

Translating established measures is generally quicker and cheaper than developing new measures for each new language or country, and international measures have the additional advantage of facilitating international comparison. It is important, however, that standardized measures developed outside a particular culture and language community should be validated before their use in that setting [5].

This study aimed to validate the Arabic versions of standardized child psychiatric measures (the SDQ and the DAWBA) for future clinical and research application in Yemen and elsewhere in Arabic speaking countries.

## Method

### Clinical sample

The clinical sample was obtained from Aden Neuropsychiatric Teaching Hospital, the main psychiatric hospital in Yemen, Alwahda Paediatric Teaching Hospital, the biggest paediatric hospital in Yemen, and from school-based psychiatric clinics in Aden. These hospitals receive referrals from a wide catchment area, mainly from Aden, Abian and Lahj provinces. The children referred to these clinics are of mixed socioeconomic status. The SDQ and the DAWBA were administered to parents. The interviewers were blind to the diagnosis made by the psychiatrist, the paediatrician or the psychologist. The SDQ was read out by the interviewer when the respondents' literacy skills were insufficient for them to complete the questionnaires directly. The SDQ and the DAWBA were administered to teachers as well. These measures were administered on a consecutive series of 108



patients aged 5–12 years when first seen at the clinics between February and July 2002. Eleven were excluded because missing answers made it impossible to generate all scores. The final sample consisted of the remaining 97 children. Teacher SDQs and DAWBAs were available only for 68 (70%), either because the child was not at school or because the parents did not consent to contact with the school.

The mean age of the children in the sample was 9.4 (standard deviation 3.1) years and 53 (54.6%) were male.

### Community sample

The community sample was selected from schools in 2 different areas, Crater and Sheikh Othman, of Aden city. These areas were chosen to represent families whose socioeconomic status was similar in range to those who made up the clinic sample. One hundred children between 5 and 12 years were selected through a 2-stage sampling programme. In the first stage, a clustered random sample of classes from the first 4 grades of primary school was selected from each school and in the second stage, children were randomly selected, 3 or 4 from each class, from the class registers of 24 classes in 3 boys' schools and 3 girls' schools; the rest were selected from 1 kindergarten.

Parents were visited at home or seen in schools and all agreed to take part in the study. Parents and teachers completed SDQs, with the questionnaire being read out when the respondent did not have adequate literacy skills. Complete parent and teacher SDQ information was available on all 100 children. The mean age of the sample was 8.9 (standard deviation 1.6) years and 51% were males. The community and clinic samples were matched for sex ( $\chi^2 = 0.63$ ,  $df = 1$ ,  $P = 0.4$ ) and did not differ significantly

for age ( $P = 0.09$ ; 95% confidence interval  $-0.99$ – $0.07$ )

Assessments were carried out between January 2002 and April 2002, avoiding the first term when teachers do not yet know their pupils, and avoiding the end of the last term when teachers are often busy with the end-of-year examinations.

### Inclusion/exclusion criteria

#### *Clinical sample*

Children between the age of 5 and 12 years who had been referred to the psychiatric clinic were included. All consecutive referrals were eligible except for children with moderate or severe learning disability or whose only problem was enuresis, epilepsy or a specific learning disorder.

#### *Community sample*

All children between 5 and 12 years of age attending the kindergarten and the first 4 grades of the 7 selected schools were eligible.

### Instruments

The SDQ is a brief behavioural screening questionnaire that covers 25 attributes, some positive and others negative [3]. The 25 items are divided between 5 scales of 5 items each, generating scores for conduct problems, inattention-hyperactivity, emotional symptoms, peer problems and prosocial behaviour. All scales but the last are summed to generate a total difficulties score (range 0–40). The same questionnaire can be completed by the parents or the teachers of 4–16-year-olds [3]. Besides covering common areas of emotional and behavioural difficulties, it also inquires whether the informant thinks that the child has a problem in these areas and, if so, asks about resultant distress and social impairment [8]. The web site at <http://www.sdqinfo.com>

provides more information and downloadable questionnaires in many languages and scoring instructions.

The SDQ had previously been translated into Arabic. This translation was revised to maximize understanding in Yemen, and back-translated to ensure fidelity to the original English version.

The DAWBA is a package of questionnaires, interviews and rating techniques designed to generate ICD-10 and DSM-IV psychiatric diagnoses on 5–16-year-olds [9,10]. It is designed so that non-clinical interviewers can administer a structured interview to parents about psychiatric symptoms and resultant impact. When definite symptoms are identified by the structured questions, interviewers use open-ended questions and supplementary prompts to get parents to describe the problems in their own words. These descriptions are transcribed verbatim by the interviewers but are not rated by them. Teachers complete a brief questionnaire covering the main conduct, emotional, and hyperactivity symptoms and any resultant impairment. The different sorts of information are brought together by a computer program that also predicts likely diagnoses. These computer-generated summary sheets and diagnoses form a convenient starting point for experienced clinical evaluators, who decide whether to accept or overturn the computer diagnosis (or lack of diagnosis) in the light of their review of all the data, including transcripts [6].

The DAWBA was translated from English to Arabic by the first author. To ensure translation equivalence, a back-translation was done in the Faculty of Linguistics and Translation, Ajman University, United Arab Emirates. Conceptual and linguistic problems were resolved by extensive consultation with the second author, who wrote the original version, and a number of Arab psychiatrists. The translated version was pi-

lotted on a number of mothers from various Arab countries at the Islamic Welfare Centre in London. The web site at <http://www.dawba.com> provides more information, and downloadable versions of the interviews and questionnaires in many languages.

### **Selection and training of interviewers**

Four female interviewers (participation rate was expected to be higher with females) were selected, 3 were experienced clinical psychologists and 1 was a psychiatric senior house officer. The mode of introducing the DAWBA and the SDQ was explained in detail. Training on the theoretical aspects was carried out for 1 week then role-play exercises were carried out followed by a field-training session in the clinic.

### **Clinical diagnosis**

Children from the psychiatric and the paediatric clinics were assigned clinical diagnoses based on the operationalized criteria of either ICD-10 or DSM-IV. These clinical diagnoses were made at the time of initial assessment by a psychiatrist, a clinical psychologist or a paediatrician. The diagnoses were made blind to the children's SDQ and DAWBA assessments.

Diagnoses were collapsed into 2 broad categories to provide cell sizes that would be sufficient for meaningful analysis and also to avoid misclassification of subcategory diagnoses, as the initial assessments were carried out by a variety of professionals at different levels of seniority. The categories were *externalizing disorder* (including hyperkinetic, conduct disorder and oppositional disorder) and *emotional disorder* (including anxiety, depressive disorder and obsessive compulsive disorder). Overall, 30 children had an emotional disorder and 79 had an externalizing disorder (with 12 individuals having both).

### **Development and Well-Being Assessment diagnosis**

All open-ended comments were translated into English by one of the authors. Cultural and linguistic nuances in each case were discussed by the authors, after which the DAWBA diagnosis was made by the second author, who had previously made or supervised many thousands of DAWBA diagnoses. The rating consisted of reviewing information from the structured and open-ended questions and re-evaluating the computer diagnosis to provide a final clinical diagnosis based on DSM-IV and ICD-10 diagnostic criteria for each subject [9,10]. Diagnoses were collapsed into 2 broad categories to match the diagnostic categories adopted for the clinical diagnosis, sufficient for meaningful analysis.

### **Statistical analysis**

#### *Validity of the Development and Well-Being Assessment*

Based on criteria originally proposed by Landis and Koch [11], the validity of the translated version was primarily tested by examining the correspondence between clinical diagnosis and DAWBA diagnosis, using the kappa coefficient ( $\kappa$ , external validity). If there is complete agreement, then  $\kappa = 1$ . If there is no more agreement than would be expected by chance alone, then  $\kappa = 0$ .

#### *Validity of the Strengths and Difficulties Questionnaire*

The ability of different SDQ scales to distinguish between community and clinic subjects was examined using receiver operating characteristic (ROC) curves, employing the area under the curve as the index of discriminant ability. For this purpose, the underlying assumption was that the children in the clinic sample were substantially more likely to have psychiatric disorders than

were the children in the community sample (i.e. the relevant psychiatric disorders were more common in the high-risk than in the low-risk group). In ROC analyses, sensitivity (percentage of correctly identified "cases") and specificity (percentage of correctly classified healthy "non-cases") are calculated for all possible cut-off points of a score, and then combined in a single value called "area under the curve" (AUC). The AUC value obtained in this way reflects the discriminant validity. As a guide to interpretation, the AUC is 1.0 for a measure that discriminates perfectly and 0.5 for a measure that has no better than chance accuracy. With the number of subjects in this study, the level of significance is significantly better than chance when the AUC is  $\geq 0.6$ .

To generate ROC curves for each SDQ scale, the community sample was compared with the most relevant operationalized categorical diagnoses derived from the DAWBA. For 4 of the scales, the total difficulties scale, the total impact scale, the peer problems scale and the prosocial behaviour scale, the comparison was between all those in the community group and all those in the clinic group. The remaining 3 scales, emotional, conduct and hyperactivity symptoms, were judged by comparing the entire community sample with those clinic cases who had the corresponding disorder, as diagnosed by the DAWBA. For example, the discriminant power of the SDQ emotional scale was judged by comparing all community subjects with those children who had been diagnosed by the DAWBA as having an emotional disorder.

## **Results**

### **Validity of the Arabic Development and Well-Being Assessment**

DAWBA diagnosis was done on 86 (89%) of the 97 clinical cases. Table 1 shows the

**Table 1 Development and Well-Being Assessment (DAWBA) and clinic diagnoses for emotional disorders**

Clinic diagnosis of an emotional disorder	DAWBA diagnosis of an emotional disorder		Total
	No	Yes	
No	56	11	67
Yes	5	25	30
Total	61	36	97

$\kappa = 0.634$  (95% CI 0.473–0.795).

cross-tabulation of DAWBA and clinic diagnoses for emotional disorders. The DAWBA diagnosed the same disorder in 83% of cases.

Table 2 shows the cross-tabulation of DAWBA and clinic diagnoses for externalizing disorders (conduct/hyperkinesis). The DAWBA agreed with clinic diagnoses in 86% of cases. Overall there was substantial agreement between the DAWBA and the clinic diagnoses on the 2 main diagnostic groupings: emotional disorders and externalizing disorders.

### Validity of the Arabic Strengths and Difficulties Questionnaire

Table 3 summarizes the ability of different SDQ scales and informants (parents and teachers) to distinguish between commu-

nity and clinic subjects, as gauged by the AUC. All 7 SDQ scales (total impact, total difficulties, emotional symptoms, conduct problems, hyperactivity, peer problems and prosocial behaviour) seem potentially useful for predictive purposes. In each case, the AUC was significantly greater than 0.5 ( $P < 0.001$ ). Discrimination was best for hyperactivity and conduct scales for both the parent SDQ (AUC = 0.97 for hyperactivity and 0.88 for conduct scale) and the teacher SDQ (AUC = 0.97 for hyperactivity and 0.86 for conduct scale).

In the clinic sample, discrimination for emotional, conduct and hyperactivity scores between patients with different sorts of disorders (as defined by the DAWBA) was also examined using the AUC (Table 4). For example, the SDQ hyperactivity score discriminated well between patients with hyperkinetic disorder and psychiatric controls, i.e. clinic patients without a hyperkinetic disorder but with other diagnoses instead. Similarly, conduct and emotional scores all discriminated satisfactorily between clinic cases with and without the corresponding type of disorders. All AUCs represented a level of prediction substantially better than chance ( $P < 0.001$ ).

It is clear that both the parent SDQ and the teacher SDQ were as good at discriminating between different types of disorder within the clinic sample as they were at distinguishing between the clinic and the community sample.

## Discussion

The main purpose of this study was to investigate the validity of the Arabic versions of 2 main measures of child psychopathology, namely the SDQ and the DAWBA.

The DAWBA worked well judged by its agreement with independent clinical

**Table 2 Development and Well-Being Assessment (DAWBA) and clinic diagnoses for externalizing disorders**

Clinical diagnosis of an externalizing disorder	DAWBA diagnosis of an externalizing disorder		Total
	No	Yes	
No	29	5	34
Yes	9	54	63
Total	38	59	97

$\kappa = 0.691$  (95% confidence interval 0.542–0.840)

**Table 3 Ability of different Strength and Difficulties Questionnaire (SDQ) scores to distinguish between community and clinic samples**

SDQ score	Comparing community and clinic <sup>a</sup> samples			
	Parent rated		Teacher rated	
	AUC	95% CI	AUC	95% CI
Total impact	0.84 <sup>b</sup>	0.78–0.90	0.85 <sup>b</sup>	0.78–0.92
Total difficulties	0.81 <sup>b</sup>	0.74–0.87	0.76 <sup>b</sup>	0.68–0.83
Emotional symptoms	0.78 <sup>c</sup>	0.70–0.85	0.70 <sup>c</sup>	0.59–0.81
Conduct problems	0.88 <sup>d</sup>	0.82–0.93	0.86 <sup>d</sup>	0.79–0.92
Hyperactivity	0.97 <sup>e</sup>	0.93–1.00	0.97 <sup>e</sup>	0.94–1.00
Peer problems	0.70 <sup>b</sup>	0.62–0.77	0.66 <sup>b</sup>	0.57–0.74
Prosocial behaviour	0.78 <sup>b</sup>	0.71–0.85	0.65 <sup>b</sup>	0.56–0.74

CI = confidence interval.

<sup>a</sup>The clinic sample included all clinic cases for total impact and difficulties, peer problems and prosocial behaviour. For the remaining scores, only clinic cases with the corresponding diagnosis were included; e.g. the area under the curve (AUC) for emotional symptoms was for all community subjects compared with just those clinic cases who had an emotional disorder.

<sup>b</sup>For all 100 community participants versus all 86 clinic patients with any Development and Well-Being Assessment (DAWBA) diagnosis.

<sup>c</sup>For all 100 community participants versus all 36 clinic patients with DAWBA emotional diagnosis.

<sup>d</sup>For all 100 community participants versus all 57 clinic patients with DAWBA conduct diagnosis.

diagnosis. This study provided the first evidence for the validity of the Arabic version of the DAWBA. Furthermore, these results support findings from previous studies from other developing countries on the validity

of DAWBA parent interview. For example, in a Brazilian report, DAWBA made a diagnosis on 94% of a clinical sample who had an independent clinical diagnosis, with agreement on diagnostic grouping for

**Table 4 Ability of different Strength and Difficulties Questionnaire (SDQ) scores to distinguish between disorders within the clinic sample**

SDQ score	Comparing clinic cases	Parent rated		Teacher rated	
		AUC	95% CI	AUC	95% CI
Emotional symptoms	Emotional disorder (yes $n = 36$ ; no $n = 50$ ) <sup>a</sup>	0.76	0.66–0.86	0.72	0.60–0.85
Conduct problems	Conduct disorder (yes $n = 57$ ; no $n = 29$ ) <sup>b</sup>	0.89	0.83–0.96	0.89	0.82–0.97
Hyperactivity	Hyperkinesia (yes $n = 27$ ; no $n = 59$ ) <sup>c</sup>	0.86	0.78–0.95	0.89	0.81–0.97

AUC = area under the curve.

CI = confidence interval.



78% [12]. In a study in Bangladesh, there was substantial agreement between the DAWBA and the independent clinic diagnosis ( $\kappa$  0.63–0.94) [13].

Our study examined validity rather than reliability. Of course, the evidence for validity provides indirect evidence for reliability too; an unreliable set of measures would also have done poorly on tests of validity [6].

The interviewers were encouraged to express their opinion and the families' feelings and attitudes about this relatively long interview as this was the first time a structured psychiatric interview had been used in Yemen and because of the intention to use this measure subsequently in a large-scale epidemiological study. In general, interviewers reported very encouraging attitudes from the families, and the interviewers found it an enjoyable experience for themselves as well because they felt they had acquired more knowledge about child psychiatric problems. The skip rules also made the interview shorter and easy to administer.

Using the SDQ, it was possible to discriminate well, with a fair degree of precision, between community subjects and clinic patients on the basis of all 7 SDQ scales. Within the clinic sample as well, the SDQs were able to predict broad-band psychiatric diagnoses with a fair degree of accuracy. This level of accuracy could potentially be clinically useful. For example, children whose parent and teacher SDQ scores suggest that they are at a particularly high risk of a hyperkinetic disorder could be allocated to a professional with particular expertise in this domain.

These results support findings from 2 previous studies conducted on the SDQ in

Arabic countries. The first was conducted in the Gaza strip on children in 4 age bands [14]. In spite of the small sample size in each age group, the findings indicated that the SDQ was very promising as a screening measure or rating scale. More recently, in Yemen, Almaqrami and Shuwail found that the self-report version of the SDQ discriminated appropriately between a clinic and a community sample and was capable of detecting childhood emotional and behavioural disorders in clinical settings [15].

## Conclusion

The present study suggests that the Arabic version of the SDQ may predict psychiatric diagnosis accurately enough to be of value for screening and epidemiological studies as well as for clinical assessment, and shows that the SDQ is not only a practical and economical, but also valid measure for assessing different behavioural aspects of children.

The DAWBA shows a substantial agreement with independent clinical diagnoses. Such measures are essential to assess child psychiatric diagnoses in large-scale surveys to determine the prevalence of mental disorders in children in Yemen or other Arabic countries. The DAWBA may also be useful for standardized assessment within child mental health services.

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# Health education in the Libyan Arab Jamahiriya: assessment of future needs

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**التثقيف الصحي في الجماهيرية العربية الليبية: تقييم الاحتياجات المستقبلية**  
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**الخلاصة:** استهدفت هذه الدراسة تحديد القضايا الصحية ذات الأولوية، والفئات المستهدفة، ووسائل التثقيف في برامج التثقيف الصحي المستقبلية في الجماهيرية العربية الليبية. وتم في إطار هذه الدراسة توجيه استبيان إلى فئتين: 60 من المسؤولين الصحيين، و300 من عامة الناس. وقد اتفقت آراء المشاركين في الدراسة على سبع قضايا صحية مشتركة، وإن اختلفوا في درجة أولويتها. واعتبر المشاركون أن الأطفال والشباب هم أهم الفئات المستهدفة، وأن المدارس هي أنسب مكان للتثقيف. وأقر الجمهور أن وسائل الإعلام الإذاعية وسيلة قيمة للتثقيف الصحي الموجه لعامة الناس. ويوصي الباحثون بالقيام باستشارة الفئات الرسمية والجماهيرية بصورة منهجية، باعتبارها شرطاً مسبقاً لمبادرات التثقيف الصحي.

**ABSTRACT** The aim of this study was to determine priority health issues, target groups and education media for future health education programmes in the Libyan Arab Jamahiriya. A questionnaire was addressed to 2 groups: health officials (n = 60) and the general public (n = 300). In their lists of health issues to focus on, 7 were the same although prioritization differed. Children and youth were considered the most important target groups and the school setting the most appropriate medium for them. Broadcast media were acknowledged as valuable for health education for the general public. We recommend systematic consultation across official and lay groups as a preliminary requisite for health education initiatives.

## **Éducation sanitaire en Jamahiriya arabe libyenne : évaluation des besoins futurs**

**RÉSUMÉ** Le but de cette étude était de déterminer les questions de santé prioritaires, les groupes cibles et les moyens d'éducation pour les futurs programmes d'éducation sanitaire en Jamahiriya arabe libyenne. Un questionnaire a été adressé à 2 groupes : des responsables de la santé (n = 60) et le grand public (n = 300). Dans leurs listes de questions de santé à privilégier, 7 étaient similaires, même si l'ordre des priorités était différent. Les enfants et les jeunes étaient considérés comme les groupes cibles les plus importants et le cadre scolaire comme le vecteur qui leur était le plus adapté. Les médias étaient reconnus comme utiles pour l'éducation sanitaire du grand public. Nous recommandons une consultation systématique des groupes de responsables et de citoyens ordinaires en tant qu'étape préliminaire nécessaire pour les initiatives d'éducation sanitaire.

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## Introduction

Health education is a cornerstone of primary health care (PHC) and an essential component of any strategy to promote the health of the community. In line with the *Declaration of Alma-Ata* [1], the *National strategy providing health for all and by all* acknowledges that health education is the most essential element in PHC [2]. The national plan for health education presents programme aims, objectives, methods and tools [3]. It also lists the implementing authorities concerned at both central and local levels. Planning, ongoing monitoring and evaluation are central; implementation is, however, local.

A variety of health education interventions within the scope of PHC and health promotion are conducted. Personal as well as impersonal approaches are employed. Mass media, including television, radio and newspapers are used and posters, leaflets and booklets are widely distributed. The school setting has been considered the most appropriate medium for communicating with children. Nevertheless, television has been acknowledged as the most effective medium for health education [4].

The national report, *Libya: human development report 1999*, showed that a major problem in the field of health services in the Libyan Arab Jamahiriya was poor planning techniques [5]. It stressed the need for scientifically based national planning. Planning health promotion interventions involves market research, assessment of community needs and determination of perceived priorities [6]. This works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health [7]. Therefore, it is very important to involve people in determining population needs [8].

A crucial element in achieving an effective health education programme is to develop an understanding of the perceptions, preferences and requirements of the target audience. This should ideally then influence the selection of message, medium and creative strategy.

This study was the first in the Libyan Arab Jamahiriya to determine priority health issues and to identify the groups of people (target groups) to whom future health education programmes should be addressed. It was also used as the basis for selecting the media most appropriate for each health issue and to each group.

## Methods

During February–April 2004, an open-ended questionnaire was developed by the authors. It was given to 2 different groups of participants, health education/promotion officials (providers) and the general public (users). The first group included the members of the National Committee for Health Education, the members of the National Advisory Board for PHC, the members of the PHC central administration, the directors of departments of PHC and health education at the district level, the managers and experts of public health programmes and the under-secretaries of health in the Libyan Arab Jamahiriya over the past 35 years. The second group was a sample representative of the general public throughout the country, selected using a stratified simple random method of sampling [9].

The 2 groups were questioned about health issues that they thought were important and about which groups of people future health education programmes should address. Participants were asked to indicate which of the media should be employed for each issue and each group of people. In

addition, both groups were asked to report their recommendations and suggestions for future planning of health education programmes. A list of 30 health issues, 20 target groups and 40 education media were presented as examples for the participants.

The questionnaire was piloted to a representative sample of each target group, 10 individuals from the officials and 50 from the general public.

The authors personally handed over the questionnaire to 60 officials at both national and local levels.

Sample size for the general public group was calculated from the pilot study, according to the equation in Pearson and Turton [10]. We (the authors with the kind assistance of colleagues, friends and relatives) distributed 300 copies personally to members of the general public. Distribution was carried out at a variety of public places, such as hospitals, schools and offices and also at a number of private places, such as homes and private events. The proportion of urban and rural participants was consistent with the configuration of the Libyan population (85:15) in order to secure a stratified, simple random distribution [11,12]. Urban participants were targeted in Tripoli, Benghazi, Misurata and Zawia. Rural participants were reached in towns around Sebha, Gherian and Zliten. Equal participation of both sexes was considered as well. The questionnaire was answered anonymously and confidentiality was assured. Completed questionnaires were personally individually collected. Data were computed using *StatView* (Mac).

## Results

Of the 60 targeted health officials, 52 (86.7%) completed and returned the questionnaires: 6 were females, 5 were former under-secretaries of health, 10 were mem-

bers of the National Committee for Health Education, 8 were members of the National Advisory Board for PHC or members of the PHC central administration, 16 were managers or members of the public health central programmes, 9 were directors of health education or PHC at local district level, and 4 were national health promotion consultants or advisors. Twenty-one of the respondents had a doctoral degree or equivalent, 11 had a masters degree or equivalent, 13 had a bachelor degree or equivalent and 7 had an intermediate diploma. Of the 300 questionnaires distributed to the general public, 154 were completed and returned (response rate 51.3%). Demographic data are shown in Table 1.

The top 10 priority health issues indicated by each group are compared in Table 2. The table also shows the ranking given by each group. Both groups ranked personal hygiene, sanitation and environmental health high, 1 by the health officials and 2 by the general public. HIV/AIDS control

**Table 1 Demographic characteristics of participants from the general public (n = 154)**

Characteristic	No.	%
<b>Sex</b>		
Male	83	53.9
Female	71	46.1
<b>Age (years)</b>		
20	13	8.4
21–30	66	42.9
31–40	42	27.3
41+	33	21.4
<b>Location</b>		
Urban	117	76.0
Rural	37	24.0
<b>Education level</b>		
Primary school or lower	11	7.1
Secondary school or equivalent	56	36.4
University or higher	87	56.5

**Table 2 Comparison of priority health issues indicated by the health officials group and those indicated by the general public group**

Health officials group (n = 52)				General public group (n = 154)			
Rank	Health issue	No.	%	Rank	Health issue	No.	%
1	Personal hygiene, sanitation & environmental health	29	55.8	1	Drug abuse control	98	63.6
2	Immunization	23	44.2	2	Personal hygiene, sanitation & environmental health	79	51.3
3	Healthy food & proper nutrition	20	38.5	3	HIV/AIDS control	55	35.7
4	Child health	19	36.5	3	Regular medical check-up	55	35.7
4	Maternal health	19	36.5	5	Healthy food & proper nutrition	49	31.8
6	HIV/AIDS control	17	32.7	6	Child health	48	31.2
6	Accident prevention	17	32.7	7	Safe use of medications	42	27.3
6	Child health during school age/school health	17	32.7	8	Sport & physical exercise	34	22.1
9	Breastfeeding	16	30.8	9	Immunization	32	20.8
10	Drug abuse control	14	26.9	10	Breastfeeding	30	19.5

received similar attention, ranked 6 by the officials and 3 by the general public. The top priority for the public was control of drug abuse; this was, however, ranked 10 by the health officials.

The top 2 suggested target groups and recommended education media for each health issue are shown in Table 3 for the health officials and Table 4 for the general public.

In the section of the questionnaire concerning future planning of health education programmes, 19.2% of the participating health officials recommended more moral and financial support for health education programmes, 19.2% suggested the need for training and specialization of health education personnel, 15.4% recommended the provision of all necessary facilities for health education programmes and 11.5% stressed the continuity of health education programmes. Of the general public respons-

es, 11.0% recommended more emphasis on television and 8.4% suggested focusing on school health education.

## Discussion

The demand for health care can often outstrip available resources and it is not easy to satisfy the competing priorities of different individuals and groups. Thus, each country has to make hard decisions about priorities. Our study was the first in the Libyan Arab Jamahiriya assessing future needs and planning health education programmes. It used a combination of top-down and bottom-up approaches, involving key people in public health services together with a representative sample of the general public.

This study represents a practical application of the *Ottawa charter for health promotion* [7] and the *Mexico framework*

**Table 3 Top ten priority health issues, main target groups and education media recommended by the health officials group (n = 52)**

<b>Health issue &amp; suggested target groups</b>	<b>No.</b>	<b>%</b>	<b>Recommended education medium</b>	<b>No.</b>	<b>%</b>
<i>Personal hygiene, sanitation &amp; environmental health (n = 29; 55.8%)</i>					
General public	19	65.5	Television	16	55.1
			Radio	13	44.8
Youth	12	41.4	Television	7	24.1
			Youth/sport clubs	6	20.7
<i>Immunization (n = 23; 44.2%)</i>					
Parents/patrons	11	47.8	Television	7	30.4
			Booklets/leaflets	6	26.1
Schoolchildren	11	47.8	Television & school curricula	8	34.8
<i>Healthy food &amp; proper nutrition (n = 20; 38.5%)</i>					
All public groups	13	65.0	Television	12	60.0
			Radio	10	50.0
Schoolchildren/students	10	50.0	School curricula	7	35.0
			Teachers	4	20.0
<i>Child health (n = 19; 36.5%)</i>					
Parents/mothers	19	100	Television	18	94.7
			Radio	12	63.2
Schoolchildren	7	36.8	School curricula	4	21.1
			Television	3	15.8
<i>Maternal health (n = 19; 36.5%)</i>					
Female youth	9	47.4	Television & booklets/leaflets	5	26.3
Mothers	7	36.8	Television & radio	7	36.8
<i>HIV/AIDS control (n = 17; 32.7%)</i>					
Youth	14	82.4	Television	12	70.6
			Radio & youth/sports clubs	9	52.9
Adult students	7	41.2	School curricula	7	41.2
			Television	6	35.3
All public groups	7	41.2	Television	7	41.2
			Radio	5	5.9
<i>Accident prevention (n = 17; 32.7%)</i>					
Youth	9	52.9	Television & lectures/seminars	5	29.4
All public groups	7	41.2	Television	5	29.4
			Radio	3	17.7



**Table 3 Top ten priority health issues, main target groups and education media recommended by the health officials group (n = 52) (concluded)**

Health issue & suggested target groups	No.	%	Recommended education medium	No.	%
<i>School health/child health during school age (n = 17; 32.7%)</i>					
Schoolchildren	16	94.1	School curricula	11	64.7
			Television	8	47.1
Teachers	12	70.6	Lectures/seminars	11	64.7
			Television & booklets/leaflets	4	23.5
<i>Breastfeeding (n = 16; 30.8%)</i>					
Mothers/pregnant women	13	76.5	Television	9	56.3
			Health professionals	6	37.5
Female youth	6	35.3	School curricula	4	25.0
			Television	2	12.5
<i>Drug abuse control (n = 14; 26.9%)</i>					
Teenagers/youth	12	85.7	Television	10	71.4
			Lecture/seminars	8	57.1
Students	8	57.1	School curricula	5	35.7
			Television	3	21.4

for countrywide plans of action for health promotion [6], calling for community participation in health services planning.

In the present study, the essential components of PHC [1,2] that need general public awareness and behaviour change were indicated in the list of priority issues by the health officials. Specifying these issues as priorities for future health education programmes is largely dependent on the awareness of the officials (drawn from their training and experience). International and national epidemiological data play an important role in influencing opinions. This represents a response to the demographic, social and epidemiological situation in the Libyan Arab Jamahiriya as well as life-style practices.

Overall, the general public agreed with the health officials, selecting 7 identical

health issues in the list of 10 priority issues. However, 3 issues chosen by the officials, accident prevention, maternal health and child health during school age/school health were not listed in the top 10 of the general public.

Both groups suggested that health education programmes in some areas should be targeted to all public groups. At the same time, it was recommended that these programmes be addressed to specific concerned groups; examples include communicating with youth regarding personal hygiene, sanitation and environmental health, and focusing on HIV/AIDS control to youth and students. McGuire's analysis of effective communication and persuasion methods suggested that messages that are more closely suited to the values and attitudes of those to whom they are directed will be

Table 4 Top ten priority health issues, main target groups and education media recommended by the general public (*n* = 154)

Health issue & suggested target groups	No.	%	Recommended education media	No.	%
<i>Drug abuse control (n = 98; 63.6%)</i>					
Teenagers/youth/students	96	98.0	Television	62	63.3
			Youth/sport clubs	50	51.0
Schoolchildren	58	59.2	School curricula	40	40.8
			Television	23	23.5
<i>Personal hygiene, sanitation &amp; environmental health (n = 79; 51.3%)</i>					
Children	55	69.2	School curricula	37	46.8
			Teachers	23	29.1
Youth	42	53.2	Youth/sport clubs	24	30.4
			Television	16	20.3
<i>HIV/AIDS control (n = 55; 35.7%)</i>					
Youth	51	92.7	Television	32	58.2
			Youth/sport clubs	23	41.8
Children	28	50.9	School curricula	14	25.5
			Television	13	23.6
<i>Regular medical check-up (n = 55; 35.7%)</i>					
Children/students	49	89.1	Television	23	41.8
			School curricula	12	21.8
Youth	29	52.7	Youth/sport clubs	17	30.9
			Television	13	23.6
<i>Healthy food &amp; proper nutrition (n = 49; 31.8%)</i>					
Schoolchildren	32	65.3	School curricula	26	53.1
			Television	14	28.6
Mothers/housewives	21	42.7	Television	16	32.7
			Radio	11	22.5
<i>Child health (n = 48; 31.2%)</i>					
Mothers	34	70.8	Television	23	47.9
			Radio	15	31.3
Schoolchildren	28	58.3	School curricula	17	35.4
			Teachers	11	22.9
<i>Safe use of medications (n = 42; 27.3%)</i>					
Patients with chronic diseases	18	42.9	Television	12	28.6
			Health professionals	9	21.4
Children	16	38.1	School curricula	10	23.8
			School activities, teachers & television	6	14.3

Table 4 **Top ten priority health issues, main target groups and education media recommended by the general public (n = 154) (concluded)**

Health issue & suggested target groups	No.	%	Recommended education media	No.	%
<i>Sport &amp; physical exercise (n = 34; 22.1%)</i>					
Youth	26	76.5	Youth/sport clubs	20	58.8
			Television	10	29.4
Schoolchildren	15	44.1	School activities	8	23.5
			Television & children's clubs	6	17.7
<i>Immunization (n = 32; 20.8%)</i>					
Schoolchildren	19	59.4	School curricula	13	40.6
			Television	10	31.3
Children under 6 years	17	53.1	Television & nursery schools	8	25.0
<i>Breastfeeding (n = 30; 19.5%)</i>					
Mothers	25	83.3	Television	24	80.0
			Radio	21	70.0
Visitors to health services	8	26.7	Health professionals	7	23.3
			Lectures/seminars	3	10.0

more effective than other types of messages [13].

Different terms were chosen by both groups to indicate that the young generation is the essential target group regarding certain health issues. It has been recommended that health education in the Libyan Arab Jamahiriya be strengthened as early in life as possible, targeting children and youth. This is probably to reduce individual exposure to self-imposed risks. This represents an orientation of health education planning on the basis of the "at-risk groups" approach. The high proportion of children and youth within the Libyan population (78.3%) [12] largely supports the viewpoint of participants of both groups in focusing on the young generation as a major target group. Moreover, youth can be considered a crucial impact group within the community, and they can be targeted in order to bring about

individual and societal change towards better health. Other important groups that were suggested include parents, guardians and foster parents, mothers, patients with chronic diseases and teachers. This demonstrates that the study participants put emphasis on targeting the new generation both directly and indirectly.

Both groups recommended broadcast mass media as the most important to be employed in future health education. Television was usually perceived as more potent than radio. In previous studies by the same authors, television was considered by the Libyan health officials and general public as the leading medium for mediating health education [4,14]. The extensive health education programmes disseminated through the Libyan television channels are perceived as contributing to these findings. Nevertheless, the relatively recent wide ac-

cess of Libyans to the various international satellite channels casts doubt on the efficacy of future health education through the national television channels.

Preference for print media for health education varied according to the health issue and the target audience. The relatively high literacy rate (82.3%) in the Libyan Arab Jamahiriya [12] supports the choice of print media as a source of health education. Booklets and leaflets were previously ranked by the Libyan general public as the lowest among the media employed to raise health knowledge or to promote healthy practices, newspapers and magazines were given a higher rank [4]. Nevertheless, officials have previously underestimated the efficacy of print media [14].

To target children, teenagers or youth, the school setting was perceived as the most appropriate medium for communication. The school enrolment rate in the Libyan Arab Jamahiriya [5] supports the use of the school setting in health education. The school setting was previously considered by the general public an effective environment for health knowledge and behaviour change [4]. Schools are widely seen as having a key role in health education, whether the desired outcomes are changing behaviours or the personal and social skills associated with empowerment [15].

To reach most of the suggested groups, a recommended combination of education media emerged, particularly to target the young generation. The use of a combination of the school setting and television was perceived to be useful. A selected combination

of communication channels tends to have a synergistic effect: it is mutually reinforcing, and can carry different types of information. Television spreads information rapidly and at low cost. On the other hand, the opportunity of 2-way interaction and obtaining feedback gives face-to-face communication a powerful advantage.

Our study revealed that the assessments of officials differed from those of the general public. These findings suggest the need for a systematic consultation across professional and lay groups as a requisite for statutory health education/promotion initiatives. Involving people in determining their own needs should result in increased effectiveness and efficiency. The results also suggest the need for reorientation of health promotion programmes in the Libyan Arab Jamahiriya, and the role of health education within these programmes, according to future priorities. It proposes reorganizing the use of different health education media in future planning, placing an emphasis on television techniques. Together with the introduction of a reliable database, this may facilitate proper planning and future evidence-based practices.

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# Congenital heart disease in Saudi Arabia: current epidemiology and future projections

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الداء القلبي الخلقي في المملكة العربية السعودية: الوبائيات الحالية والتوقعات المستقبلية

عبد الله بن عبد الرحمن آل عبد القادر

**الخلاصة:** تم تقييم نتائج الدراسات الوبائية التي أجريت في أربع مناطق في المملكة العربية السعودية (آب/أغسطس 1988 – شباط/فبراير 2000) وشملت 2604 شخصاً يعانون من الداء القلبي الخلقي، بُعِثَ إعطاء لمحة عامة عن وبائيات هذا الداء. وأثبتت الدراسة أن عيب الحاجز البطيني يمثّل أكثر الآفات شيوعاً (33.9٪)، يليه عيوب الحاجز الأذيني (18.1٪). وثبت بوجه عام، وجود نوع من التشابه في توزّع المرض بين الجنسين، وإن كان إصابة الذكور أكبر من الإناث في ثلاث حالات. فمن بين 2269 حالة (59٪) تجلّت منذ السنة الأولى من الحياة، وجد أن 566 (25٪) يعانون من داء قلبي خلقي وليدي، وكانت متلازمة داون أكثر الأسباب شيوعاً. ووُجد أن توزّع آفات معيّنة والتوزّع بين الجنسين يتشابه مع نتائج أجزاء أخرى من العالم؛ وإن كان المعدل التراكمي لاكتشاف الداء منسوباً للعمر عند تجلّي الأعراض أقل.

**ABSTRACT** To provide an overview of the epidemiology of congenital heart disease, the results of epidemiological studies done in 4 regions of Saudi Arabia (August 1988–February 2000) and 2604 individuals with congenital heart disease were evaluated. Ventricular septal defect was the commonest lesion (33.9%) followed by atrial septal defect (18.1%). Overall, sex distribution was similar; for 3 conditions, more males than females were affected. Of 2269 (59%) presenting in the first year of life, 566 (24.9%) had neonatal congenital heart disease. Down syndrome was the commonest cause. Distribution of specific lesions and sex distribution was similar to findings from other parts of the world; however, the overall detection rate at 1 year of age was lower.

## La cardiopathie congénitale en Arabie saoudite : épidémiologie actuelle et projections futures

**RÉSUMÉ** Afin de décrire l'épidémiologie des cardiopathies congénitales, les résultats des études épidémiologiques réalisées dans quatre régions d'Arabie saoudite (août 1988-février 2000) ont été évalués et 2604 cas de cardiopathie congénitale ont été analysés. La communication interventriculaire était la lésion la plus courante (33,9 %), suivie par la communication interauriculaire (18,1 %). Dans l'ensemble, la répartition par sexe était similaire ; pour trois affections, les garçons étaient plus touchés que les filles. Sur les 2269 cas (59 %) apparaissant dans la première année de vie, 566 (24,9 %) étaient des cas de cardiopathie congénitale néonatale. Le syndrome de Down était la cause la plus fréquente. La répartition des lésions spécifiques et la répartition par sexe étaient similaires à celles observées dans d'autres parties du monde ; le taux global de dépistage à l'âge d'un an était toutefois inférieur.

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## Introduction

The epidemiology of congenital heart disease in Saudi Arabia has not been determined, nor has it received the attention it warrants. Only scattered efforts have been made in 4 regions. These were done over different time periods and using different methodologies. This study aimed at utilizing the results of these studies to establish the epidemiology of congenital heart disease in Saudi Arabia. The expected problems resulting from the differences in time, place and methodology in the 4 studies are reflected.

Several previous reports suggest a changing pattern and incidence of congenital heart disease in various geographic locations [1,2]. Knowledge of the epidemiology of congenital heart disease is the basis on which investigative efforts will emerge to identify the causes of cardiac dysmorphogenesis and afford opportunities to prevent them [3]. Future projections, thought to be critical for the comprehensive and optimum care of congenital heart disease population in Saudi Arabia, are also discussed. These are also considered of pivotal importance for groups which care for patients with congenital heart disease as well as for policymakers.

## Methods

The findings of epidemiological studies conducted in 4 different regions of Saudi Arabia were examined. The areas were: east area [3] (Al-Hasaa region, estimated population 1.2 million), south-west area [4] (Aseer, estimated population, 2 million), west area [5] (Al-Madina region, estimated population 2 million) and north central area [6] (Al-Qaseem region, estimated population 1.5 million). These studies were commissioned over different

periods between August 1988 and February 2000, some overlapping, as follows: January 1990–December 1992 in Al-Qaseem, March 1992–February 1995 in Al-Madina, July 1994–June 1996 in Aseer and March 1997–February 2000 in Al Hasaa.

The studies were implemented in 4 related institutes, which are the only referral centres in those regions to which children suspected of having congenital heart disease are referred from both government and private hospitals and primary health care centres. These amount to 10–15 secondary hospitals and 30–50 primary health care centres in the 4 areas.

A total of 2604 patients, 1299 males and 1305 females, age range 0–13 years, were evaluated in the studies. The principal authors of these studies (qualified paediatric cardiologists) aided by qualified paediatric specialists made the diagnostic decisions after carrying out a full physical examination, plain chest radiography, electrocardiography and echocardiography. All patients were finally diagnosed in the main referral institutes.

A significant number of referrals (234 of 974, i.e. around 24% in the Al Hasaa study) were normal and excluded from the study. Patients with acquired heart disease such as rheumatic fever were also excluded. Down syndrome patients need karyotyping for confirming diagnosis of trisomy 21; this was done through further chromosomal analysis of blood samples at Damman Central Hospital laboratories for the patients from Al Hasaa.

Congenital heart disease was subcategorized into 9 major lesion types, the most common defects, plus a group which included the rare complex lesions. This classification is an internationally accepted practice. When there was > 1 cardiac lesion, the dominant lesion structurally and haemodynamically was used for the diagnosis.

This is also the most accepted practice in such situations.

Briefly, the diagnostic criteria of each type of cardiac lesion (based on echocardiography/Doppler examination) were:

- ventricular septal defect: communication between the 2 ventricles (perimembranous, membranous, mid-muscular, outlet, inlet or basal);
- atrial septal defect: communication between the 2 atria (primum, secundum or sinus venosus);
- pulmonary stenosis: narrowing of right ventricular outflow tract (valvular, subvalvular, supra-valvular);
- patent ductus arteriosus: patency of ductus arteriosus;
- atrioventricular septal defect: defect in the atrioventricular septum with common atrioventricular valve (complete) or 2 distinct valves (partial);
- tetralogy of Fallot: large non-restrictive outlet ventricular septal defect and infundibular stenosis with aortic overriding and secondary right ventricular hypertrophy;
- aortic stenosis: narrowing of left ventricular outflow tract (valvular, subvalvular, supra-valvular);
- coarctation of aorta: narrowing of the aortic arch at the isthmus;
- dextro-transposition of great arteries: ventriculoarterial discordance;
- other: all other congenital heart lesions, such as pulmonary atresia, tricuspid atresia, double outlet right ventricle, etc.

Data collection in these cases included proportion and sex distribution. Three studies [3,5,6] included age at presentation. The total number of individuals referred due to suspicion of heart disease was noted in 3 studies [3–5]. Neonatal congenital heart

disease was examined in 3 studies [3,5,6], covering 1566 neonates from a total of 2269. Incidence of congenital heart disease and details of congenital heart disease in Down syndrome, as well as confidence limits of sex affected with each lesion were documented in 1 study [3].

## Results

In the 4 studies, 2604 patients were diagnosed with congenital heart disease. The distribution of the various cardiac defects in each region is shown in Table 1. Ventricular septal defect was the commonest disorder in all 4 studies, accounting for 33.9% of congenital heart disease overall. The second most common lesion was atrial septal defect, accounting for 18.1% of all congenital heart disease. Left-sided obstructive lesion (aortic stenosis and coarctation of aorta) was documented in 4.8% of all congenital heart disease. The overall incidence of total anomalous pulmonary venous drainage was 0.3%.

Table 2 shows the distribution of various cardiac defects in Saudi Arabia compared with other geographic regions of the world [1,7–14]. Ventricular septal defect was consistently the commonest congenital heart condition worldwide, although a wide variation in frequency was noted (24.0% in Denmark, 60.0% in Japan). The low frequency of left-sided obstructive lesion in Asian countries such as Saudi Arabia (4.8%) [1] and Japan (3.7%) [7] contrasted with the higher figures from Europe, e.g. Denmark (11.7%) [8], Sweden (15.2%) [9] and Hungary (17.0%) [10]. Dextro-transposition of great arteries was relatively rare in Saudi Arabia compared to the other studies. Occurrence of atrioventricular septal defect varied from a low of 1.8% in Japan [7] to a high of 7.4% in the United Kingdom study [11].

**Table 1 Frequency of cardiac lesions in 2604 patients with congenital heart disease in 4 regions of Saudi Arabia [3–6]**

Lesion	Al Hassa		South east		North central		West		Overall	
	No.	%	No.	%	No.	%	No.	%	No.	%
VSD	292	39.5	109	32.5	123	38.4	359	29.7	883	33.9
ASD	85	11.5	35	10.4	37	11.6	314	26.0	471	18.1
PS	66	8.9	34	10.1	29	9.1	195	16.1	324	12.4
PDA	64	8.6	53	15.8	25	7.8	159	13.2	301	11.6
AVSD	26	3.5	12	3.6	16	5.0	38	3.1	92	3.5
TOF	31	4.2	18	5.4	15	4.7	26	2.2	90	3.5
AS	26	3.5	9	2.7	9	2.8	20	1.6	64	2.5
COA	20	2.7	11	3.3	6	1.9	23	1.9	60	2.3
D-TGA	14	1.9	5	1.5	14	4.4	22	1.8	55	2.1
Other	116	15.7	49	14.6	46	14.4	53	4.4	264	10.1
Total	740	100.0	335	100.0	320	100.0	1209	100.0	2604	100.0

VSD = ventricular septal defect; ASD = atrial septal defect; PS = pulmonary stenosis; PDA = patent ductus arteriosus; AVSD = atrioventricular septal defect; TOF = tetralogy of Fallot; AS = aortic stenosis; COA = coarctation of aorta; D-TGA = dextro-transposition of great arteries.

Distribution according to sex, male: female ratio, standard error and 95% confidence intervals (CI) for each cardiac lesion are illustrated in Table 3. For congenital heart disease in general, frequency was almost the same for males and females. Female predominance was seen in patent ductus arteriosus (95% CI: 56.2–61.8). A significant male predominance was clear in left-sided obstructive lesions [aortic stenosis (95% CI: 69.6–80.4), coarctation of aorta (95% CI: 66.2–77.8)] and dextro-transposition of great arteries (95% CI: 64.9–77.1).

The age distribution of patients presenting with congenital heart disease for each type of cardiac lesion in 3 centres (87% of all centres) is shown in Table 4. The cumulative detection rate at 1 year of age for all lesions was 59%. Age at presentation for specific lesions showed wide variation. Ventricular outflow tract obstruction such as aortic stenosis had a cumulative detection rate at 1 year of only 40%, while

for cyanotic heart disease such as dextro-transposition of great arteries, 83% were diagnosed in the first 4 weeks and 98% in the first year of life.

The incidence of various cardiac defects in neonates (infants  $\leq 28$  days old) in the same 3 centres is shown in Table 5. Ventricular septal defect was the commonest (29.0%). Patent ductus arteriosus accounted for 17.3% of neonatal congenital heart disease. The 87 (15.4%) neonates included under others, the more complex congenital heart conditions such as pulmonary atresia with and without ventricular septal defect, tricuspid atresia, univentricular heart and heterotaxy syndrome, constituted the fourth largest group. Of 3786 patients referred for evaluation of congenital heart disease in 3 centres 60% had congenital heart disease; the remainder were normal or had acquired heart disease.

Congenital heart disease in Down syndrome was specifically studied in Al Hassa

Table 2 Distribution of cardiac lesions in Saudi Arabia and in 8 other countries [1,7–14]

Lesion	Saudi Arabia % (n = 2604)	Sweden <sup>a</sup> % (n = 369)	USA <sup>b</sup> % (n = 163)	Nigeria % (n = 635)	Denmark % (n = 5249)	USA <sup>c</sup> % (n = 420)	UK <sup>d</sup> % (n = 338)	Canada <sup>e</sup> % (n = 464)	Japan % (n = 773)	Hungary % (n = 43)
VSD	33.9	27.1	31.3	35.0	24.0	32.1	28.1	31.0	60.0	20.9
ASD	18.1	4.3	6.1	7.5	9.4	7.4	8.3	11.2	5.3	10.4
PS	12.4	3.8	13.5	9.0	5.9	8.6	2.7	10.8	9.6	10.4
PDA	11.6	9.5	5.5	22.0	12.6	8.3	6.5	7.1	3.6	11.9
AVSD	3.5	3.0	3.7	–	2.6	3.6	7.4	–	1.8	4.5
TOF	3.5	4.1	3.7	10.0	5.8	5.0	8.6	8.0	5.8	4.5
AS	2.5	5.4	3.7	0.6	4.7	3.8	4.1	8.4	1.0	11.0
COA	2.3	9.8	5.5	2.0	7.0	6.7	5.6	3.4	2.7	6.0
D-TGA	2.1	6.0	3.7	4.5	4.8	2.6	5.6	2.6	2.2	4.5
Other	10.1	27.0	23.3	9.4	23.2	22.0	23.1	17.5	9.5	15.9

<sup>a</sup>Gothenburg; <sup>b</sup>California; <sup>c</sup>Multi-centre; <sup>d</sup>Blackpool; <sup>e</sup>Toronto.

VSD = ventricular septal defect; ASD = atrial septal defect; PS = pulmonary stenosis; PDA = patent ductus arteriosus; AVSD = atrioventricular septal defect; TOF = tetralogy of Fallot; AS = aortic stenosis; COA = coarctation of aorta; D-TGA = dextro-transposition of great arteries.

– = not measured.

[3]. Of a total of 740 patients, 44 were diagnosed with Down syndrome. Ventricular septal defect was the commonest acyanotic congenital heart condition in this group. Tetralogy of Fallot was the commonest cyanotic heart lesion (Table 6).

## Discussion

Echocardiography became a common diagnostic tool for congenital heart disease only in the mid-80s of the last century. Its increasing accuracy as a superior diagnostic tool resulted in increased values for incidence of congenital heart disease by uncovering commonly-overlooked lesions such as muscular ventricular septal defect, small patent ductus arteriosus and coronary artery fistulae to cardiac chambers before the development of the colour flow mapping technique. Knowledge of the incidence

of various types of congenital heart disease and their clustering in time or place may aid in understanding what caused them [13].

Generally speaking, determination of the true incidence of congenital heart disease requires accurate diagnosis of all affected individuals in the study area; consequently, underestimation is the rule since children at the extremes of the disease are inevitably not counted. This includes babies who die soon after birth with undiagnosed, severe, complex congenital heart disease and those with asymptomatic lesions. As the cardiac units in the 3 studies were the only referral centres for their respective regions, children suspected or known to have congenital heart disease of wide-ranging severity are referred to these units. This situation is thought to reflect the pattern rather than the incidence of congenital heart disease in Saudi Arabia.

**Table 3 Distribution of lesions in 2604 patients with congenital heart disease according to sex [3–6]**

Lesion	Total	Males			Females			M:F ratio
		No.	%	CI	No.	%	CI	
VSD	883	442	50.1	48.3–57.7	441	49.9	48.3–51.7	1:1
ASD	471	224	47.6	45.7–50.7	247	52.4	49.7–54.3	0.9:1
PS	324	155	47.8	45.2–50.8	169	52.2	49.2–54.8	0.9:1
PDA	301	122	40.5	38.2–43.8	179	59.5	56.2–61.8	0.7:1
AVSD	92	44	47.8	42.8–53.2	48	52.2	46.8–57.2	0.9:1
TOF	90	45	50.0	44.7–55.3	45	50.0	44.7–55.3	1:1
AS	64	48	75.0	69.6–80.4	16	25.0	19.6–30.4	3:1
COA	60	43	71.7	66.2–77.8	17	28.3	22.2–33.8	2.5:1
D-TGA	55	39	70.9	64.9–77.1	16	29.1	22.9–35.1	2.4:1
Other	264	137	51.9	48.9–55.1	127	48.1	44.9–51.1	1.1:1
Total	2604	1299	49.9	49–51	1305	50.1	49–51	1:1

CI = confidence interval.

VSD = ventricular septal defect; ASD = atrial septal defect; PS = pulmonary stenosis; PDA = patent ductus arteriosus; AVSD = atrioventricular septal defect; TOF = tetralogy of Fallot; AS = aortic stenosis; COA = coarctation of aorta; D-TGA = dextro-transposition of great arteries.

**Table 4 Distribution of various cardiac lesions in 3 areas of Saudi Arabia according to age at presentation [3,5,6]**

Lesion	Al Hassa				Al Qaseem				Al Madina				Overall			
	≤ 1 yr		1 yr		≤ 1 yr		1 yr		≤ 1 yr		1 yr		≤ 1 yr		1 yr	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
VSD	147	50	145	50	72	59	51	41	231	64	128	36	450	58	324	42
ASD	55	65	30	35	20	54	17	46	185	59	129	41	260	60	176	40
PS	36	55	30	45	13	45	16	55	77	40	118	60	126	43	164	57
PDA	48	75	16	25	14	56	11	44	122	77	37	23	184	74	64	26
TOF	24	77	7	23	10	67	5	33	16	62	10	38	50	69	22	31
AS	10	38	16	62	3	33	6	67	9	45	11	55	22	40	33	60
COA	13	65	7	35	3	50	3	50	17	74	6	26	33	67	16	33
D-TGA	14	100	0	–	13	93	1	7	22	100	–	0	49	98	1	2
Other <sup>a</sup>	43	30	99	70	46	74	16	26	75	82	16	18	164	56	131	44
Total	390	53	350	47	194	61	126	39	754	62	455	38	1338	59	931	41

VSD = ventricular septal defect; ASD = atrial septal defect; PS = pulmonary stenosis; PDA = patent ductus arteriosus; TOF = tetralogy of Fallot; AS = aortic stenosis; COA = coarctation of aorta; D-TGA = dextro-transposition of great arteries.

<sup>a</sup>Including atrioventricular septal defect.

**Table 5 Distribution of cardiac lesions in 566 patients with neonatal congenital heart disease in 3 areas of Saudi Arabia [3,5,6]**

Lesion	Al Hassa		Al Qaseem		Al Madina		Overall	
	No.	%	No.	%	No.	%	No.	%
VSD	63	35.4	30	32.3	71	24.1	164	29.0
ASD	19	10.7	10	10.8	65	22.0	94	16.6
PS	10	5.6	3	3.2	16	5.4	29	5.1
PDA	17	9.6	8	8.6	73	24.7	98	17.3
AVSD	7	3.9	9	9.7	10	3.4	26	4.6
TOF	8	4.5	3	3.2	5	1.7	16	2.8
AS	3	1.7	0	—	0	—	3	0.5
COA	8	4.5	0	—	9	3.1	17	3.0
D-TGA	8	4.5	9	9.7	15	5.1	32	5.7
Other	35	19.7	21	22.6	31	10.5	87	15.4
Total	178	100.0	93	100.0	295	100.0	566	100.0

VSD = ventricular septal defect; ASD = atrial septal defect; PS = pulmonary stenosis; PDA = patent ductus arteriosus; AVSD = atrioventricular septal defect; TOF = tetralogy of Fallot; COA = coarctation of aorta; D-TGA = dextro-transposition of great arteries; AS = aortic stenosis.

The changing incidence in different reports may be attributed to differences in the definition of congenital heart disease, study methodology, diagnostic accuracy, genetic

predisposition, calcium bioavailability and other environmental factors. Lack of rigorous definition of congenital heart disease, with the emphasis on certain exclusions has a negative impact on accurate calculation of incidence. Patent ductus arteriosus in premature babies, smaller atrial septal defects which eventually close, persistent left superior vena cava and azygous continuity in structurally normal heart are among other lesions with no potential haemodynamic significance, so their exclusion in future studies may improve incidence figures for congenital heart disease.

As in other parts of the world, ventricular septal defect was the commonest congenital heart disease in the 4 study regions individually and in Saudi Arabia overall (34%). In contrast to many other studies, atrial septal defect was the second most common, 18.1%, compared to 4.3% in Gothenburg (5th most common) [9], 5.3% in California, where it was the 3rd most common [13] and

**Table 6 Distribution of conditions in 44 individuals with Down syndrome who had congenital heart disease in 1 area of Saudi Arabia [3]**

Lesion	No.	%
<i>Non-cyanotic</i>		
VSD	13	30
ASD	7	16
PDA	9	20
AVSD	11	25
<i>Cyanotic</i>		
TOF	2	4
TAPV	2	5

VSD = ventricular septal defect; ASD = atrial septal defect; PS = pulmonary stenosis; PDA = patent ductus arteriosus; AVSD = atrioventricular septal defect; TOF = tetralogy of Fallot; TAPV = total anomalous pulmonary venous return.



10.4% in Hungary, where it was the 4th most common [10]. However, atrial septal defect was the second most common condition in 2 studies from North America, a multi-centre study and a study from Toronto, but with lower rates [1,12].

The incidence of patent ductus arteriosus was 8.6% overall. In the southeast, a high altitude area, this condition comprised 15.8% of all congenital heart disease. Alzamora-Castro et al. documented the incidence of patent ductus arteriosus to be 30 times greater at high altitudes (4500–5000 m above sea level) [15].

The rarity of aortic stenosis and coarctation of aorta in each of the study regions contrasts sharply with European figures (4.8% in Saudi Arabia versus 11% in Hungary) [10]. The same was observed in Japan, another Asian country, where aortic stenosis and coarctation of aorta were reported in only 3.7% of all patients with congenital heart disease [7]. Studies of ethnic influence on the pattern of congenital heart disease in the United Kingdom revealed a higher frequency of coarctation of aorta in non-Asian (9%) than Asian (3%) infants [16]. This might be related to racial and genetic factors.

Atrioventricular septal defect, a characteristic lesion in Down syndrome, accounted for 3.5% of all congenital heart disease in Saudi Arabia with range of 3.1%–5.0%. Fluctuation of incidence of atrioventricular septal defect in different studies is well known. Inclusion of more of the older mothers, in whom the incidence of giving birth to infants with trisomy 21 is increased, would produce higher values [13].

As regards cyanotic congenital heart disease, tetralogy of Fallot constitutes 3.5% of all congenital heart disease in Saudi Arabia with a range of 2.2%–5.4%. Most of the other studies reported a higher incidence [1,7–14]. Rigorous echocardiographic defi-

nition of tetralogy of Fallot is still lacking as some authors still consider double outlet right ventricle with pulmonary stenosis as tetralogy of Fallot, even if most of the aorta emanates from the right ventricle. This will exaggerate the incidence of tetralogy of Fallot.

Transposition of the great arteries was found in 2.1% of all congenital heart disease in Saudi Arabia compared to the studies done by Hoffman and Christian (3.7%) [2] and Campbell (4.2%) [17]. Nora and Nora suggest that interaction between genetic and environmental factors plays a major role in the etiology of transposition of the great arteries [18]. An absence or deficiency of an environmental causative factor or the presence of protective agent might have contributed to the low incidence of this condition in Saudi Arabia.

Total anomalous pulmonary venous drainage was very low overall (0.3%) and was even absent in 1 of the study regions (Al-Ahsa) [3]. This is in concordance with the findings of Mitchell, Korones and Beveland [1] and Rose, Boyd and Ashton who reported 0% incidence of total anomalous pulmonary venous drainage [12]. These can be compared with the 1.5% incidence of total anomalous pulmonary venous drainage in the Baltimore–Washington infant study [19].

Aortic stenosis and coarctation of aorta showed strong male predominance in Saudi Arabia. These findings agreed with the reports of Perry et al. and Rothman and Fyler who reported 64%–78% for aortic stenosis and 57%–65% for coarctation of aorta in boys [19,20].

Transposition of the great arteries also showed a strong male predominance. Pre-disposition of the male sex for this condition was first noted by MacMahon et al. in 1953, and has been supported by a number of subsequent studies [19,21]. On the other hand,

patent ductus arteriosus showed female predominance (male:female ratio 0.7:1); this is consistent with the reports of Perry et al. and Pradat which documented the predominance of patent ductus arteriosus in girls, range 60%–70% [19,22]. Atrial septal defect, pulmonary stenosis and atrio-ventricular septal defect were reported with slight female predominance in Saudi Arabia (male:female ratio 0.9:1 overall). A stronger female propensity for those lesions has been reported in other studies [19,20].

The consistent sex ratio for most of the congenital heart conditions suggests an important causative link that is not well understood. Gensburg, Marshall and Druschel observed that when all isolated lesions are classified by the embryonic timing of disturbed organogenesis, males tend to predominate in those that developed later in gestation [23]. The causal implications of this association are yet to be determined.

Premature babies with patent ductus arteriosus were included in some of the study centres, but since most international studies tend to exclude this group, future studies in Saudi Arabia need to do the same to make our data comparable.

Atrial septal defect was the third most frequent neonatal congenital heart condition. One study stressed the fact that atrial septal defect does not give rise to heart murmur in the newborn infant, so it is easily missed, as diagnosis would be made only by echocardiography. The condition was brought to the researcher's attention only because of cardiac and non-cardiac health problems which occurred before 28 days of life [3]. This condition is the commonest adult congenital heart disease; it is neglected or not diagnosed in many children. The true incidence can be revealed only by mass echocardiographic screening for all live-born neonates.

The other groups of neonatal congenital heart disease include, predictably, the most complex lesions, which present with haemodynamic instability shortly after birth. For example, 64% of total cases of transposition of the great arteries presented in the neonatal period.

The cumulative detection rate in 3 centres [3–5] at 1 year of age was 59%. This is much lower than the rate in a similar British study (82%) [11]. Further improvement in case detection by front-line doctors is essential. The impressive network of health institutions in Saudi Arabia should be exploited to give a better future for children with congenital heart disease.

Only 60% of 3786 children referred with suspected heart disease had a congenital heart condition. This burden of unnecessary referrals could be minimized by improving clinical skills for recognizing these conditions.

As in other international studies, the cause of congenital heart disease is largely unknown, but the role of chromosomal anomaly was conspicuous. Down syndrome is the commonest cause of congenital heart disease. There was great success in localizing the cardiac critical region in chromosome 21 to 21q22.2–22.3 region [24]. The type of cardiac lesion was determined in 44 patients with Down syndrome. Ventricular septal defect was the commonest lesion in the group, followed by atrioventricular septal defect. Other studies found this specificity of Down syndrome to the lesions listed, as in the Rowe and Uchida prospective study of 184 children [25] and a recent study by Abbag, who investigated congenital heart defects in 57 patients with Down syndrome [26].

The unprecedented progress of Saudi Arabia in all fields has brought about remarkable advances in medicine, and cardiac

medicine in particular, over the past few decades. Despite this, services are still far from adequate. The availability of paediatric cardiac services in 3 centres within the same region (Riyadh) and an almost complete absence of cardiac centres which investigate congenital heart disease in other regions is a major deficiency which deserves urgent attention from policy makers in Saudi Arabia. Based on the recommendations of the American Academy of Pediatrics, paediatric cardiac centres should be available for a population that generates over 30 000 live births per year [27]. Applying these recommendations, Ashmeg and Moheeb concluded that Saudi Arabia optimally required 20 paediatric cardiology centres, but not less than 7 centres [28]. There are already 3 centres in Riyadh; 2 are needed in

the western region and 1 centre each for the east, south and north.

The availability of sophisticated, state-of-the-art cardiac technology and cardiac surgery in Saudi Arabia created a new group of patients, "adults with operated congenital heart disease" [3,28]. They have peculiar anatomy, fluid haemodynamics, complications and special needs. The establishment of adult congenital heart disease teams is critical to continue adequate care for this unique group of patients.

Further knowledge is needed about risk factors (including familial and environmental factors) related to Saudi Arabia. With further research, we look forward to being part of international community, working with sincere efforts to unravel some of mysteries of abnormal cardiogenesis.

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# Distribution des paramètres anthropométriques des nourrissons dans la région de Monastir (Tunisie)

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توزُّع متشابهات القياسات البشرية بين الرُّضْع في منطقة المنستير التونسية  
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**الخلاصة:** قام الباحثون في إطار هذه الدراسة الاستباقية بتقييم توزُّع مُتَّابِتات القياسات البشرية بين الرُّضْع في منطقة المنستير، ومقارنتها مع المُستَوَيَات المرجعية للمركز الوطني للإحصاءات الصحية. وقد شملت الدراسة 3033 من الرُّضْع المترددين على مراكز الرعاية الصحية الأولية من أجل التطعيم، وتمَّت متابعتهم بعد ذلك لمدة 18 شهراً. وقد قام الباحثون أثناء كل زيارة للرُّضْع بقياس نسبة الوزن إلى العمر، والطول إلى العمر، والوزن إلى الطول. ولاحظوا فروقاً بين منحنى التوزُّع الذي توصلوا إليه وبين المستويات المرجعية للمركز الوطني للإحصاءات الصحية. كما لاحظوا تزايد انتشار تأخُّر النمو بازدياد العمر. وكان معدَّل انتشار حالات انخفاض الوزن والهزال أقل من 10%. كما لوحظت البدانة في 6.2% من الرُّضْع الذين تقل أعمارهم عن ثلاثة أشهر، وفي 11.6% من الرُّضْع الذين تقل أعمارهم عن تسعة أشهر.

**RÉSUMÉ** Nous avons étudié la distribution des paramètres anthropométriques chez les nourrissons de la région de Monastir et l'avons comparée à celle du *National Center for Health Statistics* (NCHS). Notre étude prospective portait sur 3033 nourrissons qui ont consulté pour vaccination dans les centres de santé de base et ont été suivis pendant 18 mois. Trois indices anthropométriques ont été étudiés : poids/âge, taille/âge et poids/taille. Nous avons trouvé un décalage des courbes de distribution des paramètres anthropométriques de notre population par rapport à celle du NCHS. La prévalence du retard de croissance augmentait avec l'âge. La prévalence de l'insuffisance pondérale et de l'émaciation était inférieure à 10 %. L'obésité touchait 6,2 % des nourrissons âgés de 3 mois et 11,6 % des nourrissons âgés de 9 mois.

## Anthropometrical parameters in infants in Monastir region, Tunisia

**ABSTRACT** We evaluated the distribution of anthropometrical parameters in infants in Monastir and compared them with the National Center of Health Statistics reference. Our prospective study included 3033 infants attending primary health care centres for vaccinations who were followed for 18 months. In each visit, we measured weight-for-age, height-for-age and weight-for-height. We found a difference between our distribution curve and the NCHS reference. The prevalence of growth retardation increased with age. The prevalence of under-weight and of wasting were less than 10%. Obesity was seen 6.2% of infants aged 3 months and 11.6% aged 9 months.

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## Introduction

Notre pays a implanté depuis les années 90 un programme national de santé maternelle et infantile, dont une composante s'intéresse à la surveillance de la croissance des nourrissons en se basant sur les références anthropométriques américaines du *National Center for Health Statistics* (NCHS). L'utilisation de cette référence a été critiquée par plusieurs auteurs [1,2], ce qui a amené l'Organisation mondiale de la Santé (OMS) à partir des années 90 à reconnaître que celle-ci comporte plusieurs insuffisances d'ordre technique [2] et à lancer une nouvelle enquête internationale sur la croissance dont les résultats sont attendus au cours de l'année 2005.

Rares sont les travaux qui se sont intéressés à évaluer cette surveillance dans le cadre de ce programme et à la validité de la référence NCHS/OMS dans notre pays.

Les objectifs de notre étude étaient d'étudier la distribution des indices anthropométriques des nourrissons de la région de Monastir et de la comparer à la référence du NCHS.

## Méthodes

### Population de l'étude

C'est l'ensemble des nourrissons âgés de 0 à 18 mois qui ont consulté pour vaccination dans les centres de santé de base (CSB) de la région sanitaire de Monastir depuis la fin de l'année 1995 jusqu'à l'année 2000, soit 3042 nourrissons.

### Méthodologie

Chaque nourrisson a été vu quatre fois aux 3<sup>e</sup>, 5<sup>e</sup>, 9<sup>e</sup> et 18<sup>e</sup> mois révolus lors des consultations de vaccination. Des mesures anthropométriques (le poids et la taille) ont

été prises lors de chaque visite. Elles ont été effectuées selon les recommandations de l'OMS par les internes affectés au Département de Médecine communautaire de la Faculté de médecine de Monastir. Le poids à la naissance a été noté à partir du carnet de soins de chaque nourrisson se présentant à la consultation. Les distributions de ces mesures anthropométriques en fonction de l'âge ont été exprimées en percentiles pour les 2 sexes. Elles ont été comparées à celles de la référence NCHS pour le 3<sup>e</sup> et le 97<sup>e</sup> percentile.

Pour chaque nourrisson, nous avons calculé par ailleurs les indices anthropométriques taille/âge (T/A), poids/taille (P/T) et poids/âge (P/A) exprimés en Z scores par rapport à la référence du NCHS.

Selon les recommandations de l'OMS [2], il fallait exclure tous les nourrissons dont les valeurs du Z score se situaient dans les fourchettes suivantes :

- taille/âge : Z score < -5 ou Z score > +3
- poids/taille : Z score < -4 ou Z score > +5
- poids/âge : Z score < -5 ou Z score > +5.

Ainsi, 3033 nourrissons ont été retenus pour l'analyse statistique.

Les Z scores des nourrissons retenus ont été regroupés en 3 classes :

- Classe I : Z score < -2 pour le retard de croissance, l'émaciation et l'insuffisance pondérale
- Classe II :  $-2 \leq Z \text{ score} \leq +2$
- Classe III : Z score > 2.

### Étude statistique

L'analyse statistique des données a été réalisée à l'aide des logiciels Epi Info 6.0 et EpiNut. Les tests statistiques appropriés ont été utilisés pour juger les éventuelles différences au seuil de 5 %.



## Résultats

La répartition selon le sexe a montré une légère prédominance masculine avec un *sex ratio* de 1,04. Les enfants uniques représentaient 31,1 % de la population étudiée.

### Poids de naissance

L'étude de la distribution des nourrissons selon le poids de naissance montre que 81,5 % d'entre eux étaient nés eutrophiques (poids de naissance compris entre 2500 g et 4000 g). Les nourrissons ayant un faible poids de naissance (poids < 2500 g) n'ont représenté que 8,9 % de l'ensemble.

### Paramètres anthropométriques

Les courbes de distribution du poids en fonction de l'âge montraient un décalage vers le bas de nos courbes par rapport à celles de la référence NCHS pour le 3<sup>e</sup> et le 97<sup>e</sup> percentile, de la naissance jusqu'au 15<sup>e</sup> mois, ensuite les 2 courbes se superposaient pour le sexe masculin (Figure 1) alors que pour le sexe féminin nous avons constaté un décalage vers le haut du 97<sup>e</sup> percentile à partir du 5<sup>e</sup> mois (Figure 2).

Pour la distribution de la taille en fonction de l'âge et chez les 2 sexes, le décalage vers le bas de nos courbes par rapport à la

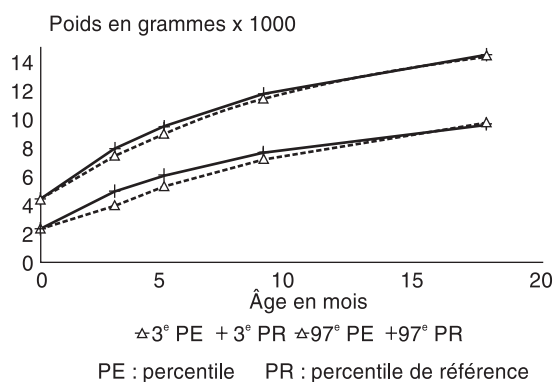


Figure 1 Distribution du poids en fonction de l'âge chez les garçons

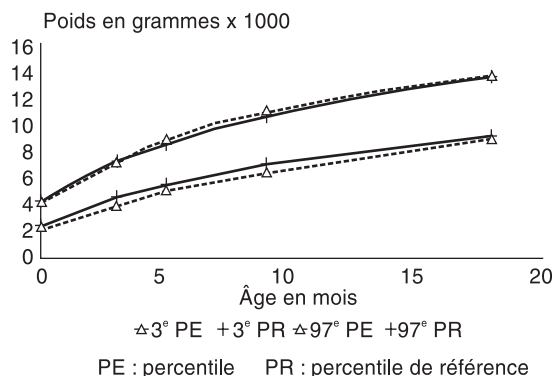


Figure 2 Distribution du poids en fonction de l'âge chez les filles

référence n'a été observé que pour le 3<sup>e</sup> percentile. Il n'existe pas de distinction entre ces courbes et celles de la référence NCHS chez les deux sexes pour le 97<sup>e</sup> percentile (Figures 3 et 4).

### Les indices anthropométriques et leurs déterminants

Dans notre étude, la prévalence du retard de croissance a été globalement faible (< 10 %). Cependant, elle a augmenté d'une façon régulière avec l'âge, passant de 4,3 % à l'âge de 3 mois à 6,3 % à l'âge de 18 mois (Tableau 1).

L'insuffisance pondérale avait une faible prévalence. Elle n'a pas dépassé les 5 % à tous les âges ; la valeur la plus élevée a été observée à l'âge de 9 mois (3,8 %), suivie d'une diminution à l'âge de 18 mois (Tableau 1).

À tous les âges, la prévalence de l'émaciation a été faible (< 5 %) et a diminué avec l'âge (Tableau 1).

Quant à l'obésité qui est définie par un Z score > +2, elle a été un phénomène d'apparition précoce dans notre étude : 6,2 % à l'âge de 3 mois, avec une tendance à l'augmentation jusqu'à l'âge de 9 mois.

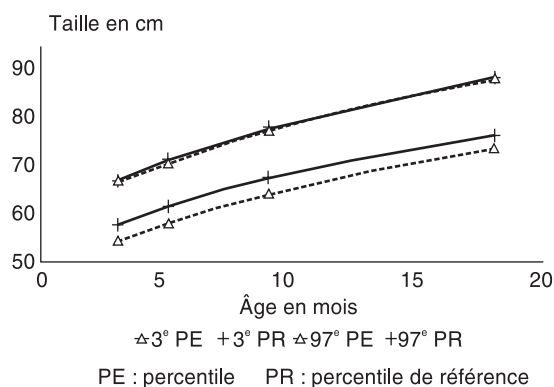


Figure 3 Distribution de la taille en fonction de l'âge chez les garçons

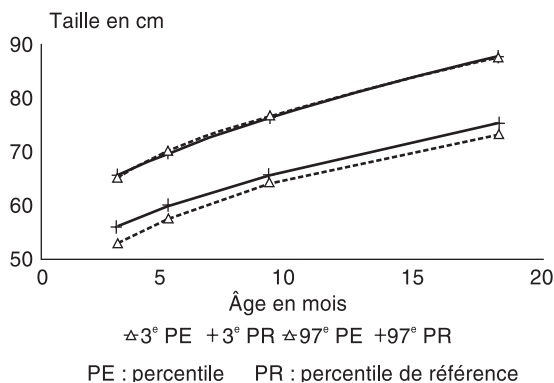


Figure 4 Distribution de la taille en fonction de l'âge chez les filles

**Tableau 1 Distribution des Z scores moyens, < -2 et > +2 des différents indices anthropométriques en fonction de l'âge**

Âge (mois)	Z moyen	Écart type	% Z < -2	% Z > +2
<i>Rapport taille/âge</i>				
3	0,003	1,07	4,3	—
5	0,041	1,09	4,9	—
9	- 0,044	1,12	5,7	—
18	- 0,119	1,12	6,3	—
<i>Rapport poids/âge</i>				
3	0,280	0,99	2,8	—
5	0,294	0,98	1,8	—
9	0,354	1,08	3,8	—
18	0,293	1,01	1,7	—
<i>Rapport poids/taille</i>				
3	0,290	1,11	3,2	6,2
5	0,323	1,16	3,2	8,9
9	0,500	1,20	2,5	11,6
18	0,517	1,10	1,2	10,2

L'étude des déterminants des différents troubles anthropométriques a montré que le sexe du nourrisson ne semble pas influencer la survenue du retard de croissance, et ce jusqu'au 5<sup>e</sup> mois. Par contre, à partir du 9<sup>e</sup> mois, cette variable devient déterminante. En effet, à cet âge, une prédominance masculine pour le retard de croissance a été notée. Au contraire, au 18<sup>e</sup> mois, le retard de croissance a touché plus les filles que les garçons. Par ailleurs, nous avons remarqué que la fréquence du retard de croissance a diminué avec l'âge pour le sexe masculin, alors qu'elle a augmenté avec l'âge pour le sexe féminin (Tableau 2).

L'effet du sexe du nourrisson sur la survenue de l'insuffisance pondérale a été statistiquement associé uniquement aux 5<sup>e</sup> et 9<sup>e</sup> mois. Cette prédominance était essentiellement masculine au 5<sup>e</sup> mois et plutôt féminine au 9<sup>e</sup> mois.

Au 9<sup>e</sup> mois, nous avons noté une prédominance féminine concernant la survenue de l'émaciation ( $p < 0,02$ ). Par contre, le sexe du nourrisson n'a pas d'influence sur

la survenue de l'émaciation aux autres âges (Tableau 2). De même, le sexe n'était pas un facteur déterminant de la survenue de l'obésité (Tableau 2).

Concernant le poids de naissance et les troubles du développement physique, nous avons remarqué qu'à tous les âges, les nourrissons dont le poids de naissance était inférieur à 2500 g étaient les plus touchés par le retard de croissance (Tableau 3). Ces nourrissons ne semblent pas pouvoir rattraper une croissance optimale, même à l'âge de 18 mois.

Par ailleurs, les nourrissons nés avec un poids de naissance inférieur à 2500 g étaient les plus touchés par l'insuffisance pondérale. Parmi eux, 36,1 % n'ont pas pu rattraper leur retard de croissance à l'âge de 18 mois (Tableau 3).

Aux 3<sup>e</sup>, 5<sup>e</sup> et 9<sup>e</sup> mois, nous avons remarqué que l'émaciation a touché davantage les nourrissons nés avec un faible poids de naissance. Cette corrélation disparaît au 18<sup>e</sup> mois (Tableau 3).

Tableau 2 Distribution des troubles de la croissance selon le sexe

Âge (mois)	Sexe masculin		Sexe féminin		p
	Z score < -2		Z score < -2		
	Nbre	%	Nbre	%	
<i>Retard de croissance</i>					
3	59	4,3	63	4,8	0,5
5	61	4,3	75	5,7	0,08
9	99	7,5	57	4,5	< 0,002
18	75	5,6	97	7,5	< 0,05
<i>Insuffisance pondérale</i>					
3	49	3,4	30	2,4	0,1
5	49	3,4	1	0,1	< 10 <sup>-3</sup>
9	42	3,2	62	4,9	< 0,03
18	22	1,7	24	1,9	0,6
<i>Émaciation</i>					
3	97	7,0	74	5,7	0,1
5	114	8,6	125	9,8	0,3
9	146	11,1	161	12,8	0,1
18	125	9,5	139	11,2	0,1
<i>Obésité</i>					
3	97	7,0	74	5,7	0,1
5	114	8,6	125	9,8	0,3
9	146	11,1	161	12,8	0,1
18	125	9,5	139	11,2	0,1

À tous les âges, nous avons constaté que l'obésité a touché davantage les nourrissons nés avec un poids de naissance supérieur à 4000 g (Tableau 3).

## Discussion

Il s'agit de la première enquête de type longitudinal, faite dans notre pays, visant à comparer la distribution des paramètres anthropométriques des nourrissons âgés de 0-18 mois avec celle de la référence NCHS/OMS. Les mesures anthropométriques ont été effectuées lors des consultations de vaccination dans les centres de santé de base de la région sanitaire de Monastir au cours des 3<sup>e</sup>, 5<sup>e</sup>, 9<sup>e</sup> et 18<sup>e</sup> mois.

Cependant, parmi les 3033 nourrissons colligés, seulement 2629 ont été vus aux 3<sup>e</sup>,

5<sup>e</sup>, 9<sup>e</sup> et 18<sup>e</sup> mois, soit 13,3 % de perdus de vue. Cette perte peut être expliquée par les hypothèses suivantes :

- certains ménages recourent au début au secteur public pour la vaccination de leurs nourrissons, puis au secteur privé.
- D'autres nourrissons, à l'inverse, n'ont pas été vus pour la première fois au 3<sup>e</sup> mois, mais plutôt aux 5<sup>e</sup>, 9<sup>e</sup> ou 18<sup>e</sup> mois. Ils ont été suivis probablement au préalable dans le secteur privé ou proviennent d'autres régions.
- Certaines mères n'ont pas respecté le calendrier vaccinal et/ou n'ont pas coopéré.
- Des épisodes morbides chez les nourrissons, qui ont été à l'origine du report de la date de vaccination.

Tableau 3 Distribution des troubles de la croissance (Z scores < -2) selon le poids de naissance<sup>a</sup>

Âge (mois)	Poids de naissance (g)						p
	< 2500		2500-4000		> 4000		
	Nbre	%	Nbre	%	Nbre	%	
<i>Retard de croissance</i>							
3	85	33,3	37	1,7	0	0	< 0,001
5	78	31,6	57	2,6	1	0,4	< 0,001
9	70	28,8	81	3,9	2	0,9	< 0,001
18	86	36,1	85	4,0	1	0,4	< 0,001
<i>Insuffisance pondérale</i>							
3	72	28,2	7	0,3	0	0	< 10 <sup>-3</sup>
5	45	19,7	5	0,2	0	0	< 10 <sup>-3</sup>
9	72	30,1	32	1,5	0	0	< 10 <sup>-3</sup>
18	33	14,2	13	0,6	0	0	< 10 <sup>-3</sup>
<i>Émaciation</i>							
3	52	21,0	35	1,7	1	0,5	< 10 <sup>-3</sup>
5	43	19,4	41	2,1	1	0,5	< 10 <sup>-3</sup>
9	23	10,5	39	2,1	3	1,4	< 10 <sup>-3</sup>
18	5	2,3	25	1,3	0	0	0,1
<i>Obésité</i>							
3	3	1,5	110	5,1	56	21,4	< 0,001
5	17	8,7	162	7,7	56	21,7	< 0,001
9	18	8,4	231	11,2	52	20,0	< 0,001
18	15	6,6	189	9,3	55	21,3	< 0,001

<sup>a</sup> Les différents pourcentages ont été calculés à partir du nombre de nourrissons vus à l'âge indiqué.

- Certains internes n'ont pas rempli correctement le support de l'enquête.

Nous avons tenu compte des données manquantes, ce qui pourrait expliquer les variations de l'effectif lors de l'étude analytique. L'absence temporaire des mères et des enfants a été évoquée dans deux études internationales [3,4].

Par ailleurs, dans notre pays, l'évaluation de l'état nutritionnel des nourrissons et des jeunes enfants a suscité plusieurs études régionales [5,6] et enquêtes nationales [7,8] transversales. Ces travaux se sont intéressés aux enfants d'âge préscolaire, y compris les nourrissons.

Notre étude a concerné uniquement les nourrissons âgés de moins de 18 mois. En

effet, le lieu de recrutement a été les consultations de vaccination qui ne reçoivent pas d'enfants au delà de cet âge.

Concernant le matériel et la précision des mesures anthropométriques, ils peuvent être des sources d'erreurs d'ailleurs évoquées dans la littérature [3,9-11]. Afin de les réduire, plusieurs mesures ont été prises :

- le bon fonctionnement du matériel a été vérifié au début de chaque séance de mesures anthropométriques ;
- les internes chargés de l'enquête ont été formés au préalable aux techniques et précisions de mesure.

L'ensemble de ces mesures nous ont permis d'avoir des données anthropométriques validées. En effet, nous avons utilisé les écarts types observés de la distribution des différents Z scores pour évaluer leur qualité. Ces écarts types, d'après l'OMS [2], doivent être relativement constants, quand les estimations de l'âge et les mesures anthropométriques sont correctes, et proches de  $1 \pm 0,2$  unités de la distribution de référence. Ces conditions ont été vérifiées pour nos indices anthropométriques.

La référence NCHS a été adoptée par l'OMS en 1978 comme une référence internationale. L'utilisation de cette référence a été critiquée par plusieurs auteurs [1,2] ; ceci a amené l'OMS, à partir des années 90, à reconnaître que cette référence comportait plusieurs insuffisances d'ordre technique [2].

Notre travail rapporte un décalage vers le bas des courbes de distribution du 3<sup>e</sup> percentile de la taille et du poids en fonction de l'âge par rapport à la référence NCHS chez les 2 sexes. Concernant le 97<sup>e</sup> percentile, nous avons remarqué également un décalage vers le bas de notre courbe chez le sexe masculin, alors que pour le sexe féminin au contraire nous avons noté un décalage vers le haut.

Les écarts pour différentes mesures anthropométriques ont été rapportés même aux États-Unis [2]. La référence NCHS a été établie sur des nourrissons allaités artificiellement et paraît inappropriée pour les nourrissons allaités au sein et en bonne santé. En effet, ces nourrissons présentent une déviation négative dans leur croissance comparée à cette référence [2,12-15].

Pour l'étude des troubles nutritionnels, nous nous sommes basés sur les différents Z scores. En effet, si les distributions en centiles des différentes mesures anthropométriques ont montré des décalages par rapport à la référence NCHS/OMS, le re-

cours aux Z scores reste néanmoins valable quand les Z scores moyens sont voisins de zéro et les écarts types voisins de 1 [2], conditions vérifiées par nos mesures.

Ainsi en Tunisie, la malnutrition protéino-énergétique est en net recul. En effet, les prévalences du retard de croissance, de l'insuffisance pondérale et de l'émaciation chez les enfants d'âge préscolaire sont passées respectivement de 39,5 %, 20,2 % et 1,3 % en 1975 à 8,3 %, 4,2 % et 1,1 % en 1997. Au contraire, la prévalence de l'obésité a presque quadruplé durant cette même période (1,3 % en 1975, 4,2 % en 1997) [7]. Nos résultats confirment cette tendance. En effet, dans notre étude, selon les critères de l'OMS [2], les prévalences du retard de croissance, de l'insuffisance pondérale et de l'émaciation ont été faibles. Par contre, la prévalence de l'obésité qui est un phénomène d'apparition précoce (6,2 % à l'âge de 3 mois) a été supérieure au seuil attendu d'une population normale ( $> 2,3$  % à tous les âges).

Pour le retard de croissance, la prévalence a été inférieure à 10 % à tous les âges. Une enquête nationale, faite en 1997 [7], a trouvé que cette prévalence a été supérieure à 10 % à partir du 6<sup>e</sup> mois. Selon une enquête plus récente réalisée en 2000 [8], une prévalence supérieure à 10 % a été observée à tous les âges (Tableau 4).

Concernant l'insuffisance pondérale, nos résultats sont conformes aux données nationales de 2000 [8], qui situent cette prévalence à des taux inférieurs à 5 % à tous les âges. Cette prévalence nationale a été supérieure à 5 % à partir du 6<sup>e</sup> mois dans l'enquête de 1997 [7].

La prévalence de l'émaciation dans notre étude a été similaire à celle retrouvée dans les deux enquêtes nationales ( $< 5$  % à tous les âges) [7,8].

Les différences concernant les prévalences du retard de croissance et de l'insuffisance



pondérale pourraient s'expliquer par le fait que notre étude s'est déroulée dans une région urbaine (région sanitaire de Monastir), alors que les deux enquêtes nationales déjà citées ont été effectuées non seulement dans les régions urbaines, mais aussi rurales.

Nous avons trouvé que la prévalence du retard de croissance augmentait avec l'âge pour atteindre 6,3 % à l'âge de 18 mois.

Aux 3<sup>e</sup> et 5<sup>e</sup> mois, la majorité des nourrissons sont encore allaités au sein ; les pourcentages du retard de croissance ont été relativement faibles, soit respectivement 4,3 % et 4,9 %.

L'aggravation du processus du retard de croissance en fonction de l'âge, durant les deux premières années de la vie, a été rapportée dans des études nationales [7,8] et internationales [16-18].

Une étude de la distribution des rapports T/A, P/A et P/T en fonction de l'âge a été menée dans 39 pays en développement chez des enfants d'âge préscolaire [19]. Les résultats montraient que le processus du retard de croissance (malnutrition chronique) était un processus définitif, qui commençait tôt dès la naissance, s'accélérait jusqu'à l'âge de 24 mois, puis se ralentissait sans s'accompagner toutefois d'un rattrapage de la croissance. Les mêmes auteurs ont constaté que le processus de l'insuffisance pondérale débutait dès l'âge de 3 mois, s'accélérait jusqu'à l'âge de 12 mois, se ralentissait par la suite jusqu'au 19<sup>e</sup> mois. Cependant, un rattrapage de la croissance a été rapporté par ces auteurs à partir de cet âge.

Dans notre étude, l'augmentation de la prévalence de l'insuffisance pondérale a été observée à l'âge de 9 mois, suivie d'une diminution à l'âge de 18 mois. Cette aggravation pourrait être attribuée au fait qu'au 9<sup>e</sup> mois, la majorité des nourrissons ne sont plus allaités au sein ; la période moyenne de

l'allaitement maternel dans notre étude était de 7,1 (E.T. 4,2) mois.

Concernant l'émaciation, nous avons trouvé que la prévalence de ce trouble (malnutrition aiguë) avait diminué avec l'âge pour atteindre 1,2 % à l'âge de 18 mois.

L'amélioration du processus de l'émaciation à partir du 18<sup>e</sup> mois a été également rapportée [19].

Quant à l'obésité, les études qui se sont intéressées à évaluer la distribution de ce trouble en fonction de l'âge chez les nourrissons sont rares. Selon notre étude, la prévalence de celle-ci a augmenté de façon aiguë jusqu'à l'âge de 9 mois, suivie d'une diminution à l'âge de 18 mois.

D'après l'enquête nationale faite par l'Institut national de Nutrition en 1997, l'obésité a été également un phénomène précoce : 6,3 % entre 0 et 5 mois, le pic ayant été atteint dans la classe d'âge 6-11 mois (15,2 %), suivi d'une diminution [7]. Cette même tendance a été rapportée dans une enquête marocaine en 1998 [20]. En effet, selon cette enquête, la prévalence de l'obésité a été de 14,9 % à l'âge de 5 mois ; le pic a été observé dans la même tranche d'âge ; la diminution de cette prévalence n'a été observée qu'à partir du 24<sup>e</sup> mois.

## Conclusion

Notre étude nous a permis de dresser le profil de croissance et de quantifier les troubles de la croissance chez les nourrissons de notre région d'une part, et a confirmé la nécessité de revoir l'utilisation des références anthropométriques NCHS/OMS d'autre part. L'établissement de courbes de croissance plutôt nationales, ou pourquoi pas maghrébines vu les similitudes de nos peuples, est devenu impératif à notre avis.

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# Knowledge and concern about avian influenza among secondary school students in Taif, Saudi Arabia

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معارف ومخاوف طلاب المدارس الثانوية حول إنفلونزا الطيور في الطائف، بالمملكة العربية السعودية  
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**الخلاصة:** تناولت هذه الدراسة معارف طلاب المدارس الثانوية في الطائف، بالمملكة العربية السعودية، بشأن إنفلونزا الطيور ومخاوفهم تجاهها. وقد تم توزيع استبيان يُستكمل ذاتياً لعيّنة طبقية عشوائية، شملت 514 طالباً من ست مدارس ثانوية. وقد أُنْضِج ارتباط نتائج المعارف ارتباطاً كبيراً بالمؤشرات الاجتماعية والاقتصادية. حيث ذكر نحو 70٪ تقريباً من المشاركين أن وسائل الإعلام (الإذاعة أو التلفزيون أو كليهما) كانت هي المصدر الأساسي لمعلوماتهم. وقد ذكر 65.4٪ من المشاركين بوجه عام، أنهم كانوا يتوقعون حدوث حالات إنفلونزا الطيور هذا العام في المملكة العربية السعودية. وكانت الطالبات أكثر قلقاً من الطلاب (70.9٪ مقابل 58.9٪). ويتضح في ضوء هذه النتائج أن هناك حاجة إلى تطبيق برامج فعّالة للتوعية والتثقيف الصحي في المدارس، لتهيئة المجتمع للتعاطي مع هذه القضية الهامة.

**ABSTRACT** This study identified knowledge and concerns about avian influenza among secondary school students in Taif, Saudi Arabia. A stratified random sample of 514 students from 6 secondary schools was given a self-administered multiple-choice questionnaire. Knowledge scores were significantly related to socioeconomic indicators. Approximately 70% of the participants reported that media (TV and/or radio) was the source of their information. Overall, 65.4% of the participants said they expected there to be cases of avian influenza in Saudi Arabia this year. Females were more concerned than males (70.9% versus 58.9%). Effective school health education programmes should be implemented in order to prepare the community to deal with this important threat.

## Connaissances et craintes au sujet de la grippe aviaire chez des élèves des écoles secondaires à Taif (Arabie saoudite)

**RÉSUMÉ** La présente étude a identifié les connaissances et craintes au sujet de la grippe aviaire chez des élèves des écoles secondaires à Taif (Arabie saoudite). Un questionnaire à choix multiples à remplir soi-même a été distribué dans un échantillon aléatoire stratifié de 514 élèves de 6 écoles secondaires. Les scores concernant les connaissances étaient significativement liés aux indicateurs socio-économiques. Environ 70 % des participants ont déclaré que les médias (TV et/ou radio) étaient la source de leurs informations. De manière générale, 65,4 % des participants s'attendaient à ce qu'il y ait des cas de grippe aviaire en Arabie saoudite dans l'année. Les filles étaient davantage préoccupées que les garçons (70,9 % contre 58,9 %). Des programmes efficaces d'éducation sanitaire en milieu scolaire devraient être mis en œuvre afin de préparer la communauté face à cette menace importante.

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## Introduction

Avian influenza viruses of the type A strains occur naturally among wild birds [1–3], which carry the virus in their intestines but usually do not become symptomatic [3]. However, avian influenza is highly contagious among birds and can cause significant morbidity and mortality among domesticated birds, including chickens, ducks and turkeys [1,4]. Avian influenza viruses do not normally infect species other than birds and pigs [3]. The first documented case of infection in humans occurred in Hong Kong in 1997, when the H5N1 strain caused severe respiratory disease in 18 humans, of whom 6 died [5]. The infection of humans coincided with an epidemic of highly pathogenic avian influenza, caused by the same strain, in Hong Kong's poultry population [2,5]. Extensive investigation of that outbreak determined that close contact with live infected poultry was the source of human infection [3,5]. Studies at the genetic level further determined that the virus had been transmitted directly from birds to humans. Limited transmission to health care workers occurred, but did not cause severe disease [5].

Of the 15 avian influenza virus subtypes, H5N1 is of particular concern for several reasons: it mutates rapidly and has a documented propensity to acquire genes from viruses infecting other animal species and its ability to cause severe disease and death in humans has now been documented [6]. Published information about the clinical course of human infection with H5N1 avian influenza is limited to studies of cases in the 1997 Hong Kong outbreak [5,7,8]. In that outbreak, patients developed symptoms of fever, sore throat, cough and, in several of the fatal cases, severe respiratory distress secondary to viral pneumonia [6,8]. Previously healthy adults and children, and some

with chronic medical conditions, were affected [6].

Laboratory-confirmed human cases in the current outbreak, which began in Vietnam in December 2003, have been reported in Viet Nam, Thailand, Cambodia, Indonesia, China, Turkey, Iraq, Azerbaijan, Egypt and Djibouti. The World Health Organization (WHO) has officially recognized well over 200 cases [9] with a case-fatality rate of more than 50%. To date, sustained person-to-person transmission has not been recognized, although probable person-to-person spread was identified in Thailand involving transmission from an ill child to her mother and aunt [10] and several other familial clusters have been recognized [11].

WHO has taken several steps toward global pandemic influenza planning, including development of a pandemic plan in 1999 and an updated plan in 2005 [12].

Since avian influenza started to take the form of a pandemic among birds, many countries have been affected and there is some evidence of alarm and panic affecting the population in several countries [4,6]. However, the possibility of an influenza pandemic is a great public health concern, and for this reason our study set out to answer some important questions related to present knowledge and concerns about avian influenza in one city in Saudi Arabia.

The aim of the present study was to identify the levels of knowledge and concern about avian influenza among secondary school students using a self-administered multiple-choice questionnaire.

## Methods

This study was conducted from December 2005 to February 2006 at Taif city, Saudi Arabia, as a cross-sectional survey. A rep-

representative sample of secondary school students was chosen to screen for assessment of knowledge and concerns regarding avian influenza.

The research protocol was approved by the Research and Ethics Committee at Al-Hada Armed Forces Hospital and informed consent was obtained from all participants in the study.

Taif city is located at 1700–2500 meters above sea level in the western mountains of Saudi Arabia (Hejaz area) with a population of 885 474 according to the 2000 census [13].

### Sample

There are 12 public and private secondary schools (7 for males and 5 for females) in Taif. A 2-stage stratified sample of 514 students from 6 out of 12 secondary schools in Taif was randomly selected for the study. The sample constituted approximately 15.7% of the secondary school population of 3267 students in all the secondary schools. In the first sampling stage, all 12 secondary schools were classified into 4 groups according to sex and socioeconomic level (categorized into male public, female public, male private and female private groups). Then, using the appropriate allocation method of sampling, 2 schools were randomly selected from the first 2 groups and 1 school was selected from the private schools (a total of 6 schools were selected). In the second sampling stage, 6 classes were selected randomly from each of the selected public schools and 3 classes from each of the private schools to represent the different grades (1 to 4). Thus, a total of 18 classes were included in the sample. Each class was considered to be a cluster, and all students in the selected classes constituted the target group of the present study.

Based upon a power analysis, a sample of 500 school students was needed for

power > 0.90 to detect a moderate effect in multiple regression analysis at 5% level of significance [14].

### Study tool

A self-administered multiple choice questionnaire in Arabic was created for the study, based on information from the World Health Organization [2] and Centers for Disease Control [1]. The questionnaire was subjected to a pilot trial on 50 students before it was distributed in its final form. Statistical analysis was used to validate the questionnaire. The questionnaire was found to be consistent, reliable and easy to read. The questionnaire contained 23 items, and included sociodemographic data, questions regarding knowledge, sources of information and concerns about avian influenza.

The knowledge section comprised questions about the definition of avian influenza, its etiology, exact causative agent, method of transmission to humans, the likelihood of human infection compared with bird infection, means of prevention and control, and the countries affected by the current pandemic.

Concern questions asked respondents if they feared that they or any of their family members were at-risk of avian influenza, whether they expected cases of avian influenza in Saudi Arabia in the current year and what they would do if cases of infection were discovered in their area.

The responses of the participants to the 7 knowledge questions were scored 1 for a correct answer and 0 for an incorrect answer (scores ranged from 0 to 7, with a median of 4). A cut-off score was calculated based on the median value. Participants scoring at or above the median value of the total knowledge score were classified as having good knowledge, while those having a total knowledge score less than the median value



were considered as having poor knowledge.

### Analysis

In non-parametric tests, the ranks of the data rather than their raw values were used to calculate the statistic. Data were ranked by ordering them from lowest to highest and assigning them, in order, the integer values from 1 to the sample size. Ties were resolved by assigning tied values the mean of the ranks they would have received if there were no ties. Accordingly, the mean rank score was calculated for each group by dividing the sum of the ranks by the sample size of that group.

Sociodemographic characteristics (age, sex, parental education, parental occupation, income and household crowding index) as well as the sources of information were treated as categorical variables. Comparison of the total knowledge score according to these categories was done using non-parametric statistical tests: the Mann-Whitney test for comparing scores of 2 sub-groups and the Kruskal-Wallis test for comparing scores between more than 2 sub-groups. The association between sociodemographic characteristics and concern about avian influenza was tested using the chi-squared test. A fixed logistic regression model was performed with the total knowledge score (good versus poor) as an outcome variable and sociodemographic data and source of information data as dependent variables. Odds ratios (OR) and 95% confidence intervals (CI) were calculated.

Analysis of data was done using *SPSS*, version 11.0 software.

### Results

The mean age of the 514 participants was 17.0 years (SD = 1.4 years), the median age was 17 years and the minimum and maxi-

mum ages were 13 and 21 years respectively. Most participants were of Saudi Arabian nationality (74.9%). Among the respondents, 55.3% ( $n = 284$ ) were females. Nearly half of the participants had university graduated fathers and secondary or university graduated mothers. The mothers of most respondents were not working (79.8%). Approximately 30% of participants had military fathers. The majority had "enough and save" income (74.1%) and a crowding index  $\leq 1.5$  persons/room (Table 1).

Table 1 also shows the knowledge about avian influenza. It shows the mean rank scores of different sociodemographic subgroups of the participants. Analysis of knowledge scores indicated that the mean rank of score was significantly higher among participants with higher maternal education level as compared with those with lower maternal educational level (Kruskal-Wallis  $\chi^2$  test = 7.74,  $P = 0.05$ ), participants with civil and retired employee as opposed to military fathers (Kruskal-Wallis  $\chi^2$  test = 16.89,  $P = 0.001$ ), and participants with higher income ("enough and save") compared with those with not enough income (Kruskal-Wallis  $\chi^2$  test = 8.81,  $P = 0.012$ ). No statistical significant differences in the knowledge score were found between different sub-groups of age, sex, nationality, paternal education, maternal work and crowding index.

Regarding sources of information, approximately 70% of the participants reported that the broadcast media (TV and/or radio) was the source of their information regarding avian influenza (Table 2). There was a statistically significant association between the knowledge score and the source of information ( $P < 0.001$ ). The highest knowledge scores were observed among participants who reported that their source of information were newspapers, followed by parents, the internet and the broadcast media.



Table 1 Avian influenza knowledge score for participants by sociodemographic data

Variables	No.	% (n = 514)	Mean rank knowledge score	Significance <sup>a</sup>
<i>Age (years)</i>				
≤ 17	308	59.9	265.2	Z = 1.49; P = 0.137
> 17	206	40.1	246.0	
<i>Sex</i>				
Males	230	44.7	247.3	Z = 1.46; P = 0.144
Females	284	55.3	265.8	
<i>Nationality</i>				
Saudi Arabian	385	74.9	255.9	Z = 0.44; P = 0.659
Non-Saudi	129	25.1	262.3	
<i>Paternal education</i>				
Illiterate or read & write	54	10.5	223.3	$\chi^2 = 3.96$ ; P = 0.266
Primary or intermediate	114	22.2	264.5	
Secondary	103	20.0	252.6	
University	243	47.3	263.9	
<i>Maternal education</i>				
Illiterate or read & write	135	26.3	229.8	$\chi^2 = 7.74$ ; P = 0.052
Primary or intermediate	126	24.5	258.4	
Secondary	126	24.5	274.9	
University	127	24.7	268.9	
<i>Paternal occupation<sup>b</sup></i>				
Military	149	29.8	219.8	$\chi^2 = 16.89$ ; P = 0.001
Civil employee	176	35.0	278.4	
Civil worker	112	22.4	237.1	
Retired	64	12.8	272.4	
<i>Maternal work</i>				
Working	104	20.2	262.3	Z = 0.63; P = 0.528
Not-working	404	79.8	252.5	
<i>Income<sup>c</sup></i>				
Enough and save	367	74.1	256.6	$\chi^2 = 8.81$ ; P = 0.012
Just enough	113	22.8	231.4	
Not enough	15	3.1	162.8	
<i>Crowding index<sup>d</sup></i>				
≤ 1.5	311	60.5	255.8	Z = 0.34; P = 0.337
>1.5	203	39.5	260.1	

<sup>a</sup>Mann-Whitney or Kruskal-Wallis tests.<sup>b</sup>Missing 13 responses; <sup>c</sup>Missing 19 responses.<sup>d</sup>No. of persons per room.

**Table 2 Avian influenza knowledge score for participants by source of information**

Source	No.	%	Mean rank knowledge score
TV or radio	251	48.8	262.6
Newspapers	28	5.4	334.9
Internet	30	5.8	283.5
School	12	2.3	180.8
Parents	8	1.6	298.5
Friends	6	1.2	159.2
TV or radio and others	111	21.6	263.4
Other combinations	12	2.3	154.2
No definite source	56	10.9	213.8

$\chi^2 = 28.07$ ;  $P < 0.001$  (Kruskal-Wallis test).

Overall, 65.4% of the participants said they expected there to be cases of avian influenza in Saudi Arabia this year. Female participants were more concerned than males (70.9% versus 58.9%,  $P < 0.001$ ) (Table 3). Similarly, the majority of the participants feared that they or a family member would get avian flu within the next 12 months (78.0%), with a higher percentage of females concerned than males (86.8% versus 67.5%,  $P < 0.001$ ). If Saudi Arabia was to experience human cases of the avian influenza virus, there would be a major public reaction. If such cases were to occur in their area, more than half of the participants (53.4%) said that they would avoid travelling and attending public events, they would stay at home, take any useful drugs and avoid eating cooked birds. There was a statistically significant difference between males and females concerning their responses towards such an event ( $P < 0.001$ ).

Table 4 shows the logistic regression analysis. The logistic regression model

included age in years ( $\leq 17$  versus  $> 17$ ), sex (males versus females), nationality (Saudi versus non-Saudi), paternal education (illiterate or read and write versus primary or intermediate, secondary and university), maternal education (illiterate or read and write versus primary or intermediate, secondary and university), paternal occupation (military versus civil employee, civil worker and retired), maternal work (yes versus no), income ("enough and save" versus "just enough" and "not enough"), crowding index ( $\leq 1.5$  versus  $> 1.5$ ), and source of information (none versus 1, 2 and  $> 2$ ).

Considering military paternal occupation as a reference category, participants with civil employee or retired fathers were at significant lower risk for having poor knowledge about avian influenza (OR: 0.47, 95% CI: 0.29–0.75 and OR: 0.42, 95% CI: 0.21–0.81 respectively). Regarding paternal education, participants with fathers of primary or intermediate education and of secondary education were at lower risk for having bad knowledge about avian influenza (OR: 0.34, 95% CI: 0.16–0.74 and OR: 0.44, 95% CI: 0.20–0.95 respectively). As opposed to participants having "enough and save" income, those having "just enough" or "not enough" income were at a 2-fold and 4-fold risk of having poor knowledge about avian influenza (OR: 2.06, 95% CI: 1.29–3.28 and OR: 3.93, 95% CI: 1.16–13.30 respectively) (Table 4).

## Discussion

Just as the threat of an influenza pandemic is finally being taken seriously by governments around the world, a small but increasing number of scientists are questioning how great the danger really is [15]. It is useful to know how the public is responding in the face of contradictory messages

Table 3 Comparison between males and females regarding their concern about infection with avian influenza

Item	Males		Females		Total		Significance
	No.	%	No.	%	No.	%	
<i>Do you expect cases of avian flu in Saudi Arabia this year?</i>							$\chi^2 = 33.68; P < 0.001$
Yes, between migratory birds	48	21.4	26	9.7	74	15.0	
Yes, between domestic birds	14	6.3	14	5.2	28	5.7	
Yes, between humans	10	4.5	28	10.4	38	7.7	
Yes, between birds and humans at the same time	60	26.8	122	45.5	182	37.0	
No, don't expect	92	41.1	78	29.1	170	34.6	
<i>Do you feel fear that you or any of your family members will be affected by avian flu?</i>							$\chi^2 = 49.3; P < 0.001$
Yes	60	26.3	151	55.5	211	42.2	
Sometimes	94	41.2	85	31.3	179	35.8	
Not at all	74	32.5	36	13.2	110	22.0	
<i>What you will do, if cases of infection are found in your area?</i>							$\chi^2 = 42.58; P < 0.001$
Avoid travelling and transportation	26	11.5	4	1.5	30	6.0	
Avoid attendance of public events	6	2.7	0	0.0	6	1.2	
Won't leave the house	10	4.4	2	0.7	12	2.4	
Take any useful drugs	26	11.5	36	13.3	62	12.5	
Won't eat cooked birds at all	40	17.7	81	30.0	121	24.4	
All of the above	118	52.2	147	54.4	265	53.4	

from experts. To the best of our knowledge, this is the first trial to assess knowledge of avian influenza among school students in the Eastern Mediterranean Region. No previously validated questionnaire was found, which necessitated the creation of a tool for the assessment in this study.

Our results showed that there was no statistical significant difference in knowledge between participants regarding age, sex or nationality; however, knowledge scores were significantly higher among participants with higher maternal education level. The logistic regression model, taking

good and bad knowledge among students as an outcome measure, showed that participants with low to moderate paternal educational level (primary or intermediate and secondary) were at lower risk of having poor knowledge compared with those with low educational level (illiterate or just able to read and write). This is in agreement with several studies that have assessed fathers' educational level and its impact on knowledge, attitudes and practice regarding different health topics [16,17].

Regarding paternal occupation, our results showed that the children of profes-

Table 4 Predictors of poor knowledge about avian influenza among participants: multivariate logistic regression analysis

Characteristic	Total knowledge score <sup>a</sup>				Adjusted OR	95% CI
	Good (n = 260)		Poor (n = 164)			
<i>Paternal occupation</i>						
Military (n = 149) <sup>b</sup>	66	44.3	36	55.7	1.0	
Civilian professional (n = 176)	104	59.1	50	40.9	0.47	0.29–0.75**
Civilian worker (n = 112)	47	42.0	49	58.0	0.87	0.52–1.48
Retired (n = 64)	40	62.5	24	37.5	0.42	0.21–0.81**
<i>Paternal education</i>						
Illiterate or read and write (n = 54) <sup>b</sup>	18	33.3	26	66.7	1.0	
Primary or intermediate (n = 114)	64	56.1	24	43.9	0.34	0.16–0.74**
Secondary (n = 103)	54	52.4	22	47.6	0.44	0.20–0.95**
University (n = 243)	124	51.0	54	49.0	0.62	0.30–1.29
<i>Income</i>						
Enough and save (n = 367) <sup>b</sup>	206	56.1	161	43.9	1.0	
Just enough (n = 113)	48	42.5	65	57.5	2.06	1.29–3.28**
Not enough (n = 15)	4	26.7	11	73.3	3.93	1.16–13.30**

<sup>a</sup>Based on median cut-off value; <sup>b</sup>Reference category.

OR = odds ratio; CI = confidence interval.

\*\*P &lt; 0.05.

sional workers and retired people had better knowledge scores than the children of military personnel. This may be explained by the greater time that professional civilians or retirees spend with their children compared with military employees who may be away from home more often; comparable results have been reported by others [17].

One of the central variables of interest in our study was a measure of family income based on monthly income. Our results showed that a higher knowledge score was significantly associated with high family income. The logistic regression model also showed that having just enough or not enough income carry a higher risk of having poor knowledge about avian influenza compared with families who have enough and can save from their monthly income. An association between family income and knowledge score would be expected. Similar findings were also reported by Muhajarine et al., who discussed community and family

characteristics, income dynamics and child health outcomes [18].

Health issues constitute a large part of the information in today's media. Already in 1990 in the United States of America (USA), at least one quarter of all articles in daily newspapers were in some way health-related [19]. In local USA television news broadcasts, health stories constituted the fifth most common topic. On Dutch television most information containing health and illness was found in television commercials [20]. Another study of commercials on USA television in 1998 showed that more than 17 commercials per hour contained health information [21]. This agrees with our results regarding sources of information, which showed that there was a statistical significant association between knowledge score and source of information ( $P < 0.001$ ) and the highest scores were observed among participants who reported that their sources of information were newspapers, parents,

internet and media respectively. However, although schools are an important place for acquiring knowledge in general and health knowledge in particular, school was one of the lowest scoring sources of knowledge among these students.

Comparing our results to those obtained from a sample of the American populations [22], there were some similarities and some differences. More than half of Americans (57%) reported concern about the potential spread of avian influenza in the USA compared with 65% of our sample in Saudi Arabia. In contrast, the majority of our participants (78%) were currently concerned about the susceptibility of themselves or one of their family members to avian influenza compared with 21% among Americans. This could be attributed to the greater exposure of the American population to public health information messages compared with the population in our Region. Meanwhile, public reactions to the hypothetical situation of human cases of avian influenza were similar. One of the interesting findings regarding concerns was the statistically significant difference between males and females. Females were more concerned about the spread of infection, the possibility of catching the infection and the response to a hypothetical threat.

The cause of this greater concern among females is as yet unknown, but hypotheses include the influence of female gonadal hormones and psychological changes that accompany puberty, including changes in social role to a parenting role [23,24].

The role of health education in the modern world is increasingly important. The goal of health education is to provide the individual with the information, skills and motivation necessary to make intelligent decisions concerning lifestyle and personal health behaviour. Health education in schools is crucial for promoting the health of young people and contributing to the overall health of the public. We also recommend the development of a validated and reliable tool for measuring knowledge, attitudes and concern regarding avian influenza as an example of a population health threat.

## Acknowledgements

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***Behind the global numbers: the real costs of research for health***

Despite new knowledge and technologies that health research has created and which have led to improvements in average life expectancy and health status over the past century, there is still an enormous mismatch between how research resources are used and the burden of diseases affecting less developed countries. Since its foundation in 1998, the Global Forum has been tracking flows of funding for health research. The latest figures, published in 2004 but based on 2001 data, gave an annual total of approximately US\$ 106 billion.

*Monitoring financial flows for health research: behind the global numbers*, a study published by the Global Forum, looks at some of the elements making up that global total. Where exactly does the money come from? Public or private sector in low-, middle- and high-income countries? How much does each source provide, where does the money go and how well are the allocations aligned with health research priorities at global and local levels? How to ensure that attention is paid to people in developing countries.

*Monitoring financial flows for health research* is available from Global Forum for Health Research, 1–5 route des Morillons, PO Box 2100, 1211 Geneva 2, Switzerland. Telephone: (41) 22 791 4260; Fax: (41) 22 791 4394. It is also available free online from: <http://www.globalforumhealth.org>.

# Intestinal parasitosis and nutritional status in schoolchildren of Sahar district, Yemen

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الداء الطفيلي المعوي والوضع التغذوي لأطفال المدارس في منطقة صحار، في اليمن  
يحيى أحمد رجاء، جميل سالم مبارك

**الخلاصة:** تم تقدير كثافة ومعدل انتشار داء البلهارسيات، والطفيليات المنقولة بالتربة بين طلاب الصف الثالث في منطقة صحار، بمحافظ صعدة بالجمهورية العربية اليمنية بعد تنفيذ أربع جولات من حملات مكافحة داء البلهارسيات. وقد تم استخدام القياسات البشرية (الأنثروبومترية) لتقييم الوضع التغذوي وعلاقته بمعدلات العدوى. ووجد أن معدل انتشار العدوى بداء البلهارسيات كان منخفضاً حيث بلغ 5.6٪، منها 3.3٪ للبلهارسيا الدموية (المتوسط المنسي 0.16 بيضة/10 مل بول) و2.3٪ للبلهارسيا المنسوية (0.18 بيضة/غ براز) كما وُجد الصَّفر الخراطيني (الأسكاريس) في 0.4٪ من الأطفال، في حين لم يُعثر على أي من سائر الديدان الطفيلية المنقولة بالتربة. وأوضحت النتائج وجود التقزُّم في 50.9٪ من الأطفال المفحوصين، والهزال في 4.5٪ منهم، ونقص الوزن في 48.7٪، ولو أنه لم يشاهد أي ترابط إيجابي بين حدوث العدوى وبين مؤشرات الوضع التغذوي.

**ABSTRACT** The prevalence and intensity of schistosomiasis and soil-transmitted parasites was estimated among third-year schoolchildren of Sahar district, Sa'dah governorate, Yemen, after 4 schistosomiasis control campaigns. Anthropometric measurements were used to assess nutritional status in relation to infection rates. The prevalence of schistosomiasis infection was low at 5.6%: 3.3% for *Schistosoma haematobium* (geometric mean 0.16 eggs/10 mL urine) and 2.3% for *S. mansoni* (0.18 eggs/g faeces). *Ascaris lumbricoides* was found in 0.4% of the children while other soil-transmitted helminths were not found. Stunting was found in 50.9%, wasting in 4.5% and underweight in 48.7% of the children examined; however, no positive association was found between infection and nutritional status indicators.

## La parasitose intestinale et l'état nutritionnel chez des écoliers du district de Sahar (Yémen)

**RÉSUMÉ** La prévalence et l'intensité de la schistosomiase et des géohelminthiases ont été estimées chez des écoliers de troisième année dans le district de Sahar, Gouvernorat de Sadah (Yémen) après quatre campagnes annuelles de lutte contre la schistosomiase. Des mesures anthropométriques ont été utilisées pour évaluer l'état nutritionnel en association avec les taux d'infection. Avec 5,6 %, la prévalence de l'infection par les schistosomes était faible : 3,3 % pour *Schistosoma haematobium* (moyenne géométrique de 0,16 œufs/10 mL d'urine) et 2,3 % pour *S. mansoni* (0,18 œufs/g de selles). *Ascaris lumbricoides* a été détecté chez 0,4 % des enfants tandis qu'on n'a pas trouvé d'autres géohelminthes. Un retard de croissance a été constaté chez 50,9 % des enfants examinés, une émaciation chez 4,5 % et un déficit pondéral chez 48,7 % ; aucune association positive n'a toutefois été trouvée entre l'infection et les indicateurs de l'état nutritionnel.

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## Introduction

Schistosomiasis and soil-transmitted helminthiasis are important health problems in several regions of the world, causing considerable morbidity and mortality. After malaria, schistosomiasis is the second most common health disease in Yemen [1]. Both *Schistosoma haematobium* and *S. mansoni* infections are prevalent in 12 governorates of Yemen while only *S. haematobium* is reported from Hadhramaut and Amran Governorates [2–10] (Arfaa F, unpublished report, 1990). Zero transmission was reported in Hodeida and Aden Governorates. However, the situation is unknown in Al-Mahrah, Al-Baidha, Shabwah and Al-Jawf Governorates.

Sa'dah Governorate is an endemic area for both *S. haematobium* and *S. mansoni* infections. Both species were reported by Arfaa in 1982 in rural areas surrounding Sa'dah city. He found rates reaching 48% for *S. mansoni* and 8% for *S. haematobium* (Arfaa F, unpublished report, 1990). In a study in 1992 on 400 schoolchildren, rates of infection reaching 76% for *S. mansoni* and 49% for *S. haematobium* were recorded [9]. In response to this high endemicity, the Yemeni Ministry of Health established a schistosomiasis control unit to carry out school surveys, apply selective treatment for positive cases, deliver health education and apply molluscicide treatments to aquatic areas. Non-governmental organizations were encouraged to assist in the programme. Four successive campaigns, including targeted de-worming, selective treatment and focal mollusciciding, have been implemented in the area over a 5-year period since 1999.

This cross-sectional study was carried out to assess the current prevalence of schistosomiasis and soil-transmitted helminthiasis

among schoolchildren after the implementation of these prevention activities and after expansion in the agricultural activities of the area. In addition, it aimed to estimate the prevalence of other intestinal parasites and the nutritional status of schoolchildren in Sahar district of Sa'dah Governorate.

## Methods

Sahar district (690 km<sup>2</sup>) is the rural area surrounding Sa'dah city. It lies in the remote north of Yemen, 250 km from the capital city, Sana'a. It is an agricultural area where mainly fruits and grains are cultivated using underground water and rainwater for irrigation. The population of the district is 113 797, with 21 393 schoolchildren enrolled in 90 schools according to the statistical yearbook 2002.

From the enrolment list of 78 primary schools in Sahar district, 15 schools were randomly selected using the random numbers list of *Epi-Info*, version 6. All children of the third-year class who were present on the day of the survey were included (mean number of pupils per class 37). Two teams of researchers visited 2 schools daily. The total number of children examined was 557.

Urine samples and stool samples were collected from children for analysis for *Schistosoma* spp., *Ascaris* spp. and other soil-transmitted parasite infections. Filtration and modified Kato-Katz techniques were adopted for urine and stool analysis [11,12]. Wet preparations were used to detect protozoa infection and hookworm eggs within 2 hours after collection. The number of children infected and the arithmetic and geometric means of egg counts were calculated (number of eggs per 10 mL of urine for *S. haematobium* and number of eggs

per 1g faeces for *S. mansoni* and *Ascaris lumbricoides*).

Two digital Seca scales measuring to the nearest 100 g and 2 stadiometers measuring to the nearest 1 mm were used to measure the weights and heights of the children. Nutritional status indicators were classified according to World Health Organization (WHO) definitions [13]. Underweight was defined as low weight-for-age, wasting was low weight-for-height and stunting was low height-for-age, i.e. below -2 standard deviations (SD) from the reference values.

The results were analysed using *Epi-Info*, version 6. Chi-squared and Fischer exact tests were used to compare the relationship between nutritional status and parasite infection. Anthropometrical measurements were processed using the *Epi-Nutri* program of *Epi-Info*.

Praziquantel (400 mg/kg) and albendazole (400 mg) were dispensed the following day, as appropriate, for all children testing positive for parasites.

## Results

Of the total of 557 children investigated, 413 (74.1%) were boys and 144 (25.9%) girls. The mean (SD) age of all children was 10.1 (1.3) years: 10.1 (1.4) years for boys and 10.1 (1.3) years for girls. The range of ages was from 7 to 14 years. Urine samples were obtained from 548 pupils and stool samples from 540. Full sets of measurements, i.e. urine, stool and anthropometric, were available for 530 pupils.

Schistosome infection was identified in 30 children (5.6%), with light intensity of egg counts (Table 1). *S. haematobium* eggs were identified in 18 urine samples (3.3%), whereas *S. mansoni* eggs were identified in 12 stool samples (2.3%). Double infection with both species was not found.

Ova of *A. lumbricoides* were found in only 2 cases and no other soil-transmitted helminths were seen (Table 1). Tapeworm infections were found in 14 children: 13 *Hymenolepis nana* and 1 *Taenia saginata*.

Table 1 Prevalence of intestinal parasites and intensity of schistosomiasis and ascariasis among schoolchildren of Sahar district, Yemen

Infection	No. tested	Parasite positive		Mean egg count	
		No.	%	Arithmetic	Geometric
Parasite					
<i>Schistosoma haematobium</i>	539	18	3.3	4.92 <sup>a</sup>	1.12 <sup>a</sup>
<i>Schistosoma mansoni</i>	534	12	2.2	0.11 <sup>b</sup>	1.12 <sup>b</sup>
<i>Ascaris lumbricoides</i>	534	2	0.4	9.06 <sup>b</sup>	1.02 <sup>b</sup>
<i>Entamoeba histolytica</i>	534	34	6.4	—	—
<i>Hymenolepis nana</i>	534	13	2.4	—	—
<i>Taenia saginata</i>	534	1	0.2	—	—
Multiple infections					
1 parasite	50	74	13.5	—	—
2+ parasites	550	3	0.5	—	—

n = total number of children tested.

<sup>a</sup>Number of eggs/10 mL urine.

<sup>b</sup>Number of eggs/1 g faeces.

The mean heights and weights of the children by age group are shown in Table 2. A high proportion of pupils were stunted (50.9%), wasted (4.5%) or underweight (48.7%) by WHO norms (Table 3). Comparing infected and non-infected children of the same cohort, the association of schistosome infection with underweight and wasting was not statistically significant, whereas there was a statistically significant inverse relationship with stunting (Table 3).

## Discussion

Two species of schistosome infection were identified in the study population. The rate of infection found in this study was lower than rates reported previously from Sa'da (76.3% for *S. mansoni* and 49.0% for *S.*

*haematobium*) [9]. This finding can be attributed to the 4 schistosomiasis control campaigns in the previous 5 years in the area. The campaigns comprised health education, case finding and treatment in schoolchildren and mollusciciding. This implies that annual campaigns are effective in lowering the prevalence and transmission of the infection. Helminthiasis is also very low in the area. Therefore, the minimal package of activities to control for schistosomiasis and soil-transmitted helminthiasis which is recommended by WHO should be continued [14].

The anthropometrical measurements revealed that the children of Sahar district are shorter and lighter than WHO standards. Around half of the children were found to be stunted or underweight, which is better than

Table 2 Anthropometric values of 534 schoolchildren in Sahar district, Yemen

Age (years)	Sex	No.	Mean (SD) height (m)		Mean (SD) weight (kg)	
7	Boys	5	116.7	(10.8)	20.2	(3.0)
	Girls	2	118.6	(2.3)	21.1	(0.7)
8	Boys	35	120.5	(4.8)	20.9	(1.9)
	Girls	15	121.2	(7.7)	21.5	(3.1)
9	Boys	99	123.7	(5.7)	22.0	(2.3)
	Girls	29	124.0	(7.2)	22.3	(3.3)
10	Boys	122	127.3	(6.0)	22.3	(3.3)
	Girls	38	127.3	(5.6)	23.4	(3.3)
11	Boys	74	129.9	(6.6)	24.8	(3.3)
	Girls	41	133.3	(6.2)	26.6	(3.5)
12	Boys	40	135.1	(7.4)	26.8	(3.9)
	Girls	13	138.4	(7.5)	28.6	(3.8)
13	Boys	14	135.0	(7.6)	27.2	(4.5)
	Girls	1	138.7	(0.0)	33.7	(0.0)
14	Boys	5	147.9	(17.1)	35.3	(9.0)
	Girls	1	137.0	(0.0)	26.8	(0.0)

SD = standard deviation.

**Table 3 Nutritional status in relation to schistosome infection of schoolchildren in Sahar district, Yemen**

Undernutrition indicator <sup>a</sup>	Total No.	Schistosome positive		Schistosome negative		P-value
		No.	%	No.	%	
Stunting <sup>b</sup>	272	9	31.0	259	52.0	$\chi^2 = 4.82$ , $P = 0.028$
Wasting <sup>c</sup>	17	2	10.0	15	4.2	Fisher exact test, $P = 0.228$
Underweight <sup>b</sup>	260	9	31.0	247	49.9	$\chi^2 = 3.78$ , $P = 0.052$

<sup>a</sup>World Health Organization definitions.<sup>b</sup>Total readings are 534.<sup>c</sup>Total readings are 378.

the results of the Al-Mahweet study which reached 59% for stunting [15]. This difference could be attributed to the relatively higher socioeconomic status of people in Sa'dah than Al-Mahweet. The prevalence of underweight was almost similar to that reported from Al-Mahweet. The association between schistosome infection and underweight and wasting was not statistically significant. The reason behind that could be the low intensity of infection. Moreover, in the present study wasting, which is an indicator of acute undernutrition, was high in the infected children: 2 out of 20 (10.0%) infected children versus 15 out of 357 (4.2%) in Al-Mahweet [14]. Examination of a larger number of infected children may be needed to confirm this relationship.

In conclusion, the low level of schistosomiasis infection in this study after 4 rounds

of a parasite control campaign suggests that these control programmes, with a minimal package of control of schistosomiasis and soil-transmitted helminthiasis, are effective in reducing the rates of infection. No statistically positive association was found between infection and nutritional status.

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# Factors influencing inappropriate hospitalization in Riyadh, Saudi Arabia: physicians' perspectives

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العوامل التي تؤثر على إدخال المرضى دون داع إلى المستشفيات في الرياض بالمملكة العربية السعودية: وجهة نظر الأطباء

بدران العمر، عساف العساف، خالد العيان، خالد كلش، فاطمة جاويد

**الخلاصة:** تستقصي هذه الدراسة العوامل التي تؤدي إلى دخول المرضى بدون داع إلى المستشفيات من وجهة نظر الأطباء العاملين في المستشفيات الحكومية، ومستشفيات الرعاية الأولية، والمستشفيات العسكرية في الرياض، بالمملكة العربية السعودية. وقد أظهر الاستبيان الذي استكمل ذاتياً من قبل 250 طبيباً، أن غالبية الأطباء كانوا مدركين لحقيقة إدخال المرضى إلى المستشفيات بدون داع، وكانت المشاكل الناجمة عن الإدخال غير الضروري للمرضى تحدث في المستشفيات العمومية (سواء الحكومية أو العسكرية) أكثر منها في المستشفيات الخاصة. وكانت عدم قدرة أسرة المريض على رعايته، أو الاستجابة لطلب المريض، أو عدم وجود من يمكنه إخراج المريض من المستشفى، من أهم أسباب إدخال المرضى إلى المستشفيات، والبقاء فيها بدون داع.

**ABSTRACT** This study investigated factors causing inappropriate hospitalization from the physicians' perspectives at government, primary and military hospitals in Riyadh, Saudi Arabia. A self-administered questionnaire to 250 physicians showed that the majority were aware of inappropriate admissions. Problems with inappropriate admissions occurred more frequently at public hospitals (both government and military) than private hospitals. The reasons believed to contribute most to inappropriate admission and hospitalization were the inability of the patient's family to take care of the patient, to satisfy the patient's request, and the absence of someone to get the patient out of the hospital.

## Facteurs influençant la non-pertinence des hospitalisations à Riyad (Arabie saoudite) : points de vue des médecins

**RÉSUMÉ** La présente étude a examiné les facteurs responsables de la non-pertinence des hospitalisations du point de vue des médecins dans les hôpitaux gouvernementaux, primaires et militaires à Riyad (Arabie saoudite). Un auto-questionnaire adressé à 250 médecins a montré que la majorité d'entre eux se rendaient compte de la non-pertinence des admissions. Les problèmes associés aux admissions non pertinentes survenaient plus fréquemment dans les hôpitaux publics (gouvernementaux et militaires) que dans les hôpitaux privés. L'incapacité de la famille du patient à prendre soin du patient, à répondre à sa demande, et l'absence de quelqu'un qui puisse faire sortir le patient de l'hôpital constituaient les raisons considérées comme contribuant le plus à la non-pertinence des admissions et des hospitalisations.

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## Introduction

Various studies have looked at the appropriateness of hospitalization. Inappropriate hospital utilization has been described as the “hospitalization of patients who, from the clinical perspective, could be managed on a less intensive health care level” [1]. Restuccia et al. defined inappropriate bed utilization as a length of stay of more than 28 days [2].

Many factors may lead to inappropriate hospitalization. In a study of appropriateness of admission and average length of stay (ALOS), Bare et al. found that inappropriate admissions were primarily attributable to hospitalization for diagnostic and/or therapeutic services that could have been rendered on an ambulatory basis [3]. A survey on inappropriate admissions in inner London found that patients were inappropriately utilizing acute beds because of difficulties in organizing care at home or elsewhere [4]. A study on factors associated with inappropriate emergency hospital admissions in the United Kingdom by Coast et al. reported an attempt to assess the factors associated with inappropriate hospitalization [5]. They concluded that the complex interplay between the characteristics of patients, referrers and alternate forms of care might result in quite different types of inappropriate admissions in different locations. In a similar study to the present one, Matar conducted a study in Saudi Arabia soliciting physicians’ views regarding factors causing inappropriate admissions and inappropriate medical procedures [6]. The study found no difference in physicians’ views about the appropriateness of admissions in relation to differences in hospital ownership.

Many strategies have been proposed to reduce inappropriate utilization, although not all have been shown to be effective:

reducing the average length of stay in hospital [7], limiting the number of inpatient care beds and access to outpatient services [8], targeting for review only patients with a high average length of stay [9] and patient self-referral [10]. The key to reducing inappropriate admissions is improving the hospital review process through prospective review (pre-admission of appropriateness and necessity of services before they are delivered) and concurrent review (gathering information about the patient and assessing the continuation of services). However, to be effective, this process needs to be informed about the factors which lead to inappropriate admissions and excessive length of stays in a particular hospital setting.

The rationale for carrying out the present study was the shortage of research about length of stays and inappropriate admissions in Saudi Arabia, and the impending implementation of a national health insurance system in the country, which would require optimum utilization of hospital resources. The aim of the present study was to assess Saudi physicians’ beliefs about the extent to which inappropriate admissions and under- or over-utilization of beds occurred in their hospital and the reasons for inappropriate admissions. Comparisons were made between different types of hospital to discover whether inappropriate admissions and bed utilization occurred more frequently at public or private hospitals.

## Methods

A descriptive analytical research design was used in this study. A self-administered questionnaire survey was used to examine the factors that influence inappropriate admission and hospitalization in hospitals in Riyadh city, Saudi Arabia.

## Sample

A representative sample of all of the hospitals in Riyadh was randomly selected. A stratified random sample technique was applied to cover the 3 categories of hospital care services providers in Riyadh. From Ministry of Health (MOH) government-run hospitals, 6 hospitals out of 10 were selected and coded as A–F to protect anonymity; from private hospitals, 5 hospitals out of 8 were selected and coded as G–K; and from military hospitals, 2 out of 3 were included and coded as L and M. Bed capacities at the hospitals ranged from 120–300 for governmental hospitals, 60–252 for private hospitals and 511–800 for the 2 military hospitals.

The study population consisted of all physicians at all levels, including residents, specialists and consultants at the selected hospitals covered by this study. During the period from December 2001 to March 2002, a stratified random sample was drawn and 400 questionnaires were distributed among the hospitals: 31 questionnaires were distributed among physicians in each hospital, except for hospitals I and K where 25 questionnaires were distributed to each and hospital L where 40 questionnaires were distributed. The difference in the number of questionnaires distributed was due to the different numbers of physicians in each hospital. A total of 250 complete and usable questionnaires were received, an overall response rate of 62.5%. Response rates were 116/180 from MOH hospitals (64.4%), 57/71 from the military hospitals (80.3%) and 77/149 from private hospitals (51.7%).

## Instrument

The covering letter attached to each questionnaire explained the purpose of the study and instructions for completing the questionnaire. The first part consisted of 9 questions covering the sociodemographic variables of

respondents and 2 questions about hospital name and kind. The second part included a question to reflect the physicians' opinion about inappropriate admissions in the hospital they work in, and another question included 17 statements related to the factors that influence inappropriate hospital admissions. Inappropriateness was described to include both inappropriate admissions (the lack of medical necessity for admission to the hospital) and inappropriate length of stay (the over- or under-utilization of hospital beds). The physicians' opinions about the importance of each one of the above listed factors on inappropriate admission in hospitals were measured on a 4-point Likert scale ranging from strongly agree (1) to strongly disagree (4).

To assure the validity of the research questionnaire, the following procedures were conducted. First, a review was made of the relevant literature and previous study instruments were examined to develop the first draft of the questionnaire. Secondly, a pilot study to test the draft questionnaire was conducted at the King Fahad National Guard Hospital and, based on the responses, some questions were clarified, added or deleted in the study questionnaire. Thirdly, the face validity was assessed by giving the questionnaire to different health professionals, as well as faculty members of the Master's programme in Health and Hospital Administration at King Saud University. Their suggestions were also considered in the formulation of the final draft of the questionnaire.

The alpha coefficient of the questionnaire—an indication of a scale's internal consistency—was 0.82% which is considered a good level of reliability.

## Data analysis

Descriptive analyses and inferential analyses were used for the analysis of the data.

Frequencies, percentages, Cramer's V, Kendall's tau-b and Kendall's tau-c methods were used to measure the significance, the strength, and the direction of the relationship between the study variables [11].

## Results

### Physicians' sociodemographic characteristics

Comparisons across the different hospital groups (MOH, private and military) revealed substantial differences in physicians' sociodemographic characteristics (Table 1). For example, military hospitals had the highest proportion of young physicians. For consultant status, private hospitals had more physicians with doctorates than other sectors. However military hospitals had physicians with the longest years of experience, while MOH hospitals had the highest ratio of medical to surgical specialists.

### Presence of inappropriate admissions

In Table 2 the data from MOH and military hospitals were combined because they deliver free health services to patients. There was a significant difference between public and private hospitals in the volume of inappropriate admissions and hospitalization. Overall 86.0% of the responding physicians from the public hospitals believed that "sometimes" and "always" there are inappropriate admissions/hospitalization) compared with only 44.0% of those from the private hospitals. The problem of inappropriate admissions/hospitalization occurred more frequently in public hospitals (Cramer's V = 0.447;  $P < 0.001$ ).

### Factors causing inappropriate admissions and hospitalization

From Tables 3–5, we can see there were 2 categories of reasons believed to cause in-

appropriate admissions and hospitalization: patient-related and hospital-related. The patient-related reasons were: inability of the patient's family to take care of him/her; to satisfy the patient's request; refusal of the patient to be discharged on completion of treatment; absence of anyone to take the patient out of hospital; and presence of a relationship between the patient and hospital staff. The hospital-related factors were: lack of a good admissions policy; and delayed test results.

As shown in Table 3, for MOH physicians, there were 3 factors believed to contribute to the problem of inappropriate admission and hospitalization: inability of the patient's family to take care of the patient; to satisfy the patient's request; and absence of anyone to take the patient out of the hospital.

Table 4 illustrates that in military hospitals the major factors believed by physicians to cause inappropriate hospitalization were: inability of the patient's family to take care of him/her; refusal of the patient to be discharged after completion of treatment; to satisfy the patient's request; lack of a good admissions policy; absence of anyone to take the patient out of hospital; presence of a relationship between the patient and hospital staff; and delayed test results.

Table 5 shows that according to physicians in private hospitals inappropriate hospitalization was less of a problem than in MOH and military hospitals. Two reasons for inappropriate hospitalizations were identified, both patient-related; inability of the patient's family to take care of him/her and to satisfy the patient's request.

### Physicians' sociodemographic characteristics and reasons for inappropriate admissions

Cramer's V, Kendall's tau-b and Kendall's tau-c were used to measure the significance,

Table 1 Sociodemographic characteristics of the physicians

Variable	MOH hospitals (n = 116)		Military hospitals (n = 57)		Private hospitals (n = 77)		Total (n = 250)	
	No.	%	No.	%	No.	%	No.	%
<i>Age (years)</i>								
≤ 35	38	34.2	26	46.4	8	11.6	72	30.5
36 ≤ 45	53	47.7	17	30.4	34	49.3	104	44.1
46+	20	18.0	13	23.2	27	39.1	60	25.4
Total	111	100.0	56	100.0	69	100.0	236	100.0
<i>Sex</i>								
Male	93	80.2	41	71.9	67	87.0	201	80.4
Female	23	19.8	16	28.1	10	13.0	49	19.6
Total	116	100.0	57	100.0	77	100.0	250	100.0
<i>Professional title</i>								
Consultant	36	31.3	15	26.3	48	62.3	99	39.8
Specialist	42	36.5	27	47.4	17	22.1	86	34.5
Resident	37	32.2	15	26.3	12	15.6	64	25.7
Total	115	100.0	57	100.0	77	100.0	249	100.0
<i>Specialization</i>								
Surgery	44	38.6	30	52.6	32	42.7	106	43.1
Medicine	70	61.4	27	47.4	43	57.3	140	56.9
Total	114	100.0	57	100.0	75	100.0	246	100.0
<i>Educational level</i>								
Bachelor	43	39.1	16	28.1	10	13.5	69	28.6
Masters	18	16.4	7	12.3	13	17.6	38	15.8
Fellowship	20	18.2	21	36.8	13	17.6	54	22.4
Doctorate	29	26.4	13	22.8	38	51.4	80	33.2
Total	110	100.0	57	100.0	74	100.0	241	100.0
<i>Experience (years)</i>								
≤ 3	51	46.8	17	30.4	44	58.7	112	46.7
4 ≤ 6	27	24.8	13	23.2	21	28.0	61	25.4
7+	31	28.4	26	46.4	10	13.3	67	27.9
Total	109	100.0	56	100.0	75	100.0	240	100.0
<i>Nationality</i>								
Saudi	41	35.7	38	66.7	12	15.8	91	36.7
Non-Saudi	74	64.3	19	33.3	64	84.2	157	63.3
Total	115	100.0	57	100.0	76	100.0	248	100.0

MOH = ministry of health.

n = total number of respondents.

the strength and the direction of the relationship between the physicians' sociodemographic characteristics and reasons for inappropriate admissions (Tables 6 and 7).

Table 6 shows that nationality (Saudi or non-Saudi), sex, specialization (surgery or medicine) and professional title (resident,



**Table 2 Occurrence of inappropriate admissions according to hospital type as reported by physicians**

Response	Physicians in public hospitals <sup>a</sup>		Physicians in private hospitals		Total	
	No.	%	No.	%	No.	%
<i>Inappropriate admissions occur:</i>						
Never	24	14.0	42	56.0	66	26.8
Sometimes	119	69.6	31	41.3	150	61.0
Always	28	16.4	2	2.7	30	12.2
Total	171	100.0	75	100.0	246	100.0
Cramer's $V = 0.447$ ; $P < 0.001$						

<sup>a</sup>Responses from Ministry of Health and military hospitals were combined.

**Table 3 Physicians' views about the reasons for inappropriate admissions at Ministry of Health (MOH) hospitals**

Reason	Total no.	% Required <sup>a</sup>	% Achieved <sup>b</sup>	Importance
Inability of patient's family to take care of patient	115	57.7	66.3	Important
To satisfy patient's request	115	57.7	61.2	Important
Absence of someone to get patient out of hospital	114	57.7	58.6	Important
Refusal of patient to be discharged	115	57.7	56.9	Not important
Delayed test results	114	57.7	52.5	Not important
Relationship between patient and hospital staff	115	57.7	43.1	Not important
Wrong diagnosis	114	57.7	43.1	Not important
Lack of good admissions policy	114	57.7	37.1	Not important
Physicians' inexperience	116	57.4	37.0	Not important
Faulty medical equipment	115	57.7	33.9	Not important
Poor medical records system	115	57.7	31.9	Not important
Admission for teaching purposes	113	57.7	26.7	Not important
Availability of large number of beds	115	57.7	26.7	Not important
To increase the bed usage rate	109	57.9	24.2	Not important
Lengthy discharge procedures	115	57.7	21.5	Not important
Delayed discharge procedures	111	57.8	18.1	Not important
To carry out medical investigations	114	57.7	16.3	Not important

<sup>a</sup>% Required =  $N/2 + 0.8225\sqrt{N}$ .

<sup>b</sup>% Achieved = % answering "Strongly agree" + "Agree".

**Table 4 Physicians' views about the reasons for inappropriate admissions at military hospitals**

Reason	Total no.	% Required <sup>a</sup>	% Achieved <sup>b</sup>	Importance
Inability of patient's family to take care of patient	57	60.9	89.4	Important
Refusal of patient to be discharged	54	61.3	78.9	Important
Absence of someone to get patient out of hospital	55	61.1	72.5	Important
To satisfy patient's request	55	61.1	73.7	Important
Lack of good admissions policy	53	61.3	73.7	Important
Relationship between patient and hospital staff	55	61.1	63.2	Important
Delayed test results	55	61.1	63.2	Important
Delayed discharge procedures	56	61.1	56.2	Not important
Faulty medical equipment	54	61.3	54.6	Not important
Wrong diagnosis	54	61.3	38.6	Not important
Lengthy discharge procedures	54	61.3	31.6	Not important
Poor medical records system	54	61.3	31.6	Not important
Physicians' inexperience	53	61.3	31.6	Not important
To increase the bed usage rate	50	61.6	26.3	Not important
Admission for teaching purposes	54	61.3	24.5	Not important
Availability of large number of beds	54	61.3	21.0	Not important
To carry out medical investigations	51	61.6	21.1	Not important

<sup>a</sup>% Required =  $N/2 + 0.8225\sqrt{N}N$ .

<sup>b</sup>% Achieved = % answering "Strongly agree" + "Agree".

specialist or consultant) were significant factors.

Saudi physicians tended to believe more than non-Saudi physicians that the following were the causes of the inappropriate admissions: carrying out medical investigations, lack of a good admissions policy, presence of a relationship between the patient and hospital staff, delayed tests results, faulty medical equipment, a poor medical records system, refusal of the patient to be discharged, and inability of the patient's family to take care of the patient (Table 6).

There was a positive relationship between physician's sex and the following factors (i.e. male physicians believed more than female physicians that these factors were the cause of the problem): wrong diagnosis, physician's inexperience, delayed test results, refusal of the patient to be discharged, and inability of the patient's family to take care of the patient (Table 6).

With regard to the specialization of physicians, it was observed that surgeons were significantly more aware of the contribution to inappropriate hospitalization of factors

**Table 5 Physicians' views about the reasons for inappropriate admissions at private hospitals**

Reason	Total no.	% Required <sup>a</sup>	% Achieved <sup>b</sup>	Importance
Inability of patient's family to take care of patient	75	59.5	79.2	Important
To satisfy patient's request	73	59.6	70.1	Important
Refusal of patient to be discharged	74	59.6	46.8	Not important
Absence of someone to get patient out of hospital	71	59.7	46.8	Not important
Delayed test results	74	59.6	27.3	Not important
Wrong diagnosis	72	59.7	24.7	Not important
Lack of good admissions policy	69	59.9	22.1	Not important
To increase the bed usage rate	70	59.9	19.5	Not important
Physicians' inexperience	73	59.6	16.9	Not important
Delayed discharge procedures	74	59.6	13.0	Not important
Availability of large number of beds	73	59.6	10.4	Not important
Lengthy discharge procedures	74	59.6	10.4	Not important
Relationship between patient and hospital staff	73	59.6	10.4	Not important
Admission for teaching purposes	74	59.6	9.1	Not important
Faulty medical equipment	72	59.7	9.1	Not important
Poor medical records system	73	59.6	9.1	Not important
To carry out medical investigations	73	59.6	7.8	Not important

<sup>a</sup>% Required =  $N/2 + 0.8225\sqrt{N}$ .

<sup>b</sup>% Achieved = % answering "Strongly agree" + "Agree".

such as: availability of a large number of beds, carrying out medical investigations, and faulty medical equipment. A positive relationship also existed between professional titles and the following factors: availability of a large number of beds, lack of a good admissions policy, presence of a relationship between the patient and hospital staff, delayed tests results and faulty medical equipment (Table 6).

Table 7 shows that physician's age, years of experience and educational level were also significant factors.

Age of the physician had a positive relationship with the following reasons

for inappropriate hospitalization: carrying out medical investigations, satisfying the patient's request, lack of a good admissions policy, wrong diagnosis, physicians' inexperience, delayed tests results and faulty medical equipment (Table 7).

The physician's years of experience had a significant relationship with only 1 factor: the refusal of the patient to be discharged (Table 7).

Educational level also had a significant positive relationship with the following reasons for inappropriate hospitalization: availability of a large number of beds, lack of a good admissions policy, presence of a

**Table 6 Factors affecting physicians' views of the reasons for inappropriate admissions: analysis of nationality, gender, specialization and professional title**

Factor	Cramer's V	P-value
<i>Nationality (1 = Saudi, 2 = non-Saudi) and:</i>		
Lack of good admissions policy	0.359	0.000
Refusal of patient to be discharged	0.259	0.001
Delayed test results	0.224	0.007
Faulty medical equipment	0.223	0.008
To carry out medical investigations	0.212	0.014
Poor medical records system	0.213	0.013
Relationship between patient and hospital staff	0.206	0.017
Inability of patient's family to take care of patient	0.182	0.043
<i>Sex (1 = male, 2 = female) and:</i>		
Refusal of patient to be discharged	0.331	0.000
Physicians' inexperience	0.275	0.000
Inability of patient's family to take care of patient	0.235	0.003
Wrong diagnosis	0.230	0.005
Delayed test results	0.230	0.005
<i>Specialization (1 = surgery, 2 = medicine) and:</i>		
Availability of large number of beds	0.199	0.024
To carry out medical investigations	0.187	0.042
Faulty medical equipment	0.182	0.049
<i>Professional title (1 = resident, 2 = specialist, 3 = consultant) and:</i>		
Availability of large number of beds	0.226	0.000
Delayed test results	0.220	0.001
Lack of good admissions policy	0.195	0.007
Faulty medical equipment	0.185	0.012
Relationship between patient and hospital staff	0.170	0.031

relationship between the patient and hospital staff, wrong diagnosis, delayed test results and faulty medical equipment (Table 7).

## Discussion

The general aim of this study was to investigate the factors influencing inappropriate

admissions at hospitals in Riyadh city. These were investigated from the physicians' perspectives. The sociodemographic characteristics of the respondents were taken into consideration during the analysis.

There was a significant difference in physicians' perspectives according to differences in hospital ownership; that is, pub-

**Table 7 Factors affecting physicians' views of the reasons for inappropriate admissions: analysis of age, years of experience and educational level**

Factor	Kendall's tau <sup>a</sup>	P-value
<i>Age (1 = ≤ 35 yrs, 2 = 36 ≤ 45 yrs, 3 = 46+ yrs) and:</i>		
Lack of good admissions policy	0.249	0.000
Delayed tests results	0.209	0.000
Faulty medical equipment	0.201	0.000
To carry out medical investigations	0.197	0.000
Wrong diagnosis	0.132	0.012
Physicians' inexperience	0.118	0.029
To satisfy patient's request	0.101	0.052
<i>Experience (1 = ≤ 3 yrs, 2 = 4 ≤ 6 yrs, 3 = 7+ yrs) and :</i>		
Refusal of patient to be discharged	-0.119	0.034
<i>Educational level (1 = bachelor, 2 = masters, 3 = fellowship, 4 = doctorate) and:</i>		
Lack of good admissions policy	0.193	0.000
Delayed test results	0.162	0.002
Faulty medical equipment	0.154	0.004
Relationship between patient and hospital staff	0.150	0.003
Availability of large number of beds	0.147	0.007
Wrong diagnosis	0.126	0.021

<sup>a</sup>Kendall's tau-c used for age; Kendall's tau-b used for experience and education level.

lic hospitals had significantly more cases of inappropriate admissions than private hospitals. This result conflicts with a previous study conducted in Saudi Arabia, which showed no difference in physicians' views about the appropriateness of admissions according to hospital ownership [6]. Yet this result could be attributed to the fact that public hospital services are provided free of charge in Saudi Arabia.

The study also showed that the degree of awareness by physicians concerning inappropriate hospitalization varied with the ownership of the hospital. It is clear that the problem of inappropriate admissions/hospitalization occurred more frequently in public hospitals. Factors identified by physicians were primarily patient-related, and were social and not medical in nature. The top rated factor in all types of hospital was the inability of the patient's family to

take care of the patient. Other factors cited as contributing factors to inappropriate hospitalization were the lack of admission policies and the delay in test results.

At MOH hospitals all the factors contributing to inappropriate admission were patient-related issues, not medical but mainly social, and all of which would lead to lengthening of hospital stays.

The first was inability of the patient's family to take care of the patient, the second was to satisfy the patient's request and the third was the absence of someone to take the patient out of hospital. These findings were also established in a study conducted by Victor and Khakoo, where acute beds were inappropriately utilized because of complications in organizing care at home or elsewhere [4].

In military hospitals, factors identified by the physicians as contributing to inap-

appropriate hospitalization were a mixture of both patient- and hospital-related issues. All of these, however, have the potential of lengthening hospital stays thus causing more inefficiencies and more waste in resources.

At private hospitals only 2 reasons for inappropriate hospitalizations were identified, both patient-related: the inability of the patient's family to take care of him/her and to satisfy the patient's request. In both cases, however, this is usually not a problem for private hospitals since patients have to pay for their care. This difference is further supported by a study by Coast et al., which suggested that alternate forms of care might result in different types of inappropriate admissions in different locations [5].

Nationality (Saudi or non-Saudi), sex, specialization (surgery or medicine) and professional title (resident, specialist or consultant) were factors significantly affecting physicians' views about the reasons for inappropriate admissions. Male physicians were more aware than female physicians about factors affecting inappropriate hospitalization. Awareness of inappropriate hospitalization was higher among surgeons than medical specialists, and among residents than consultant physicians.

Age, years of experience and educational level were also significant factors in physicians' views about the reasons for inappropriate admissions. The older the physician, the more importance was given to the following causes of inappropriate hospitalization: lack of good admission policy, delayed tests results, faulty medical equipment, more medical investigations, wrong diagnosis, and satisfying the patient's request. For years of experience, the relationship was negative; that is, the less experienced the physician, the more importance was given to refusal of the patient to be discharged as the cause of inappropriate

hospitalization. However, the higher the education level of the physician, the more importance was given to causes such as lack of a good admissions policy, delayed tests results, faulty medical equipment, a relationship between the patient and hospital staff, availability of a large number of beds and wrong diagnosis.

These findings agree with the those of Dermott et al. and Haug et al. [9,10]. Both studies indicated that if treatment modalities are applied, and delayed decision-making practices dealt with in time, then average length of stay can be contained. The ability to carry out such procedures is more apparent in the older, more experienced, and more educated physicians.

## Conclusions and recommendations

We conclude that more stringent policies and guidelines need to be established at hospitals in Riyadh to tackle the problem of inappropriate admissions and hospitalization. The following recommendations are suggested to improve hospital admission and hospitalization and hence hospital resource utilization:

- Hospital management needs to lay out a policy on admission and communicate technical as well as administrative parameters to assist physicians to make appropriate medical decisions relating to admissions and hospitalization.
- Improved coordination is needed among physicians, admissions department, and other departments inside the hospital such as laboratory department, X-ray department, and so on, to improve the timeliness of patients' tests results.
- Social service departments inside hospital must play a larger and more effective role in discharging patients. This needs



more coordination between patient's family from one side and the hospital staff from other side.

- Finally, further studies in the same subject are recommended to be conducted

in other cities in Saudi Arabia to cover most of health care providers, including additional variables that may affect inappropriate admission, in order to gain better utilization of hospital resources.

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# Safe injection practices in a primary health care setting in Oman

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ممارسات الحقن المأمون في مرافق الرعاية الصحية الأولية في سلطنة عُمان

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**الخلاصة:** قام الباحثون بإجراء مسح وطني لممارسات الحقن في 78 من المرافق الصحية الحكومية في سلطنة عُمان في عام 2001. وقد حصلوا على المعطيات من خلال إجراء اللقاءات ومن الملاحظة الشخصية. وأظهر المسح جودة المعايير المتبعة بوجه عام، وكفاية المخزون من المعدات الوحيدة الاستعمال. ولم يلاحظ إعادة تغطية الإبر إلا في مرفق واحد فقط، ولو أنه لوحظ احتواء صناديق النفايات على إبر معاد تغطيتها، وذلك في 28% من المرافق. وسجل في 17.9% من المرافق، وقوع إصابات ناجمة عن وخز الإبر في العام السابق. وفي 9% من هذه المرافق، لوحظ وجود أدوات حادة حول المرفق، كما وجدت حاويات للتخلص من الفضلات غير خاضعة للإشراف في 12.8% من المرافق. ولوحظ أن تخزين الصناديق المملوءة بالبضائع كان يتم بشكل غير مأمون في 11.5% من هذه المرافق. ومع أن التخلص من النفايات كان يتم بعيداً عن المرافق الصحية، إلا أن 33.3% منها فقط كان يتخلص من هذه النفايات بالترميز الصحيح.

**ABSTRACT** We conducted a national survey of injection practices in 78 government health facilities in Oman in 2001. Data were obtained by interview and observation. The overall standards were good and the stock of disposable equipment was adequate. Recapping of needles was only observed in 1 facility but in 28%, waste disposal boxes contained recapped needles and 17.9% reported needle-stick injuries in the past year. In 9% of the institutions, sharps were observed around the facility, in 12.8% unsupervised disposal containers were seen and in 11.5% unsafe storage of full boxes was observed. While disposal of the used waste was done away from the health facility, only 33.3% disposed of it by correct incineration.

## Pratiques d'injection sûres dans le cadre des soins de santé primaires à Oman

**RÉSUMÉ** Nous avons réalisé une enquête nationale sur les pratiques d'injection dans 78 établissements de santé gouvernementaux à Oman en 2001. Le niveau général était bon et le stock de matériel à usage unique était suffisant. Le recapuchonnage des aiguilles n'a été observé que dans un établissement mais dans 28 % des établissements, les boîtes prévues pour l'élimination des déchets contenaient des aiguilles recapuchonnées et 17,9 % des établissements avaient signalé des blessures par piqûre d'aiguille dans l'année écoulée. Concernant 9 % des établissements, on a observé des objets tranchants aux alentours, dans 12,8 % on a constaté la présence de conteneurs d'élimination non surveillés et dans 11,5 % le stockage non sécuritaire des boîtes pleines. Si l'élimination des déchets utilisés s'effectuait à distance de l'établissement de santé, seuls 33,3 % des établissements les éliminaient en les incinérant correctement.

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## Introduction

Mathematical modelling of available epidemiological data suggests that each year unsafe injection practices are responsible for 8 to 16 million people contracting hepatitis B virus (HBV), 2.3 to 4.7 million people contracting hepatitis C virus (HCV), and 80 000 to 160 000 people contracting human immunodeficiency virus (HIV) worldwide. In most cases, the transmission of these agents goes unrecognized because the infection is initially subclinical [1]. Globally, it has been estimated that unsafe injections cause about 1.3 million deaths annually [2]. In most developing countries, unsafe injections occur routinely, posing a significant potential threat for the transmission of bloodborne pathogens such as Hepatitis B, C and HIV [2,3].

In 2000, the World Health Organization (WHO) estimated that contaminated injections might have caused 250 000 HIV infections among injection recipients and 1000 among injection providers [4]. In developing countries it is estimated that 20%–50% of all injections administered are unsafe or done with re-used syringes [2]. In addition, in some countries of the WHO Eastern Mediterranean Region like Egypt and Pakistan, unsafe injections have been a significant mode of transmission responsible for the introduction of HCV [5–7].

In Oman, safe injection practices have been followed since the early 1970s. Due to concern over transmissible infections such as hepatitis B, C and HIV, disposable syringes have been used for vaccines as well as for other injections in all the health institutions. There have been no documented shortages of the supply of syringes and needles at any level of health

care delivery which might lead to reuse of injection equipment.

Health care delivery in Oman is almost entirely through the Ministry of Health (MOH) and the private sector contributes to some specialized tertiary health care components. Vaccines under the Expanded Programme on Immunization (EPI) are provided free to all MOH institutions and there are some nominal charges for private health care services.

Vaccine-associated unsafe injection practices are also monitored by analysing data on acute events following immunizations (AEFI). The AEFI surveillance was launched in Oman in 1993 as a complementary programme to EPI. Ever since, the data are routinely compiled and analysed at the national level. The events are broadly classified into the following categories: BCG adenitis, local reactions, injection abscess and systemic reactions. However, AEFI surveillance is not sufficient to entirely reveal all aspects of injection practices being followed in a country.

In order to validate the assumption that in Oman all components of safe injection practices are being followed, a national survey was undertaken in the primary health care setting with technical assistance from WHO. The study was conducted to determine whether the health facilities surveyed met the necessary requirements in terms of injection equipment, supplies and waste disposal and to determine whether all the critical steps of injection administration were being executed in accordance with the recommended standards. The main objective was to identify unsafe injection practices and make the necessary modifications to the existing policies through recommendations to decision-makers.

## Methods

Our study was a cross-sectional observation survey covering the entire country, which is administratively divided into 8 provinces (6 regions and 2 governorates) and further divided into 59 districts (*wilayat*). The population size was derived from the projections based on the 1993 census provided by the Ministry of National Economy.

The provinces were listed along with their respective populations. Eight clusters were then randomly selected from the provinces (1 from each province) using probability proportional to size sampling technique. Only government health facilities providing primary health care (preventive and curative), i.e. health centres, extended health centres and *wilayat* hospitals, were included. Private clinics as well as hospitals, providing secondary and/or tertiary care were excluded from the survey.

The estimated total sample size required 80 health care facilities. Thus for each cluster within the region 10 primary health care facilities were then randomly selected. In Muscat governorate for the 2 selected clusters only 18 primary health care facilities were available. Hence, finally it was decided to include a total of 78 primary health care facilities in the survey. All the selected facilities were surveyed except 1 in the southern Dhofar region. This health centre was not operational at the time of the survey and hence was substituted by another nearby health centre.

Four teams of field workers of the cadre of national EPI supervisors working in the MOH were recruited for data collection. Each team comprised of 2 experienced staff members familiar with EPI and the injection equipment. Each team was responsible for collecting data in 2 clusters (10 health facilities per cluster).

This injection safety assessment was conducted using the new WHO/BASICS

standardized assessment tools that were developed in the framework of the Safe Injection Global Network (SIGN) coalition [8]. Survey data collection was conducted using 2 different but complementary methods. The first was to carry out a systematic observation of the health facility focusing on supplies of injection equipment, handling and delivery of injection services, safety precautions and waste disposal procedures. The second was to interview injection providers and supervisors as a primary source of data using a standard structured questionnaire. In a health centre, at least 2 staff nurses were interviewed while in a small hospital we interviewed 8–10 staff members. The knowledge, attitude and practices of the staff that may favour needle-stick injuries were assessed by interviewing the staff concerned. A facility was judged on the basis of the general consensus as well as on the beliefs of the key senior supervisory staff. It is worth noting that usually the opinions and beliefs of the senior staff concerning a procedure is taught and followed by the other staff. The interviewers were trained to assess all available evidence and only then to classify a facility.

A WHO consultant visited Oman from 4 to 6 June 2001 prior to launching the survey, at which time all the field workers were trained in the data collection tools and procedures. Special emphasis was placed on tactfulness of observation and conduct of the interviews. Practical demonstration in carrying out the structured interviews and observations was also given. During the WHO consultant's visit, the questionnaire was revised and refined to fit the local circumstances after carefully studying the prevailing injection practices in Oman through detailed discussion with the central supervisory staff and a field visit to a primary health care facility. Questions related to auto-disable syringes and sterilizable

injection equipment or needle-removers or needle-cutters were omitted as they were not relevant to Oman. The questionnaire was reviewed to ensure that it covered the major areas and issues related to injection equipment, procedures and waste management. Data collection started on June 10, 2001 and was completed by July 7, 2001.

The logistics for the field visits was provided by the MOH. Each team was instructed to contact the regional directorate upon arrival and to request for administrative assistance. The selection of the region, the names of the health institutions as well as the day of visit were not disclosed in order to preserve the element of surprise and to ensure that the prevailing practices were observed. The field team visited the institution and briefed the medical officer in charge about the purpose of the survey before conducting the interviews.

The survey did not involve any experiment on human subjects and hence the question of ethical issues did not arise. Field workers were informed that they should tactfully interrupt an injection that would be obviously harmful to the recipient if it was about to occur.

The field teams did not face any major constraints during the survey. Occasionally the administrative head of the health institution questioned why they had not been informed in advance. However, after explanation by the field staff of the reasons for not doing so, their concerns were allayed and they agreed to cooperate.

Data were entered and analysed using *Epi-Info*, version 6.04 software.

## Results

All 78 selected health facilities were visited during the survey. One facility in Dhofar Governorate was closed and hence substituted by a nearby health centre. Most of the

facilities were from the rural areas providing primary health care services (60 health centres and 4 extended health centres). The 14 small hospitals included in the survey were either *wilayat* (district) level or local hospitals providing primary health care services.

As Oman had long abandoned the use of sterilizable syringes and needles and single-use disposable injection equipment was routinely in use in all the health facilities, all data collected were on disposable syringes and needles.

On the day of the visit, 27 (34.6%) health facilities were providing immunization services. An average of 12.9 injections for immunization were administered per day per institution (range 1 to 150). Similarly, during the visit 12 (15.4%) of the health facilities were also engaged in other curative activities involving injections. On average, 22.2 injections were offered for therapeutic purposes per day per institution (range 1 to 190). Overall, 63.2% of the injections administered were for therapeutic purposes, while 36.8% were administered for vaccination.

Supply of disposable syringes in almost all facilities was found to be abundant in relation to the reported workload of weekly injections. The syringes of 1 mL, 2 mL, 3 mL and 5 mL were supplied attached with needles. Of these, 1 mL, 2 mL and 3 mL syringes were used for immunizations while the 5 mL syringes were used only for transferring diluent.

On average 4096 syringes were in stock per health facility while the weekly average injection load for each was 245. In other words, the supply would allow each facility to continue providing injection services for a minimum period of about 16 weeks.

Table 1 shows the distribution of health facilities by the sufficiency of syringes and needles. Most of the health facilities were

**Table 1 Sufficiency of the supply of injection syringes observed in the health facilities**

Supply sufficient for:	Health facilities (n = 78)	
	No.	%
< 2 weeks	1	1.3
2–4 weeks	9	11.5
5–8 weeks	6	7.7
> 8 weeks	62	79.5

comfortably supplied with assorted syringes sufficient for over 2 weeks, of which 62 (79.5%) had enough supplies for over 8 weeks. Only 1 of the facilities, had supplies sufficient for less than 2 weeks.

The stock of disposable syringes was found to be adequate in all the health facilities. However, 3 (3.8%) institutions had experienced shortages of certain equipment at some point. This shortage was due to the faulty inventory and indenting procedures followed in those health facilities and not due to actual short supply. All the respondents were unanimous in confirming that sufficient quantities of injection equipment were generally available at the health facilities and that there had never been any occasion when vaccinations or therapeutic injections were abandoned because of the non-availability of injection equipment.

Since not all the health facilities were carrying out injections on the day of the visit, the data presented on the “observed” injection practices apply only to the 39

**Table 2 Selected indicators of injection practice observed in the health facilities**

Injection practice indicator	Immunization (n = 27)		Other injections (n = 12)	
	No.	%	No.	%
Clean designated table or tray	27	100.0	12	100.0
Use of syringe from sterile packet or fitted with 2 caps	27	100.0	12	100.0
Use of needles from sterile packet	27	100.0	12	100.0
Removal of needles from multi-dose vial between injections	26 <sup>a</sup>	96.3	12	100.0
Use of clean barrier to break ampoule	7	25.9	5	41.7
For each reconstitution, use of sterile syringe and needle	24 <sup>a</sup>	88.9	12	100.0
Reconstitution of vaccine/drug with correct volume of diluents	23 <sup>a</sup>	85.2	9	75.0
Vials kept at 2–8 °C during period of use	27	100.0	NA	NA
Vaccine vial shaken prior to withdrawing content	23 <sup>a</sup>	85.2	NA	NA
Needles recapped after injection	0	0	1	8.3

<sup>a</sup>In the remaining health care facilities the specified indicator was not applicable.

n = number of health facilities.

NA = not applicable.



health institutions that were carrying out injections. Table 2 highlights some of the selected indicators applicable to injection safety based solely on observations by the interviewer at the time of visit to the health facility. This shows that safe practices were generally followed. However, the use of a clean barrier while breaking the ampoule was followed in only 7 out of 27 (25.9%) facilities carrying out the procedure. In addition, while recapping of needles after injection was only observed in 1 health facility, in 22 of the 78 (28.2%) surveyed institutions, the waste disposal boxes contained recapped needles, suggesting that recapping was a fairly common practice despite clear instructions to the contrary. In fact, 1 EPI staff nurse even argued with the interviewer that recapping should be done prior to disposal.

Waste disposal safety boxes were universally available. In all of the health facilities surveyed the safety containers were available in stock. In the majority (78.0%), 5 or more safety containers were being used or were available at the time of the survey (Table 3).

Fourteen (17.9%) institutions reported needle-stick injuries in the past year. In 1 institution, 4 such incidents were reported (Table 4).

Needle removal by hand was considered an appropriate practice by the members of

**Table 4 Frequency of needle-stick injury reported in the health facilities**

Number of incidents of reported needle-stick injury	Health facilities (n = 78)	
	No.	%
None	64	82.1
1	8	10.3
2-3	5	6.4
4	1	1.3
Total	14	17.9

*There were a total of 22 needle-stick injuries reported.*

staff in 11 (14.1%) of the facilities, while in the majority of centres (79.5%), the staff was aware of the MOH policy of the disposal of syringe and the needle together (Table 5). The health staff of 18 (23.1%) health institutions was not aware of where to report after a needle-stick injury. While all the health facilities had MOH EPI manual, few (28.2%) were in possession of specific protocols for injection safety other than the EPI manual. Shortage of syringes and needles was reported by 3 facilities in the last 12 months and that of safety containers by 5 facilities (Table 5).

Table 6 summarizes the important observations regarding injection waste-disposal practices. In all the surveyed sites, disposal was carried out at a remote place, i.e. away from the injection room. However, in 7 (9.0%) of the facilities, used sharps were observed around the health facility while sharps in open containers were observed in 3 (3.8%) facilities, both of which are a risk for needle-stick injury. Unsupervised sharps boxes (casual placement away from observation by staff) were seen in 10 (12.8%) centres, while unsafe storage of full boxes (full, open boxes accessible to staff, patients cleaners, etc.) was observed in 9 (11.5%) health facilities.

**Table 3 Safety boxes available in stock observed in the health facilities**

Number of safety containers	Health facilities (n = 78)	
	No.	%
1 to 4	25	32.1
5 to 9	25	32.1
10 to 20	19	24.4
> 20	9	11.5

Table 5 Knowledge and practices of injection providers and supervisors (interviews and observation)

Activity	Health facilities (n = 78)	
	No.	%
Removal of needle by hand before disposal	11	14.1
Practice of throwing needle with syringe	62	79.5
Institutions reporting needle-stick injuries	14	17.9
Knowledge of where to report after needle-stick injury	60	76.9
Specific person assigned for sharps disposal	62	79.5
In possession of standard operating procedures: <i>National EPI manual</i> [9] <sup>a</sup>	78	100.0
In possession of any other injection safety policy/ protocol <sup>b</sup>	22	28.2
No shortage of syringes & needles in the last year	75	96.2
No shortage of safety containers for waste disposal in last year	73	93.6

<sup>a</sup>The facilities were classified into categories based on the response of the key senior supervisory staff since generally the others followed their instructions.

<sup>b</sup>Verbal responses were verified by observation wherever feasible.

Final disposal of injection waste by incineration is the recommended method, but such facilities are not available universally in Oman. Only the new regional referral

hospital at the regional headquarter *wilayat* had the proper equipment and facilities for incineration of injection and other types of hazardous medical waste. In some regions

Table 6 Indicators of injection waste disposal observed in the health facilities

Injection waste disposal indicator	Health facilities (n = 78)	
	No.	%
Presence of sharps boxes in injection room/area	75	96.2
Presence of overflowing, pierced or open container	5	6.4
Full sharps boxes stored safely waiting for disposal	66	84.6
Full sharps boxes stored unsafely waiting for disposal	10	12.8
Sharps in open container posing risk of needle-stick injury	3	3.8
Evidence of used sharps around the health facility	7	9.0
Transport of waste off site	78	100.0

the peripheral health centres and hospitals (33.3%) had established a procedure to transfer the hazardous waste to the regional hospital for incineration. However, this practice was not universally followed (Table 7). In the majority (66.6%) of the health facilities, final disposal was either done by burning (37.2%), burial (1.3%) or dumping (28.2%) on municipal land.

## Discussion

Several countries have used the WHO assessment tool to validate the injection safety practices (A. Zenaw, Assessment of injection practices in Egypt, 2000; Y. Berhane, Report of injection safety survey in Ethiopia, 2000. Unpublished reports).

Although Oman has overall good standards of injection safety, an assessment can certainly provide information to identify weak areas in order to improve further the standards. The MOH has issued clear guidelines (standard operating procedures) in the *EPI manual* [9] to all health institutions and the private sector. Furthermore, the system of regional and national supervision of the EPI programme is well established and functions effectively. The national supervisors periodically visit the regions as well as the private clinics certified to administer vaccination.

The supply of injection equipment, including safety disposal boxes, in all the health institutions was ample. It is worth noting that indenting for and supply of injection equipment/drugs and vaccines is from 2 different government departments; Medical Stores and Central Vaccine Stores respectively.

Although relatively few instances were on record, needle-stick injuries do continue to occur in some facilities, thus exposing the health care workers to the risk of infection of bloodborne pathogens [10]. Recapping needles is recognized as the practice most likely to lead to needle-stick injuries [11–13] and it is against MOH policy. The survey revealed that, although recapping was not a common practice, it was still being done in some institutions. Indeed, some staff still manually remove needles, another practice that can lead to needle-stick injury. Therefore, there is a need to reaffirm MOH policies and for strong and sustained supervisory action to prevent injection-associated infection [3]. Similarly, clear policy and guidelines should be made available for the reporting and management of needle-stick injuries.

A shortage of syringes and needles was reported by some of the health facilities in the last 12 months. This information, however, was contrary to the observation of an ample supply of all the required equipment at the time of our interviews. After further inquiry, it became apparent that this shortage was due rather to lack of an inventory and timely indent than an actual shortage. Similarly the indenting procedures for safety containers should be streamlined so that shortages of this essential piece of equipment do not lead to a compromise on safety.

All the health staff interviewed were generally aware of the safety concerns of the MOH regarding injection practices.

**Table 7 Type of waste disposal facility used by the health facilities**

Type of disposal	Health facilities (n = 78)	
	No.	%
Incineration in the hospital	26	33.3
Open burning on municipality land	29	37.2
Burial in municipality land	1	1.3
Dumping on municipality land	22	28.2

However, the policies and guidelines encompassing all the issues of injection safety were not clearly defined.

Final disposal of injection waste by incineration is the recommended method [14]. Unsafe waste management of sharps may expose the community to needle-stick injuries [15]. The survey revealed that the practices and procedures of safe disposal of sharps and other injection waste were far from ideal and require further strengthening. There was no uniform practice of the final disposal of the waste. In some health facilities the used injection equipment was either not stored properly prior to disposal or discarded indiscriminately. Such unsafe practices may result in the exposure of the general community to bloodborne pathogens. Thus injection waste disposal practices and facilities in Oman need to be improved.

## Conclusions

The survey revealed that the overall standards of injection safety in Oman were good. However, there are some areas of concern where safe practice needs to be strengthened. The following recommendations were made based on the observations and results of the survey.

- The policies and guidelines as well as the protocols on injection safety practices should be unambiguous with reference to equipment supply and handling, sharps collection and final disposal. Injection equipment indent and supply procedures should be streamlined particularly for the safety containers.
- The essential elements of safety procedures should be displayed in the form of a poster in all health facilities at the loca-

tion where injections are offered. Such posters would prove to be a constant reminder to the staff.

- The final disposal of sharps should be considered a top priority in Oman. Incineration is the best method of safe disposal. An acceptable and practical system should be established to transport the waste on a regular basis to the incineration facilities available in the regional referral hospitals.
- A mutually agreeable arrangement should be made in collaboration with the local municipal authorities for safe disposal of injection waste in remote health facilities with no access to regional hospitals.
- Needle-stick injury should be made notifiable and a national protocol should be developed for its effective management.
- The next (3rd) edition of the EPI manual should include a specific chapter on injection safety and also should incorporate all the other recommendations from the present study.

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# Evaluation of dental waste management in two cities in Palestine

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تقييم إدارة نفايات عيادات طب الأسنان في مدينتي في فلسطين

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**الخلاصة:** دُرست طرق التخلص من نفايات عيادات طب الأسنان في 37 عيادة تم اختيارها بصورة عشوائية في مدينتي رام الله والبيرة، منها 31 عيادة من القطاع الخاص و6 عيادات تابعة لمؤسسات عامة أو منظمات لا حكومية. وسُئل أطباء الأسنان عن طرق التخلص من مختلف أنواع النفايات المتخلفة عن ممارسة طب الأسنان. فتبين أن المطهرات ومحاليل الأشعة السينية تُطرح جميعاً في بالوعات الصرف. أما بالنسبة للأدوات الحادة فكان يتم التخلص منها كما يلي: 13.5% من العيادات تستخدم صناديق غير قابلة للثقب (في عيادات المؤسسات العامة/ المنظمات اللاحكومية فقط)، و45.9% من العيادات تتخلص من الإبر مباشرة في القمامة بعد إعادة تغطيتها، و40.5% من العيادات تضع الإبر والشفرة في قوارير بلاستيكية تغلق قبل التخلص منها في النفايات العامة. وفي حين تم تطعيم 10.75% من أطباء الأسنان ضد فيروس الكبد "بي"، فإن 47% من العاملين في العيادات الخاصة لم يتلقوا هذا التطعيم.

**ABSTRACT** Disposal of dental waste was investigated at 37 randomly selected clinics in Ramallah and Al-Bireh cities: 31 private practices and 6 public/NGO clinics. Dentists were interviewed regarding their disposal of different forms of dental waste. Disinfectants and X-ray processing solution were thrown down the drain. For sharps, 13.5% of dentists used puncture-resistant containers (only in the public/NGO clinics), 45.9% discarded needles directly in the garbage after being recapped and 40.5% placed the used needles and blades in closed plastic bottles before throwing in the general garbage. Blood-soaked dressings and amalgam waste were also thrown in the garbage. While 10.75% of dentists were vaccinated against hepatitis B, 47% of the staff at private clinics were not.

## Évaluation de la gestion des déchets dentaires dans deux villes de Palestine

**RÉSUMÉ** L'élimination des déchets dentaires a été examinée dans 37 dispensaires choisis au hasard dans les villes de Ramallah et d'Al-Bireh : 31 cabinets privés et 6 dispensaires publics/d'ONG. Les dentistes ont été interrogés en ce qui concerne la manière dont ils éliminent différentes formes de déchets dentaires. Les désinfectants et la solution pour le développement des radiographies étaient jetés dans les égouts. Pour les objets tranchants, 13,5 % des dentistes utilisaient des récipients résistants aux perforations (seulement dans les dispensaires publics et des ONG), 45,9 % jetaient les aiguilles directement à la poubelle après avoir remis le capuchon et 40,5 % plaçaient les aiguilles et les lames dans des bouteilles en plastique fermées avant de les jeter dans la poubelle générale. Les pansements imbibés de sang et les déchets d'amalgames étaient également jetés à la poubelle. Si 10,75 % des dentistes étaient vaccinés contre l'hépatite B, 47 % du personnel des dispensaires privés ne l'était pas.

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## Introduction

Challenges arise in dealing with the considerable amount of health care waste that is generated by health care centres on a regular basis. About 20% of health care waste is considered hazardous and may pose grave threat to the surroundings [1]. Despite the fact that dental clinics are considered a minor source of health care waste [1], they nevertheless generate a certain amount of hazardous waste. The harmful effects of such waste cause serious human and environmental consequences if not dealt with properly. The common sources of major hazardous waste at dental clinics include X-ray fixer and film [2–4], chemical disinfectants [2,5–7], dental amalgam [8], sharps [9,10] and blood-soaked dressings [1,10,11].

There is no doubt that by following the environmental regulations that deal with different types of dental waste, the hazardous effects of such waste can be reduced or even eliminated. Minimizing the effects is strongly related to the behaviour of dental care professionals in their clinics. Many countries have aimed towards the elimination or minimization of the noxious effects of such waste. While several developed countries have established a comprehensive system for the management of health care wastes [12], developing countries still tend to suffer from improper waste disposal, insufficient financial resources, lack of awareness of health hazards and few data on health care waste generation and disposal.

In many areas of Palestine, dental waste along with other health care waste is often disposed of as part of the solid waste management system which is collected and dumped in uncontrolled landfills. Some local studies have investigated the generation and management of domestic solid wastes [13], a few have looked at the generation

of waste in hospitals [14] but none has addressed the issue of dental waste. In the absence of such studies and in the absence of regulations for medical waste disposal in Palestine, we investigated the handling and disposal of various types of dental waste generated on daily basis within the dental offices throughout the cities of Ramallah and Al-Bireh in the West Bank of Palestine.

## Methods

Field visits to randomly selected dental clinics were carried out during the month of January 2002. We conducted structured interviews, lasting about 30 minutes, with the dentists using a pilot-tested questionnaire designed by us.

There were a total of 106 registered dental clinics in Ramallah and Al-Bireh district in 2001, distributed between public, nongovernmental organizations (NGO) and the private sector [15]. Of these, 94 were located within the borders of Ramallah and Al-Bireh cities: 86 of the 94 were private clinics and 8 belonged to public institutions or NGOs. The remaining 12 clinics were located in the rural areas. Our study focused on the clinics within the urban centres only because of the difficulty faced in reaching the rural areas due to Israeli military checkpoints that cut off Ramallah and Al-Bireh Cities from the rural surroundings.

The study sample included 37 dental clinics out of the 94 in Ramallah and Al-Bireh; 31 private clinics were randomly chosen from the 86 within the private sector and all 8 public clinics were included, since they were few. Each clinic only has 1 dentist. However, data could not be collected from 2 of the public clinics because the dentist serving 1 of the NGO clinics was abroad at the time of the study, and the other

clinic is run by UNRWA in Al-Jalazon refugee camp and this could not be reached due to the military checkpoint there. Both the dentists and the clinic were evaluated.

The first part of the questionnaire included data on type of clinic and hepatitis B vaccination status of the dentist and clinic staff. The last item was included because of the risks for health personnel who handle dental waste, especially sharps.

The second part of the questionnaire focused on the various types of waste generated by the dental clinics on a daily basis. Dentists were asked about the various types, concentrations and estimated amounts of disinfectants that they use in the dental clinic, and whether they follow the label instructions for the products on how to handle and discard the solutions. Furthermore, dentists who use X-ray units in their offices were asked about the handling and disposal of the processing solutions.

Sharps and blood-soaked dressings were addressed in the final section of the questionnaire. The questions focused on the presence of puncture-resistant containers in the clinics and the personnel in charge of their collection from the clinic. In addition, dentists were asked to estimate the average number of simple tooth extractions performed every week, as well as the average number of minor oral surgeries performed every month.

Data were entered and analysed with *SPSS*, version 11. Simple frequencies, means and cross-tables were used.

## Results

Different types of disinfectants were used in the dental clinics. They included sodium hypochlorite (bleach), chlorhexidine, Cidex®, phenols and ammonia compounds. Chlorhexidine, bleach and Dettol were the most commonly used disinfectants. The

concentration of the used chlorhexidine or bleach ranged from 0.05% to 5%. Dettol was used in diluted form. The amounts used varied between the clinics with a monthly average estimate of 1.17 L, 2.2 L and 0.6 L for the Dettol, chlorhexidine and bleach respectively. It was also found that high concentrations of chlorhexidine (> 1.5%) were used diluted with water.

We found 13 (35.1%) clinics used a disinfectant with the trade name Microten (Unident, Geneva). The chemical ingredients of this product were not given on the label, except that it contained ammonium compounds without mentioning the concentration. This product is used diluted with water in a proportion of 1:10. However, no instructions were written about its proper disposal. As regards disposal of disinfectants, all dentists and their assistants disposed of the used disinfectants down the drain.

About 21.6% of the private dentists had X-ray units in their clinics while only 1 of the public/NGO clinics had an X-ray unit. The number of X-rays performed each week by a single dentist ranged from 0 to 15 per week. All clinics used a single processing solution that had no mention of composition or concentration. The used material was disposed of in the drain in all clinics and the lead foil that shields the X-ray film was discarded in the regular garbage.

The majority of amalgam waste (87.9% of extra newly placed amalgam, 84.8% of non-contact amalgam) ended up in the garbage or drain posing considerable danger to the environment.

Puncture-resistant containers were found in most (4 out of 6) public/NGO clinics, while none of the private clinics had such a container. Thus, 45.9% of dentists disposed of sharps in the garbage and 40.5% placed needles in separate plastic bottles; 13.3% of these did not throw the needle-containing

bottles in the garbage, but themselves burnt them in a non-crowded area. In addition, 2 dentists reported that they also put the amalgam waste in the plastic bottles where they kept the used sharps. Table 1 shows the methods of sharps disposal.

Blood-soaked dressings, including gauze and cotton as well as the extracted teeth, are all placed in the garbage in all the clinics.

As regards vaccination against hepatitis B, 10.8% of dentists were not vaccinated and 47% of staff at private clinics were not vaccinated either; 12.5% of staff at public and NGO clinics were not vaccinated.

To obtain a rough estimate of the waste generated, dentists were asked to estimate the average number of needles used, and simple extractions and minor oral surgery carried out. The mean number of needles used by each dentist per month was 112. The average number of simple extractions per week was 15 teeth per dentist.

## Discussion

The 37 randomly selected dental offices represented 39.4% of the total number of dental clinics (94) located within the boundaries of Ramallah and al-Bireh cities.

Our results show that the methods of disposal of dental waste are generally inadequate and expose dental staff and others to health risks and may contribute to environmental contamination.

Disposal of the diluted disinfectants was generally acceptable as the majority can be safely poured down the drain as was done by all the dentists. This is in line with the recommendations of different environmental agencies which agree on placing the frequently used disinfectants in dental offices like bleaches and alcohols in the sanitary sewer if their concentration is less than 10% [5]. However, 35.1% of the clinics used a disinfectant (Microten) of unknown composition and concentration and with no disposal information. Such products should not be used at all as they could be toxic or corrosive [1,5,7] and they should never be poured down the drain since they can produce hazardous effects once released within the wastewater.

This is also the case for dealing with the X-ray wastes, particularly the X-ray fixer which is a hazardous liquid. While globally disposal of such products is usually dealt with through recycling companies [2] or silver recovery units [4], no such solutions are available locally in Palestine and this leads to clinics simply discarding it in the drain.

Our findings indicate that the improper disposal of sharps, amalgam and blood-soaked dressings is widespread among the clinics as these items are discarded with the general garbage thereby jeopardizing the well-being of whoever deals with it. The lack of separate puncture-resistant containers in all the private clinics and the disposal of sharps in the general garbage, which is placed in badly controlled landfills in Ramallah city, will also lead to polluted surroundings and pose a risk of transmitting infectious diseases due to accidental injuries throughout the garbage disposal process. Indeed, there are reports of children being affected while playing with syringes that they found in uncontrolled dumping sites near their houses [16]. It should be noted

Table 1 Means of sharps disposal of the dentists

Disposal method	No. (n = 37)	%
Puncture-resistant container	5	13.5
Separate plastic bottle	15	40.5
Garbage	17	45.9

that other areas of Palestine such as Nablus city have experimented with incinerating sharps collected from hospitals [14,16] and such schemes could be extended to other areas.

Sharps are regarded as highly hazardous health care waste since they can cause injuries and puncture wounds [1,10]. The risk of disease transmission with bloodborne pathogens such as HIV, and hepatitis B and C is always present due to the exposure to contaminated sharps. According to the World Health Organization, many cases of infection with various pathogens are due to exposure to improperly managed health care waste, especially in developing countries [1]. For example, in 1992, 8 cases of HIV infection were recognized as occupational infections, 2 of which were parentally injured waste handlers [1].

While the majority of dentists in our sample had been vaccinated against hepatitis B, 47% of the staff at private clinics had not, which is alarming. Like any other health personnel, dental care professionals are at risk of infection from bloodborne pathogens. According to the US Environmental Protection Agency, the annual number of viral hepatitis B infections resulting from injuries from sharps among US dentists and dental assistants is < 1% and 5%–8% respectively [5]. Therefore, it is strongly recommended that hepatitis B vaccination be administered to all dental health care workers as well as others who deal with medical waste. Nevertheless, precautions

should always be taken since vaccinations are not yet available for other infectious diseases such as HIV and hepatitis C.

The generation of dental waste is escalating due to the increasing number of graduate dentists. The accumulated harmful effects of such hazardous waste pose a public health risk and urgent efforts are needed to address the issue of dental health waste disposal. In the absence of laws and regulations, there is no doubt that responsible disposal of waste within each dental clinic would reduce the heavy impact and would make a difference. For example, the placement of sharps in separate puncture-resistant containers may not entirely eliminate their harmful effect, but it would certainly minimize it considerably and all clinics should have and use such containers. Furthermore, the final disposal of sharps should be by incineration. Thus, awareness should be raised among dental care professionals regarding the proper disposal of dental waste and the health issues involved and they should be encouraged to follow safe procedures.

Our study has provided initial data on waste disposal in Palestine. It is hoped it will act as a stimulus for further in-depth investigations regarding dental and medical waste generation, handling and disposal in the local setting so that comprehensive data are available and crucial steps can be taken towards planning and implementing a sound medical waste management system throughout Palestine.

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## تقييم أثر التعريب على تحصيل طلاب الطب، جامعة الجزيرة، السودان

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**الخلاصة:** أجريت هذه الدراسة بهدف تقييم أثر تدريس الطب باللغة العربية في كلية الطب بجامعة الجزيرة، على التحصيل الأكاديمي للطلاب المتخرجين بناءً على المعدل التراكمي النهائي لهؤلاء الطلاب. وقد تم اختيار 16 دفعة متخرجة (من مجموع 20 دفعة) ثمان منها (الدفعة 5 إلى الدفعة 12) درست باللغة الإنكليزية والثماني الأخرى (الدفعة 13 إلى الدفعة 20) درست باللغة العربية، وهي تمثل كل الطلاب الذين تخرجوا بعد التعريب حتى تاريخ كتابة هذه الورقة (يناير 2004). تم حساب ومقارنة نسب الطلاب الحاصلين على تقدير ممتاز (معدل تراكمي 3.50-4.00) ونسبة الطلاب الحاصلين على تقدير جيد جداً وجيد (معدل تراكمي 2.50-3.49) ونسبة النجاح الكلي للمجموعتين (معدل تراكمي 2.00 فما فوق) وكذلك نسبة الطلاب الراسبين (معدل تراكمي أقل من 2.00). كان أداء الطلاب الدارسين باللغة العربية عموماً أفضل من أقرانهم الدارسين باللغة الإنكليزية، والفرق يعتد به إحصائياً ( $P < 0.05$ ).

### Evaluating the impact of Arabization on medical students' acquisition, Gezira University, Sudan

**ABSTRACT** This study aimed to assess the teaching of medicine in Arabic at the Faculty of Medicine, University of Gezira, and its impact on the academic attainments of graduates in terms of their final grade point average (GPA). Of a total of 20 graduation classes, 16 classes were selected, 8 of which (classes 5 to 12) studied in English whereas the other 8 (classes 13 to 20) studied in Arabic. The last 8 classes include all graduates (until January 2004) since the Arabic teaching system was first introduced. The proportion of graduates with excellent grade (GPA 3.5 to 4.0), very good and good grade (GPA 2.50 to 3.49), overall pass grade (2.00 and above) of both groups were calculated and compared, as were the failure rates (GPA below 2.00). The overall performance of the classes that studied in Arabic was better ( $P < 0.05$ ).

### Évaluation de l'impact de l'arabisation sur le degré de réussite des étudiants en médecine, Université de Gezira (Soudan)

**RÉSUMÉ** L'objectif de cette étude était d'évaluer l'enseignement de la médecine en arabe à la Faculté de Médecine de l'Université de Gezira (Soudan) et son impact sur les résultats des diplômés en termes de moyenne générale (MG) finale. Sur un total de 20 promotions, 16 promotions ont été sélectionnées, dont 8 (promotions 5 à 12) avaient étudié en anglais tandis que les 8 autres (promotions 13 à 20) avaient étudié en arabe. Les 8 dernières promotions comprennent tous les diplômés (jusqu'à janvier 2004) depuis l'introduction du système d'enseignement en arabe. Les pourcentages de diplômés ayant obtenu la mention excellente (MG de 3,5 à 4,0), la mention très bien ou bien (MG de 2,5 à 3,49), la mention passable (2,00 et plus) pour les deux groupes ont été calculés et comparés, ainsi que le taux d'échec (MG inférieure à 2,00). La performance générale des promotions qui avaient étudié en arabe était meilleure ( $p < 0,05$ ).

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## المقدمة

يُعَدُّ تعريب التعليم من قضايا الأمة الأساسية. وقد تبنى مجلس وزراء الصحة العرب قرار تعريب الدراسة في كليات الطب في عام 1980. واتخذت كلية الطب في جامعة الجزيرة قرار تنفيذ التعريب في عام 1993 ابتداءً من الدفعة 13، بعد أن عقدت عدة لقاءات عمل تمخضت عن كيفية إنفاذ هذا القرار، ووضعت لذلك خطة واضحة. وقد تم تقييم هذه التجربة عدة مرات وكتب أوراق عنها [1]. وفي هذه الورقة دراسة لتقييم أثر التعريب على التحصيل الأكاديمي للطلاب. نرجو أن يكون في هذه الدراسة العلمية رد على كل الذين يتخوفون من الدخول في هذه التجربة.

## أهداف الدراسة

- حصر المعدلات التراكمية عند التخرج لكل الطلاب الذين شملتهم الدراسة (16 دفعة)؛
- حساب نسبة الطلاب في كل المستويات والتي قسمت إلى ممتاز - جيد جداً - جيد - حسن - رسوب؛ وذلك حسب المعدل التراكمي لكل طالب.
- مقارنة الطلاب الذين درسوا باللغة العربية مع الطلاب الذين درسوا باللغة الإنكليزية في الأداء العام عند التخرج وكذلك في المستويات المختلفة.

## المنهجية

### مكان الدراسة

كلية الطب بجامعة الجزيرة هي ثاني كلية طب في السودان من حيث الإنشاء، وأول كلية خارج العاصمة الخرطوم. وقد تأسست عام 1975 وبدأ قبول الطلاب بها في عام 1978. وهي من أوائل كليات الطب - على مستوى الإقليم والعالم ككل - التي تبنت فلسفة التعليم المتوجه نحو حل مشاكل المجتمع.

واتبعت الكلية لتحقيق ذلك استراتيجيات التعليم داخل مؤسسات المجتمع، والتعليم المبني على حل المشاكل، وتداخل العلوم الأساسية والسريرية (الإكلينيكية) والسلوكية.

ظلت الإنكليزية هي لغة التدريس في كلية الطب منذ إنشائها وحتى عام 1993، حين التزمت جامعة الجزيرة بتنفيذ قرار الدولة بتعريب التعليم الجامعي، وكانت الدفعة 13 هي أول دفعة لبدء تنفيذ سياسة التعريب.

يتم قبول الطلاب لكلية الطب وفق معايير القبول الموحد التي تحددها وزارة التربية والتعليم للطلاب الناجحين في امتحان الشهادة السودانية أو الشهادات الموازية لها في الدول الأخرى. ومن المهم التأكيد على أن القبول للجامعات الحكومية في السودان قومي يخضع فقط للمنافسة الأكاديمية. كما استجد أمر قبول الطلاب على النفقة الخاصة وهؤلاء يكونون حاصلين على نسبة تقل 7٪ عن النسبة العامة للقبول في العام المعني. وقد تزامن القبول الخاص مع بداية التعريب.

### نظام التقييم في كلية الطب - جامعة الجزيرة

تبنت الكلية نظام الساعات المعتمدة والتقييم المستمر، وأيضاً نظام الفصول الدراسية والمقررات كوحدات قائمة بذاتها (course block system) بحيث يحتوي كل فصل دراسي على عدد من المقررات. يمتحن الطالب في كل مقرر على حدة ويُعطى إحدى الدرجات الآتية: أ، ب، ج أو هـ (رسوب). وقد أُعطيت كل درجة قيمة معينة على الوجه الآتي: أ = 4، ب = 3، ج = 2، هـ = صفر

بنهاية الفصل الدراسي يُعمل ما يلي: تُضرب الساعات المعتمدة بالقيمة التي يحصل عليها الطالب حسب درجته. فمثلاً إذا كانت الساعات المعتمدة لمقرر ما تساوي 6 ساعات، وحصل الطالب على تقدير أ، تكون القيمة

6 × 4 = 24 نقطة. تُجمع النقاط المحسوبة بنفس الطريقة لكل المقررات في الفصل الدراسي المعني، ثم تُقسم على مجموع الساعات المعتمدة لذلك الفصل، ويُسمى الناتج المعدل الفصلي. بعد ذلك، ومع تقدّم الطالب في الفصول الدراسية، تجمع له كل النقاط التي حصل عليها، وتقسم على كل الساعات المعتمدة التي جلس لها، ليكون الناتج هو المعدل التراكمي. فأعلى معدل تراكمي إذن يكون 4.00 وأقل معدل تراكمي للنجاح هو 2.00. في مثل هذا التقييم المستمر، تعكس نتيجة الطالب عند التخرج تحصيله الأكاديمي طوال فترة دراسته بالكلية، وبالتالي يكون المعدل التراكمي مؤشراً حقيقياً للتحصيل الأكاديمي للطالب [2].

### مجتمع الدراسة

أجريت الدراسة على الطلاب المتخرجين من كلية الطب في الفترة منذ عام 1987 إلى عام 2003، وهي الدفعات 5 إلى 20 من الطلاب. واتبعت الدراسة أسلوب الحصر الشامل، حيث شملت جميع الطلاب المتخرجين في كل دفعة، وذلك تفادياً لأي تحيز قد ينجم عن اختيار عينة منتقاة من هؤلاء الطلاب. وقد استُبعدت الدفعات الأربع الأولى من الخريجين نظراً لوجود بعض النقص في سجلات الطلاب بها. أما الدفعات 5 إلى 12 فقد درست باللغة الإنكليزية في حين أن الدفعات 13 إلى 20 درست باللغة العربية.

### متغيرات الدراسة

بما أن الهدف الرئيسي للدراسة كان مقارنة التحصيل الأكاديمي للطلاب الدارسين باللغة الإنكليزية (الدفعات 5 إلى 12) مع التحصيل الأكاديمي للذين درسوا باللغة العربية (الدفعات 13 إلى 20) فقد استخدمت الدراسة «المعدل التراكمي» للطلاب عند التخرج كمؤشر لقياس تحصيلهم الأكاديمي.

### تصميم الدراسة وطرق جمع المعلومات

هذه دراسة تحليلية راجعة تم فيها الرجوع إلى السجلات الأكاديمية للطلاب، ومن ثم حساب النسب المئوية التي حصل عليها الطلاب في كل دفعة، حسب مجموعات المعدلات التراكمية الآتية:

- 4.00–3.50 (ممتاز)
- 3.49–3.00 (جيد جداً)
- 2.99–2.50 (جيد)
- 2.49–2.00 (حسن)
- أقل من 2.00 (رسوب)

وتمت بعد ذلك مقارنة هذه النسب المئوية للمجموعة التي درست باللغة الإنكليزية (الدفعات 5 إلى 12) مع المجموعة التي درست باللغة العربية (الدفعات 13 إلى 20) وتم حساب اختبار خي مربع ( $\chi^2$ ) بين المجموعات لقياس الفرق بين نسب الطلاب في كل مجموعة.

### النتائج والمناقشة

توضح الجداول (1)، (2)، (3) أعداد ونسب الطلاب في المجموعتين في ما يختص بالمعدلات التراكمية: أقل من 2.00، 2.49–2.00، 2.99–2.50، 3.49–3.00، 4.00–3.50.

وقد كانت نسبة النجاح الكلي للطلاب الدارسين باللغة الإنكليزية 97.8% مقارنة مع 97.6% للطلاب الدارسين باللغة العربية، هذا بالرغم من الزيادة الكبيرة في أعداد الطلاب الدارسين باللغة العربية (450%) والتي وصلت إلى 727% بالنسبة للدفعتين 14 و15، ولذلك رأينا أيضاً مقارنة النسب المذكورة أعلاه بعد استبعاد هاتين الدفعتين، وكانت النتيجة أن تساوت تماماً عند 97.8%. ونودّ أن نشير إلى أنه لا يوجد أي فرق يُعتدُّ به إحصائياً بين

نسب الطلاب الناجحين (معدل تراكمي 2 فما فوق) وذلك بالرغم من وجود الدفعتين 14 و 15 (97.8٪ للطلاب الدارسين بالإنكليزية، 97.6٪ للطلاب الدارسين بالعربية).

الجدول (1) أعداد الطلاب الدارسين باللغة الإنكليزية ومعدلاتهم التراكمية

الدفعة	عدد الطلاب	4.00-3.50	3.49-3.00	2.99-2.50	2.49-2.00	2.00 <
5	46	1 (2.17٪)	9 (19.57٪)	25 (54.35٪)	11 (23.91٪)	-
6	46	4 (8.70٪)	15 (32.61٪)	19 (41.30٪)	8 (17.39٪)	0
7	28	0 (0.00٪)	3 (10.71٪)	13 (46.43٪)	11 (39.29٪)	1 (3.57٪)
8	48	0 (0.00٪)	8 (17.00٪)	18 (37.50٪)	18 (37.50٪)	4 (8.00٪)
9	49	1 (2.00٪)	12 (24.00٪)	15 (31.00٪)	19 (39.00٪)	2 (4.00٪)
10	43	2 (4.70٪)	9 (20.90٪)	16 (37.20٪)	15 (35.00٪)	1 (2.20٪)
11	48	4 (8.30٪)	17 (35.40٪)	19 (39.50٪)	8 (16.80٪)	0
12	55	7 (12.70٪)	17 (30.90٪)	22 (40.00٪)	9 (16.40٪)	-
المجموع	363	19 (5.20٪)	90 (24.80٪)	147 (40.50٪)	99 (27.30٪)	8 (2.20٪)
		109 (30.00٪)				
		256 (70.50٪)				
		355 (97.80٪)				
		363 (100.00٪)				

الجدول (2) أعداد الطلاب الدارسين باللغة العربية ومعدلاتهم التراكمية

الدفعة	عدد الطلاب	4.00-3.50	3.49-3.00	2.99-2.50	2.49-2.00	2.00 <
13	99	6 (6.00٪)	40 (45.0٪)	45 (8.0٪)	8 (41.0٪)	-
14	316	9 (2.90٪)	36 (11.40٪)	144 (45.50٪)	122 (38.60٪)	5 (1.60٪)
15	339	4 (1.20٪)	57 (16.80٪)	155 (45.90٪)	111 (32.60٪)	12 (3.50٪)
16	125	2 (1.60٪)	33 (26.40٪)	56 (44.80٪)	30 (24.00٪)	4 (3.20٪)
17	165	13 (9.00٪)	55 (33.00٪)	57 (34.00٪)	35 (21.00٪)	5 (3.00٪)
18	205	13 (6.34٪)	68 (33.18٪)	78 (38.04٪)	41 (20.04٪)	5 (2.40٪)
19	176	11 (6.30٪)	58 (33.00٪)	66 (37.50٪)	39 (22.20٪)	2 (1.00٪)
20	196	13 (6.65٪)	69 (35.20٪)	70 (35.71٪)	38 (19.38٪)	6 (3.06٪)
المجموع	1621	71 (4.38٪)	416 (25.66٪)	671 (41.40٪)	424 (26.16٪)	39 (2.40٪)
		487 (30.04٪)				
		1158 (71.44٪)				
		1582 (97.60٪)				
		1621 (100.00٪)				

الجدول (3) أداء الطلاب الدارسين باللغة العربية بعد استبعاد الدفعتين 15 و 14

المعدل التراكمي	4.00-3.50	3.49-3.00	2.99-2.50	2.49-2.00	2.00 <
عدد الطلاب (966)	58	323	372	191	22
النسبة المئوية	6.00٪	33.60٪	38.50٪	19.7٪	2.2٪
39.60٪					
78.10٪					
97.80٪					
100.00٪					

وكانت نسبة الطلاب المتميزين (معدل تراكمي 3.50 إلى 4.00 - ممتاز) تساوي 5.20٪ للدارسين بالإنكليزية و4.38٪ للدارسين بالعربية ولا يوجد أي فرق ذي أهمية إحصائية بينهما، ولكن عند استبعاد الدفعتين 14 و15 ارتفعت نسبة المتميزين بين الدارسين بالعربية إلى 6٪ (راجع الشكل 1).

أما نسبة الطلاب الراسيين فقد كانت 2.2٪ للطلاب الدارسين باللغة الإنكليزية و2.4٪ للطلاب الدارسين باللغة العربية، وتساوت النسبتان عند 2.2٪ لكل مجموعة بعد استبعاد الدفعتين 14 و15 (راجع الشكل 2).

وحصل 24.8٪ من الطلاب الدارسين باللغة الإنكليزية على تقدير « جيد جداً » (معدل تراكمي 3.00 إلى 3.49) بينما كانت نسبة طلاب العربية الحاصلين على هذا التقدير 25.66٪ وارتفعت إلى 33.6٪ عند استبعاد الدفعتين 14 و15. وحصل 40.5٪ من طلاب الإنكليزية على تقدير « جيد » (معدل تراكمي 2.50 إلى 2.99) بينما حصل 41.4٪ من طلاب العربية على نفس التقدير وباستبعاد الدفعتين 14 و15 أصبحت النسبة 38.5٪.

أما التقدير « حسن » (معدل تراكمي 2.00 إلى 2.49) فقد حصل عليه 27.3٪ من الطلاب الدارسين بالإنكليزية و26.16٪ من الطلاب الدارسين بالعربية، وعند استبعاد الدفعتين 14 و15 صارت النسبة 19.7٪.

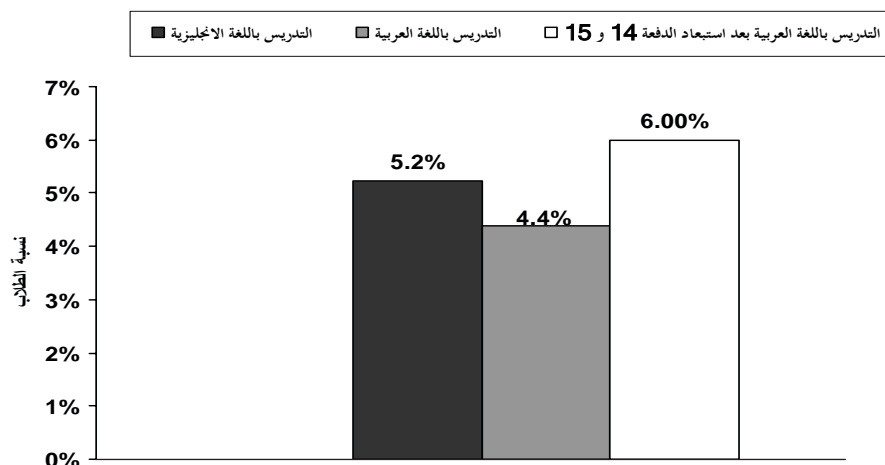
هذه النتائج مماثلة لدراسة سورية بحثت في نتائج الأطباء السوريين في امتحان المجلس التعليمي للأطباء الأجانب (ECFMG) بالولايات المتحدة وخلصت هذه الدراسة إلى أن مستوى الأطباء السوريين في هذا الامتحان لا يقل عن مستوى زملائهم من مختلف أنحاء العالم، هذا على الرغم من أن الامتحان يعقد باللغة الإنكليزية. مما يدل على أن تعلم الطب باللغة العربية لم يكن عائقاً أمام الأطباء السوريين يحول دون أدائهم للامتحان واجتيازهم له بنجاح [3].

وفي دراسة أخرى بكلية الطب في جامعة الملك فيصل، أجريت على عينة من 124 طالب طب وطبيب امتياز وطبيب مقيم لمعرفة سرعة الاستيعاب خلال العام الدراسي 1992/91، اتضح أن استيعابهم للنص باللغة العربية أفضل بـ 7.5 درجة من استيعابهم باللغة الإنكليزية، أي بزيادة 15٪ وكانت الفوارق كلها معتدلاً بها إحصائياً وتعكس القدرة على الجانب الكيفي لعملية التحصيل. واتضح أيضاً أن نسبة التحسن في التحصيل العملي، لو كان التعلم باللغة العربية، تصل إلى 64٪ لأطباء الامتياز و55٪ للأطباء المقيمين و80٪ لطلاب الطب (3).

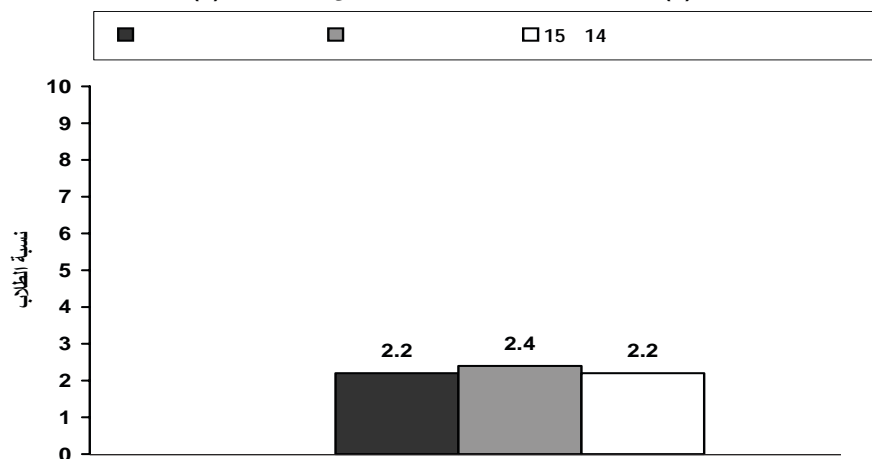
### وقد أبرزت النتائج الأنفة الذكر النقاط التالية:

1. أن الأداء بالنسبة للطلاب الدارسين باللغة العربية لم يختلف عن أداء الدارسين باللغة الإنكليزية.
2. بالرغم من الزيادة الكبيرة في أعداد الطلاب الدارسين باللغة العربية، ووجود مشاكل أخرى مثل تناقص أعداد الأساتذة ذوي الخبرة العالية، وتبني الدولة لنظام العلاج الاقتصادي، الذي أدى إلى صعوبات في التدريب السريري في المستشفيات التعليمية، هذا بالإضافة إلى الضغط النفسي على الطلاب وبعض الأساتذة لأن كلية الطب -جامعة الجزيرة هي الكلية الوحيدة التي التزمت بتنفيذ قرار التعريب في السودان، بالرغم من كل ما كان أداء طلاب العربية لا يقل عن الطلاب الدارسين باللغة الإنكليزية، بل كان أدائهم أفضل في التقديرات العليا (جيد جداً إلى جيد).
3. كان أداء الطلاب الدارسين باللغة العربية بالمستوى الذي أبرزته الدراسة الحالية، على الرغم مما سبق أن أشرنا إليه من أن إدخال نظام القبول الخاص تزامن مع بداية التعريب، وأن طلاب القبول الخاص أقل مستوى من طلاب القبول العام.
4. بما أن الزيادة في أعداد الطلاب كانت عالية جداً في الدفعتين 14 و15، ولم تصحبها أي زيادة مماثلة في أعداد الأساتذة بالكلية، فقد رأينا مقارنة المجموعتين بعد استبعاد هاتين الدفعتين، وكانت النتيجة أن الأداء أصبح متساوياً في بعض التقديرات وأفضل في تقديرات أخرى، وخاصة المستويات العليا.

الشكل (1) : مقارنة أعلى معدل (3.5-4) لجملة الطلاب



الشكل (2) : مقارنة للطلاب الراسبين الحاصلين على معدل أقل من (2)



ومن الجدير بالذكر أن أول دفعة دخلت في تجربة التعريب (الدفعة 13) كان أدائها هو الأفضل، مقارنة بكل الدفعات في المجموعتين، حيث نجح أفرادها بنسبة 100٪، وحصل 86٪ منهم على معدل تراكمي 2.5 إلى 3.49 (جيد وجيد جداً). ولعل أهم الأسباب لتمييز هذه الدفعة هي:

- (1) أن التجربة جديدة ودرجة الحماسة لها بين الأساتذة كانت عالية.
- (2) أن التجربة سبقتها لقاءات عمل عديدة وإطلاع على تجارب بعض الكليات التي سبقتنا في هذا المجال خاصة في الجامعات السورية.

وقد أشار الدكتور أمين هيكل في ورقته بعنوان تعريب الطب في سور - هل فشلت التجربة؟، إلى شكوى الطلاب من صعوبات في التعريب، وإلى المشاكل التي تقابلهم بعد التخرج ولا سيما عند السفر للخارج للتخصص. ولكنه ذكر أن هذا تخوف نفسي ولا أساس له في الواقع، حيث إن أداء الأطباء السوريين في الخارج كان مماثلاً لأداء الأطباء الآخرين من مختلف الجنسيات، وقد أثبتت ذلك عدة دراسات. وفي ختام دراسته تخوَّف الدكتور هيكل من فشل تجربة التعريب، وذكر أن سبب الفشل يعود إلينا لا إلى لغتنا العربية، وأن الفشل يتمثل في تطبيق مبدأ التعريب لا في المبدأ نفسه، وذلك بدليل أن التجربة أثبتت نجاحها لفترة طويلة في سورية قبل أن تراجع مستويات خريجي كليات الطب مع تراجع التعليم الجامعي بشكل عام. ورأى أن الحل هو إنفاذ التجربة التي هي من الأمور القليلة التي ما زال يمكن التفاخر بها في جامعاتنا.[4]

### نُخْلِص من دراستنا هذه إلى ما يلي:

- (1) أن الدفعة 13 وهي أول دفعة دخلت في تجربة التعريب، كانت أفضل الدفعات التي شملتها الدراسة تحصيلاً، حصل جميع الطلاب (100٪ منهم) على معدل تراكمي 2.00 فأكثر، كما حصل 86.00٪ منهم على معدل تراكمي 2.50-3.49.
- (2) لم يكن هناك فرق يُعتدُّ به إحصائياً بين الأداء العام للدفعات التي درست باللغة العربية (نسبة نجاح عام 97.60٪) والدفعات التي درست باللغة الإنكليزية (نسبة نجاح عام 97.80٪) - ( $P > 0.05$ ).
- (3) هناك عوامل كثيرة أثرت سلباً على أداء دفعات التعريب، أهمها:
  - (أ) هجرة الأساتذة ذوي الخبرة منذ نهاية الثمانينات وبداية التسعينات مما أدَّى إلى نقص في عدد الأساتذة.
  - (ب) تبني الدولة لنظام العلاج الاقتصادي مما أدَّى إلى صعوبات مع المرضى في المستشفيات التعليمية.
  - (ج) زيادة متوسط عدد الطلاب بنسبة 450٪ - في كل الدفعات، ولا سيما للدفتين 14 و 15 اللّتين كانت الزيادة فيهما 727٪. وعند استبعاد هاتين الدفتين كان أداء الدفعات التي تدرس باللغة العربية أفضل ( $P < 0.05$ ).

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## Report

# Visceral leishmaniasis control in Thi Qar Governorate, Iraq, 2003

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## مكافحة داء الليشمانيا الحشوي في محافظة ذي قار العراقية، 2003

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**الخلاصة:** بداية من عام 1991، أخذ داء الليشمانيا الحشوي يمتد إلى مناطق جديدة في العراق نادراً ما تفسى فيها من قبل، مثل المحافظات الجنوبية. وفي عام 2003، وفي أعقاب الغزو الذي قامت به قوات التحالف على العراق، تعرضت محافظة ذي قار بشدة لمخاطر فاشية من داء الليشمانيا الحشوي. وتتناول هذه الورقة بالوصف التعاون بين منظمة دولية غير حكومية وبين إدارة للرعاية الصحية الأولية في منطقة صحية، من أجل تحديد وتعزيز برنامج مكافحة داء الليشمانيا الحشوي في محافظة ذي قار في عام 2003، واتقاء وقوع فاشية كبرى من الليشمانيا الحشوي. كما تناقش هذه الورقة البحثية الدروس المستفادة من هذه التجربة، وتقدم توصيات من أجل المستقبل.

**ABSTRACT** Since 1991, visceral leishmaniasis has extended to new areas rarely affected before in Iraq, such as the southern governorates. In 2003, in the aftermath of the invasion of the Coalition Forces, Thi Qar Governorate was at high risk for an outbreak of visceral leishmaniasis. This paper describes the cooperation of an international nongovernmental organization and a district primary health care department to restore the visceral leishmaniasis control programme in Thi Qar in 2003 and prevent a major outbreak of visceral leishmaniasis. It also discusses the lessons learned and presents recommendations for the future.

## La lutte contre la leishmaniose viscérale dans le Gouvernorat de Thi Qar (Iraq), 2003

**RÉSUMÉ** Depuis 1991, la leishmaniose viscérale s'est étendue à de nouvelles zones rarement touchées auparavant en Iraq, telles que les gouvernorats du Sud. En 2003, après l'invasion des forces de la coalition, le Gouvernorat de Thi Qar présentait un risque élevé de flambée de leishmaniose viscérale. Cet article décrit la coopération d'une organisation non gouvernementale internationale et d'une administration de soins de santé primaires de district afin de rétablir le programme de lutte contre la leishmaniose viscérale à Thi Qar en 2003 et d'éviter une importante flambée de leishmaniose viscérale. Il examine également les enseignements tirés et présente des recommandations pour l'avenir.

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## Introduction

Although there are no available data on any recent epidemic outbreak of visceral leishmaniasis (VL) in Iraq, the disease is a public health threat in Iraq, especially following the Gulf War in 1990–91 and United Nations sanctions against Iraq that followed. According to the World Health Organization (WHO) [1], over 3000 cases per year were reported in Iraq following the War. The most important endemic areas before 1991 were central Iraq and the greater Baghdad area [1]. However, with the drainage of marshes in southern Iraq in 1996 and redistribution of water sources in Iraq, the majority of cases occur now in southern Iraq and the distribution of the disease has shifted south and across the country [1]. The public health situation in Iraq further deteriorated after the invasion by Coalition Forces in March/April 2003.

It was clear that a major outbreak of VL was possible in 2003. To prevent this and to restore the VL control programme in Thi Qar Governorate of Iraq, a joint effort was made in 2003 by an international nongovernmental organization (International Medical Corps) and a local district primary health care department. This paper describes the programme and discusses the lessons learned and recommendations for the future.

## Situation in Thi Qar before 2003

Thi Qar is one of 4 southernmost governorates or provinces in Iraq. It has an area of 12 900 km<sup>2</sup> and a population of 1 458 500 people [2]. It has 5 smaller administrative districts: Nassiriyah, Shatra, Rifei, Chebayetsh and Souk Shouk.

VL in Thi Qar is usually diagnosed by clinical examination and the diagnosis is later confirmed by the demonstration of

parasites in bone marrow aspirates or by immunofluorescent assay serological tests [3,4]. The disease typically affects children under 5 years of age [5]. In 2003 15.5% of Thi Qar's population (226 000 people) were children under 5 years old [3], the age group at highest risk.

In 2002, the health directorate in Nassiriyah district reported a total of 840 cases of VL in Thi Qar Governorate, the great majority of them in children under 5 years old [3,6]. The incidence of VL in Iraq as a whole was 10.9 per 100 000 in year 2001 while the incidence of VL in Thi Qar was more than 5 times higher at 55.5 per 100 000 for 2002 [1,3,6]. There are no recent data on mortality from VL, as deaths from VL occur mostly at home in Thi Qar and they are usually not registered as VL deaths.

Many factors that could explain the shift of VL to the south and across Iraq in recent years were also present in Thi Qar in 2003. These include: deterioration of the health status of children below 5 years, i.e. malnutrition, immunodeficiencies and co-infections; population movements from rural to urban settings which brought non-immune populations into transmission areas; increased density of sandfly vectors due to increased number of breeding sites generated by the destruction of water and sanitation systems, and shortage of proper insecticides, spraying and fogging machines and other supplies and equipment; inefficient sewage treatment and disposal systems; accumulation of garbage in urban settings; and increase in the canidae population especially dogs. Drought, migration of the population to larger cities, malnutrition, minimal infrastructure and sanitation and increase in the canidae population are all well-known factors favouring large outbreaks of VL elsewhere in the world, e.g. in Brazil [7].

Additionally, after the Coalition Forces invasion in March/April 2003, both the surveillance systems for communicable diseases in Thi Qar and the supply of pentavalent antimonial drugs (sodium stibogluconate), the first-line treatment for VL [6], were disrupted due to looting of health facilities and lack of motivation and resources for health workers.

### **Visceral leishmaniasis control plan, 2003**

Before the recent conflicts, the VL control plan in Thi Qar followed the Iraqi national plan: entomological investigations in affected areas; indoor residual insecticide spraying for 40 days twice annually (May and September) to interrupt transmission of the parasite; night fogging activities; reservoir control measures (e.g. culling of stray dogs); and early diagnosis of cases and complete management and treatment of VL cases [3,6,8–10].

The VL control strategy for 2003 was a joint programme by International Medical Corps and the Primary Health Care Department of Nassiriyah District. The plan, which aimed to be integrated, feasible and efficient, included:

- entomological investigations in affected areas;
- residual insecticide spraying;
- distribution of bednets to high-risk areas for VL;
- a comprehensive community health education campaign to create community awareness about VL; and
- lectures on diagnosis and treatment of VL for primary health care personnel.

### **Entomological investigation**

An entomological investigation by the United States Army Medical Corps in summer

2003 found that the rate of sandflies infected with *Leishmania* spp. in Nassiriyah district of Thi Qar (1:50) was 200 times higher than the usual rate in Nassiriyah (1:10 000). The findings were reported at a WHO meeting in Basra in July 2003 [13].

### **Residual insecticide spraying**

Two indoor sprayings for VL in Nassiriyah and Shatra districts of Thi Qar Governorate in May and October 2003 were supported by International Medical Corps and delivered by the Unit for Communicable Diseases, Nassiriyah Primary Health Care Department. Both sprayings lasted for 40 days.

### **Distribution of bednets**

Bednets treated with the insecticide permethrin were distributed to households in those villages in Thi Qar which had been at highest risk for VL during previous years (according to information from the Unit for Communicable Diseases at Nassiriyah Primary Health Care Department). The distribution was organized through the Thi Qar primary health care system [3].

### **Community health education campaign**

A comprehensive health education campaign to create community awareness and improve early diagnosis of VL was organized and implemented through close collaboration of International Medical Corps and the Primary Health Care Department in Nassiriyah. All health messages were approved by Nassiriyah Health Directorate, a regional equivalent to the Ministry of Health in Baghdad.

Print and broadcast media were used in a campaign that lasted for 5 months. Public health messages on local TV and leaflets were designed by experienced local public health and primary health care pro-

professionals. The health education campaign was broadcast on Nassiriyah TV station at peak viewing times (between 21.00 and 23.00) each day for 3 months, and 1 and 3 minute health messages ran interchangeably. Printed health education leaflets were created, copied and later distributed to all main health units, i.e. 6 hospitals and 36 main primary health care units in all 5 Thi Qar districts. Information on VL was delivered in the health education departments in primary health care units (called "health education corners"), which are the area where staff (usually nurses) conduct education sessions. A lecture on VL was also delivered by a local health educator to schools in Nassiriyah town, which was one of the areas of highest risk for VL in Thi Qar Governorate.

Health education messages advised people to stay in well-screened or air-conditioned areas as much as possible, to avoid outdoor activities, especially from dusk to dawn when sandflies are the most active, to wear long-sleeved shirts, long pants, and socks when outside, to apply insect repellent on uncovered skin and under the ends of sleeves and pant legs, to spray clothing with permethrin-containing insecticides, to spray living and sleeping areas with an insecticide to kill insects and to use insecticide treated bednets if not sleeping in an area that is well screened or air-conditioned. The health messages also contained information on how to recognize early symptoms of disease and where to go for help.

According to feedback received from beneficiaries, health education messages were culturally appropriate, easy to understand and acceptable to various categories of the Thi Qar population.

#### **Lectures for primary health care personnel**

The topic of VL was covered in a 6-month training for Thi Qar primary health care

professionals, delivered as a joint effort by International Medical Corps and the Nassiriyah Primary Health Care Department. This training emphasized early diagnosis and complete treatment of VL cases.

#### **Treatment supplies**

In addition, to restore availability of treatment, supplies of the drug sodium stibogluconate were delivered to Thi Qar Governorate by the Iraqi major whole drug supplier, Kimadia.

### **Outcomes**

#### **Residual insecticide spraying**

A total of 1751 houses in 27 villages at highest risk for VL in Thi Qar were reached by indoor spraying in May and October 2003 (26 in Shatra and 1 in Nassiriyah), covering a total area of 826.9 m<sup>2</sup> (815.0 m<sup>2</sup> in Shatra and 11.0 m<sup>2</sup> in Nassiriyah).

#### **Distribution of bednets**

In 87 villages, 20 primary health care centres were involved in the distribution of bednets. Overall 6000 bednets were distributed to families with children under 5 years in areas of highest risk (100 in Nassiriyah, 2600 in Al-Shatra, 800 in Rifei, 1600 in Souk Shouk and 900 in Chebayetsh).

#### **Community health education campaign**

According to information from Nassiriyah TV, 700 000 people in 4 Thi Qar districts (Nassiriyah, Chebayetsh, Souk Shouk and Shatra) had access to public health information on VL through the medium of local TV (this is an estimate of the number of people who had TVs in their homes in these 4 districts in 2003). Rifei district had a separate TV station and it was therefore not covered by the TV health education campaign.

Printed health education material on VL was created and distributed to 22 schools in Nassiriyah town, all 36 main primary health care units and all 6 hospitals in Thi Qar Governorate. A local health educator gave lectures on VL at 22 schools in Nassiriyah, one of the areas of highest risk for leishmaniasis in Thi Qar.

We estimate that at least 80% of the Thi Qar population had access to some kind of information on VL, either through print or broadcast media or through direct health education in primary health care units.

### Lectures for primary health care personnel

The health educator visited all primary health centres in Nassiriyah and gave lectures on VL to their health education staff. Lectures on VL were delivered to 394 primary health care professionals (64 doctors, 175 assistant doctors and 155 nurses) in all 5 Thi Qar districts (36 in Nassiriyah, 60 in Shatra, 49 in Chebayetsh, 102 in Souk Shouk and 47 in Rifei).

### VL incidence data before and after the campaign

Data on incidence of VL in Thi Qar in 2003 were collected by the Unit for Communicable Diseases, Nassiriyah Primary Health

Care Department (Table 1). Compared to an average number of cases of VL in Thi Qar for a period 1999–2002, there was an increase in the number of cases of VL in Thi Qar for all months in 2003, except for March and May (Table 2). The greatest increases in the number of cases was in July (+288%) and November 2003 (+286%). Altogether, there were 52% more cases of VL in 2003 than the average from 1999–2002 (Table 2).

The success of the campaign is demonstrated by the data in Table 3, showing a 55% decrease in the number of cases of VL in January and February 2004 compared with January and February 2003. If we compare the total number of cases of VL in Thi Qar in 2003 (877 cases) with the total number in year 2002 (840 cases), we can see that there were only 37 more cases in year 2003 a 4.4% increase.

## Discussion

This report is the first to describe the incidence of VL in Thi Qar Governorate and the VL control programme in one Iraqi Governorate after the invasion of the Coalition Forces in March/April 2003.

Table 1 Distribution of cases of visceral leishmaniasis in Thi Qar in 2003 by month and district

District Total	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	
Nassiriyah	25	30	— <sup>a</sup>	20	10	22	29	12	19	13	14	11	205
Shatra	68	53	10	15	8	23	25	18	13	17	25	47	322
Rifei	15	10	6	10	10	2	10	5	3	11	10	19	111
Souk Shouk	22	7	2	5	10	2	4	6	8	7	12	5	90
Chebayetsh	20	16	3	7	9	12	25	15	12	8	8	14	149
Total	150	116	21	57	47	61	93	56	55	56	69	96	877

<sup>a</sup>No data available.

Source: Unit for Communicable Diseases, Primary Health Care Department in Nassiriyah, Thi Qar Governorate, Iraq

**Table 2 Comparison of number of cases of visceral leishmaniasis in Thi Qar in year 2003 with average number of cases in Thi Qar by month during 3-year period (1999–2002)**

Month	Mean no. of cases over 1999–2002	No. of cases in 2003	% change between 2003 and 1999–2002
January	66.3	150	+126
February	84.3	116	+38
March	68.8	21	–69
April	42.3	57	+35
May	60.0	47	–22
June	50.0	61	+22
July	24.0	93	+288
August	36.8	56	+52
September	32.0	55	+72
October	27.3	56	+105
November	17.5	69	+294
December	64.0	96	+50
Total	573.3	877	+52

Source: Unit for Communicable Diseases, Primary Health Care Department, Nassiriyah, Thi Qar Governorate, Iraq.

The high incidence of VL in Thi Qar in 2003 may be the result of interruption of previously applied methods of control, e.g.

**Table 3 Comparison of number of cases of visceral leishmaniasis in Thi Qar in January and February 2003 with number of cases in Thi Qar in January and February 2004**

Month	No. of cases in 2003	No. of cases in 2004	% change between 2004 and 2003
January	150	66	–56
February	116	55	–53
Total	266	121	–55

Source: Unit for Communicable Diseases, Primary Health Care Department, Nasariyah, Thi Qar Governorate, Iraq.

insecticide spraying or early diagnosis and treatment of positive cases. It may also be a result of lack of proper diagnostic skills/ methods and drugs for treatment of VL during previous years. It is therefore possible that some cases of VL detected in year 2003 were accumulated cases of the previous year's transmission. The incubation period for VL is generally 2–6 months but it ranges from 10 days up to several years [8]. Additionally, all risk factors favourable for an outbreak of VL—such as inefficient sewage treatment and disposal systems, accumulation of garbage in urban settings, increase in the dog population and increased density of sandfly vectors due to increased number of breeding sites generated by the destruction of water and sanitation systems—were present in Thi Qar in 2003 after the Coalition Forces invasion.

There are several important lessons learnt from this project and there are also several recommendations for future programmes in Iraq.

### Lessons learned

- It was possible to launch a successful and comprehensive health education campaign in Iraq almost immediately after the Coalition Forces invasion (at least in Thi Qar Governorate). The success of a health education campaign was very important for prevention of an outbreak of VL. Passive detection of VL cases is of the utmost importance for a VL control programme which depends largely on the awareness of the public about the early symptoms of VL [10]. Health education of the population in endemic foci is the most important element of the control strategy [10].
- The success of our health education campaign depended on many factors such as good local health educators and



their motivation to deliver proper health education messages, cooperation of the health system and local media and coordination of health education activities with the local health system. Elfituri et al. [11] found that television was acknowledged as the most effective health education medium for raising health knowledge of the general population. Therefore, our comprehensive health education campaign placed an emphasis on educational TV.

- Primary health care professionals in Iraq could benefit more from up-to-date information on diagnostics and treatment of VL. Our training of primary health care professionals in Thi Qar was continuously monitored and evaluated and it included appropriate and different teaching methods, e.g. role plays, case studies, etc. Abdel-Naser et al. [12] found that the effectiveness of any training programme depends on its continuous monitoring and evaluation, and the training should include appropriate and different teaching methodology.
- Despite the poor state of infrastructure and services in Iraq, the local health system and local health professionals in Thi Qar were capable of running the VL control programme, especially when adequately supported by international organizations.

### Constraints

Some of the most important constraints encountered were:

- Indoor spraying for VL started too late, in October instead of September 2003, mostly because of security concerns and temporary lack of funding. It was also limited only to areas at highest risk for VL (according to information

from the Unit for Communicable Diseases, Primary Health Care Department, Nassiriyah) [3]. Spraying houses with insecticide is the most widely used intervention for controlling sandflies that rest mostly indoors after feeding [13].

- Not all the targeted population in Thi Qar received the health education messages broadcast on local terrestrial TV. After the 2003 Coalition Forces invasion, many people in Iraq bought satellite dishes (which had been forbidden under the previous government) and some popular satellite programmes were on the air at the same time when the local TV education spot on VL was transmitted. Furthermore, the health education campaign would probably have been even more effective if it had been done continuously throughout the whole of year 2003 and in previous years as well.
- The health education areas within primary health centres in Thi Qar were not always able to deliver proper health education messages due to overload of patients. According to Elfituri et al. [11], lack of time was highlighted by 76% of doctors as a barrier to providing more health advice for their patients.
- There was a lack of feedback on whether insecticide-treated bednets distributed through Thi Qar primary health care system reached the final beneficiaries, i.e. families with children under 5 years old in areas of Thi Qar at highest risk for VL [14]. Although it is unclear whether insecticide-treated bednets substantially reduce the incidence of VL, they definitively provide considerable protection and they are no less effective than indoor spraying in reducing the risk of VL [13].

## Conclusions

Although most of the risk factors for an outbreak of VL were present in Thi Qar after the invasion of the Coalition Forces in 2003, a major outbreak of the disease was prevented. The VL control programme in Thi Qar was restored through a combination of: entomological investigation in affected areas; indoor spraying campaign; distribution of insecticide-treated bednets; comprehensive health education campaign;

and training of primary health care professionals on early diagnosis and complete treatment of VL cases.

Overall the project was successful, although it could probably have been better if bednets had been distributed before the end of warm period of the year (end of the biting season for the sandfly). Also, indoor spraying did not start on time in September 2003 and it was limited only to areas at highest risk for VL.

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## Report

# WHO EMRO's approach for supporting e-health in the Eastern Mediterranean Region

N. Al-Shorbaji<sup>1</sup>

نهج المكتب الإقليمي لمنظمة الصحة العالمية لشرق المتوسط في دعم الصحة الإلكترونية في الإقليم  
نجيب الشرجبي

**الخلاصة:** « الصحة الإلكترونية » مصطلح عام يقصد به استخدام تكنولوجيا وتطبيقات الحاسوب والاتصالات في مجال الصحة والرعاية الطبية. وتعرض هذه الورقة البحثية الإطار العام للأسلوب الديناميكي والتنوع لمنظمة الصحة العالمية في دعم الصحة الإلكترونية في إقليم شرق المتوسط. وهو يشتمل على: رسم السياسات؛ وتنمية الموارد البشرية؛ والتخطيط والرصد والتقييم؛ والمشاركة والاتصال؛ وتطوير البنية التحتية؛ وتقديم الخدمات الاستشارية؛ والنشر الإلكتروني؛ وتطوير النظم؛ والتعلم الإلكتروني؛ والتطبيق عن بُعد؛ وتقديم الخدمات المكتبية على الخط المباشر؛ ودعم مبادرة الشبكة الدولية للصحة لتيسير الوصول إلى نتائج البحوث الصحية HINARI. كما تستعرض هذه الورقة البحثية بعض العقبات التي تقف أمام تطوير نظم الصحة الإلكترونية في الإقليم.

**ABSTRACT** "E-health" is a generic term covering the use of computer and communication applications and technologies in health and medical care. This paper outlines WHO's dynamic and diversified approach for supporting e-health by the Regional Office of the Eastern Mediterranean. This includes: policy-setting; human resources development; planning, monitoring and evaluation; networking and communication; infrastructure development; consulting services; electronic publishing; systems development; e-learning; telemedicine; and online library services and support to HINARI. It also reviews some of the impediments towards development of e-health in the Region.

## Approche du Bureau régional OMS de la Méditerranée orientale pour promouvoir la cybersanté dans la Région de la Méditerranée orientale

**RÉSUMÉ** « Cybersanté » est un terme générique couvrant l'utilisation d'applications et de technologies informatiques et de communications dans le domaine de la santé et des soins médicaux. Le présent article décrit l'approche dynamique et diversifiée de l'OMS pour promouvoir la cybersanté adoptée au Bureau régional de la Méditerranée orientale. Cette approche comprend : l'établissement de politiques, le développement des ressources humaines, la planification, le suivi et l'évaluation, l'établissement de réseaux et la communication, le développement des infrastructures, les services de consultation, la publication électronique, le développement des systèmes, le cyberapprentissage, la télémédecine, ainsi que les services de bibliothèque en ligne et le soutien à l'initiative HINARI. Il examine également certains des obstacles qui entravent le développement de la cybersanté dans la Région.

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## Introduction

The goal of information management in health care is to obtain, manage and utilize information to improve the performance of health care and medical services, governance and management and support processes. Delivering health care to the population is a complex endeavour that is highly dependent on information about the individual patients, the techniques of care, the care provided, the outcome of the care, as well as the performance of the health care provider. Like other resources—human, material and financial—information is a resource that must be managed effectively by health care managers and leaders if they are to plan, coordinate and integrate services.

The basic assumption in this paper is that information technology has no value unless the information component is the prime target. Information technology is a tool to help the management of information. Health information management has become one of the essential elements of all national health care systems. The growing interest in the subject and the increase in allocation of funds for its development have led to its institutionalization and recognition by senior management and health workers. The growth of health information management systems is based on a number of assumptions [1]:

- health care will increasingly be an information-driven service;
- information is a major resource which is crucial to the health of individual patients, the population in general and the success of the organization;
- health information systems should be viewed on a continuum, beginning with patient-specific data (clinical), moving to aggregated data (performance, utilization), to knowledge-based data (planning

and decision support), to comparative, community data (policy development);

- the quality of data and its transformation into information are fundamental to the efficiency and effectiveness of all information systems. Emphasis should therefore be placed on information that has value in decision-making, evaluation, planning and policy development.

Technology will increasingly be integrated and assimilated into the working life of all health managers and health professionals. Therefore, the purpose of this paper will be to discuss the ways in which information and communication technology (ICT) can contribute to the improvement of health care. In other words: what is e-health?

The Regional Office for the Eastern Mediterranean (EMRO) of the World Health Organization (WHO) established its health informatics and telematics programmes over 10 years ago. It has been providing support to its member states through the full integration of health information management, informatics and telecommunication services. At Headquarters level, WHO has moved one step forward by creating the Department of Knowledge Management and Sharing. This department has a unit called E-Health which is supported by a number of other departments at Headquarters. In EMRO, one department coordinates this support through the Unit of Health Information Management and Telecommunication. This paper reviews EMRO's approach to supporting e-health in the Region.

## Definitions

A simple definition of medical informatics is: "computer applications in medical care".

The *Journal of Medical Internet Research* has defined e-health as "an emerging

field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally and worldwide by using information and communication technology" [2].

EMRO's definition of e-health is "the use, in the health sector, of digital data—transmitted, stored and retrieved electronically—for clinical, educational and administrative purposes, both at the local site and at a distance" [3]. In a paper presented to the WHO Executive Board in January 2005, e-health was described as "the use of information and communication technologies locally and at a distance" [4]. As adopted by EMRO, e-health covers all aspects of health: both public health and medical care; both information technology and telecommunication; both remote and local access to information.

### **E-health as part of the health care professional's work: implications for the curriculum**

The argument that health care informatics should be a central feature of the health/medical undergraduate curriculum rests on the intimate relationship of information management to the 5 essential roles envisaged for future health care professionals. For each of these roles the health care informatics learning needs could be stated as learning objectives. These roles are as follows ("informatics" is data processing using computers while "telematics" refers to data

communication using telecommunications technology):

#### **1. ICT learning needs for "the life-long learner role"**

To fulfil this role the graduate should be able to demonstrate knowledge of information resources and tools available to support life-long learning. The knowledge component includes the awareness of these resources, their content and the information needs they can address. The skills that are needed for this role include the ability to retrieve information as well as filter and evaluate it. The required attitudes will include developing appropriate information habits.

#### **2. ICT learning needs for "the clinician role"**

To fulfil this role the graduate should be able to use appropriate and available ICT to acquire and analyse patient information leading to proper clinical decision-making. The range of informatics and telematics skills which are required for this role include the ability to store and retrieve patient information, the analysis of such information, including laboratory information, and using any supportive facilities. The necessary attitudes which relate to this role include attention to the confidentiality of patient information and its security in the electronic medium.

#### **3. ICT learning needs for "the educator/communicator role"**

Medical and health practitioners need effective education/communication skills in the context of relating to students, peers, patients and the public at large. This role will be facilitated by skills enabling utilization of the ICT and its potential for making effective communication messages and presentations. It also includes the ability

to access and utilize relevant information resources in the Internet, on CD-ROM or in any other electronic format.

#### **4. ICT learning needs for “the manager role”**

To fulfil this role the graduate should be able to collect and analyse information about service clients, the work done and the system functions that, when put together, comprise the ingredients of a management information system. The relevant informatics and telematics skills for this role include the ability to use information technology for collection, storage, retrieval and analysis of service information. The learning may include training in specific software packages used for the management of resources, supplies, personnel and surveillance information.

#### **5. ICT learning needs for “the researcher role”**

Throughout their career, health/medical graduates will be involved in the consumption of research products and in many instances conducting their own research. Research includes traditional biomedical research in the laboratory, clinical research and population-based and health system research. The relevant informatics and telematics skills needed for this role include the knowledge of literature sources and how to access them, the use of computers in data collection and analysis and how to disseminate the results.

### **Areas of application of medical informatics**

Medical informatics can be applied in a number of areas of health care:

### **Management**

Support to management activities in health care ranges from the management of an activity (e.g. an immunization or an awareness campaign), to the management of a national programme (e.g. disease control), to the management of a health care institution (e.g. a hospital or a laboratory) or the management of the health services of an entire nation.

“Management” refers to the cyclical process of problem analysis, planning, programming, budgeting, implementation and monitoring, evaluation and re-planning. Thus, it includes, but is not restricted to, logistics, administrative and financial management. For example, whereas it includes the support to the monitoring of expenditure against approved budgets, it must also support the managerial necessity of linking resources (financial, human) to the various aspects of the health services and programmes.

Whereas there are numerous examples of informatics and telematics support to specific areas of management (e.g. logistics, administrative and financial), there are no fully developed systems supporting the broad role of management as defined above.

### **Hospital management information systems**

A hospital management information system (HMIS) provided key information across the continuum of health care for hospitals: in inpatient facilities, outpatient clinics and extended care facilities. An integrated HMIS provides patient billing, patient scheduling and tracking, and electronic medical records that include personal data, laboratory and diagnostic data and all clinical



cal data (treatment, medication). The HMIS integrates hospital services with outpatient care, payment services and public programmes. Different solutions have emerged based on standardized solutions or according to specific needs.

### **Epidemiological surveillance**

Disease surveillance involves the collection of ongoing routine data to examine the extent of disease, to follow trends and to detect changes in disease occurrence. Epidemiological surveillance is essentially the study of the patterns of distribution and the trends of diseases and related health care measures, by geographical areas, age groups, communities, etc., so as to establish priorities and optimize health care measures through monitoring and evaluation. This requires the collection and analysis of large amounts of data, from and about the locations where diseases and other health problems occur and from where patients present themselves, typically in urban and rural health centres and hospitals.

Although informatics and telematics support to health statistics was one of the earliest applications of computing in developing countries, it is also an area that requires the most improvement. Arguably, traditional routine data collection practices could be replaced by more cost-effective computer-supported sampling techniques. The accuracy and cost of manual recording of data about admission, discharge and transfer of patients in hospitals (and the equivalent stages in health centres) could be improved by relatively simple computer support, since such statistics can be computer-extracted from the application. Furthermore, better utilization of satellite-based remote sensing data could provide the essential intelligence sought for surveillance of certain problems such as waterborne vectors and diseases.

Developments in informatics and telematics prompt the need for a major rethink of the traditional methods employed for disease surveillance, early warning and sentinel systems, especially for communicable diseases.

### **Electronic health records**

There has always been a desire for well-structured and accessible patient data, and developments in computer science now make it possible to develop a comprehensive electronic health record for patients. The electronic health record has a number of advantages, including:

- *Simultaneous access from multiple locations.* Consultants, physicians and nurses located in separate buildings, in other cities or even in other countries can simultaneously share access to the patient record for a consistent view of the problem.
- *Support for data exchange and sharing of care.* Two hospitals will easily be able to share the content of a medical record electronically without the need to move files between locations. Parts of a record can be copied to other locations according to needs and access rights.
- *Legibility of records.* As the data is machine-coded or typewritten, there is no room for mistakes based on misinterpretation of data.
- *Variety of presentations.* As data is electronically stored in a structured manner, it can be presented in different formats.
- *Completeness of the record.* As the data elements are well-defined, they can be tagged in such a way that the operator has to enter the data before moving to a new data field. This ensures that the record is complete.
- *Support for decision-making.* A complete and accurate medical record will

allow the physician to make decisions based on the data available in the record. The ability to link data elements and generate new information based on inferences can help in decision-making in clinical trials and medical care.

- *Support for other data analysis.* Medical research, epidemiological surveillance and disease trend analysis is not patient-based. The need here is to generate information based on extraction of data from multiple sets of records to analyse relationships, e.g. between geographic location and a certain disease or disease and age group, etc.

The above advantages can be even greater as the storage capabilities of new computer systems make it possible to create a multimedia medical record, including X-ray images, charts, sound recordings, diagrams and pathology reports. These not only have clinical value but are also invaluable for education purposes.

Although computers have the potential to improve legibility, accessibility and structure of records, they also pose heavy demands on data collection. In order for the electronic medical record to accomplish its clinical, legal, and administrative requirements, an information infrastructure must be in place to support the various data capture, storage, processing, communication, security and presentation functions.

Another success factor in the electronic health record is the application of standards, specifically those of Health Level Seven (HL7). HL7 is one of several accredited standards developing organizations operating in the health care arena and its mission is to "to provide standards for the exchange, management and integration of data that support clinical patient care and the management, delivery and evaluation of health care services. Specifically, to

create flexible, cost effective approaches, standards, guidelines, methodologies, and related services for interoperability between healthcare information systems" [5].

### **Access to literature and information services**

Many libraries in developing countries are victims of the economic and currency problems of their countries. University and medical libraries have had to dramatically reduce their acquisitions of journals and publications of foreign medical societies. The use of CD-ROMs that list the holdings of foreign libraries largely alleviates the problem of searching for information, but there is still the problem of acquisition of scientific literature. The gravity of the situation motivated the international scientific community to collaborate to seek affordable means of linking scientists in developing countries to international networks to access the available information and literature services. The health sector is a major beneficiary of this collaboration.

Health and biomedical literature is presented in a number of electronic media that facilitate access to this literature by the health care community. These include:

- *Health and biomedical information on CD-ROM.* The most cost-effective electronic publishing medium of health literature has been the CD-ROM. By this means, MEDLINE and many other bibliographic databases have been able to reach even the most remote health care units in most countries.
- *Electronic journals.* For many medical professionals, online or CD-ROM abstracts are inadequate compared with the full text of research papers. In response to this need, many publishers of medical journals have either moved to electronic publishing or have published their

journals in both printed and electronic formats. Many of these journals are available free of charge on the Internet or on CD-ROM.

- *The Internet.* Many health care organizations and publishers have started to use the Internet as a vehicle to publish their products on the Internet. These include textbooks, manuals, video clips, articles, frequently asked questions, drug information, etc. A major issue, however, is still the quality of biomedical information on the Internet.
- *Electronic mail systems and discussion and newsgroups.* E-mail was the driving force behind advancements in telecommunication links, to directly link individuals and institutions of similar professional interests or engaged in joint activities and projects. The same links that enable e-mail also enable the establishment of electronic bulletin boards, discussion groups and electronic conferencing. E-mail text messages are the least costly computer application because messages are primarily stored and forwarded without any time-consuming processing. The past 5 years have witnessed an exponential growth in e-mail within and between developing countries and internationally, particularly over the Internet and over simpler networks bridging onto the Internet. Experience has shown that the installation of networking and e-mail facilities in one site vigorously triggers the enthusiasm for more national and international links, even via simple radio links or semi-reliable local telephone lines. E-mail services are only one aspect of the full range of multi-media services on the Internet.

Specific examples of Internet use by the health and medical community include: medical training and continuous

education, medical information access, patient care and support, remote diagnosis and consulting, emergency/epidemic support, tele-working for the disabled, preventive care education and preventive health, and electronic publishing of the full texts of health and biomedical literature.

### Knowledge-based services

An application of informatics that is relatively recent but will expand with the spread of telematics support is the access to and use of knowledge-based systems—also known as expert systems and decision support systems. Given a patient's coordinates and symptoms, for example, the system can provide diagnostic support, suggest additional tests or propose a treatment. Starting in the mid-1970s, a growing number of knowledge-based systems have been developed in the health sciences. Such systems often include a combination of literature-based data (from journals articles and textbooks) and opinion-based data (e.g. guided by experts and derived from well-documented patient cases).

Appropriate knowledge-based information is acquired, assembled and transmitted to users as required. Knowledge-based information management consists of systems, resources and services to:

- help health care professionals acquire and maintain the knowledge and skills they need to care for patients;
- support clinical and management decision-making;
- support performance improvement;
- satisfy research-related needs; and
- educate patients and families.

Large knowledge-based systems under active development have the potential for becoming national and international repositories of medical knowledge. The work

of the National Library of Medicine in developing the Unified Medical Language System (UMLS) is an example. UMLS develops and distributes multi-purpose, electronic “knowledge sources” and associated lexical programmes. Systems developers can use the UMLS products to enhance their applications—in systems that are focused on patient data, digital libraries, web and bibliographic retrieval, natural language processing and decision support. The aim is that researchers will “find UMLS products useful in investigating knowledge representation and retrieval questions” [6].

Expert or decision-support systems (the former name for knowledge-based systems) have some shortcomings, as a clinician cannot convey his or her complete understanding of a patient case to a computer programme. The computer programme in most cases is not capable of assimilating all data input to it. The training requirements for the system and the operators are extensive and demanding. This training or lack of it will influence the clinical decisions made by the physician.

Knowledge-based systems are in use on an experimental basis in many developing countries, including some that have been developed by institutions and groups in the countries themselves. A few main issues, which are not unique to developing countries, remain to be resolved. For example, the assurance that the content of the knowledge base has been vetted by a recognized authority (who and how); the validity of the knowledge base when it is transported from one setting to another; and the lack of legislation concerning the respective responsibilities of the developers, users and intended beneficiaries of such systems. Nevertheless, knowledge-based systems can be valuable sources of expertise and knowledge, especially as they double up as educational and training tools. These

are particularly useful to physicians and other health workers in remote locations, depending on the availability and types of telecommunications services.

### **Geographic information systems**

A geographic information system (GIS) is an organized collection of computer hardware and software, geographic and tabular data, and personnel and knowledge designed to capture, store, manipulate, update, analyse and display spatial data. GIS has become an essential part of health information systems as it provides a visual presentation of statistical data with a clear link to geographic locations. As a system, GIS comprise 5 major parts: hardware, software, data, procedures and people, and the content are the spatial database and the attributes. The benefits of GIS include linking spatial and attribute data; cartographic displays; customization of applications; data entry, data processing and data integration; database management; visual database analysis; and visual reporting on screen or in print.

### **Telemedicine**

Telemedicine is the “use of information technology to deliver medical services and information from one location to another” [7]. It is “medicine at distance”. It uses electronic signals to transfer medical data (i.e. high-resolution photographs, radiological images, sounds, patients’ records and videoconferencing) from one site to another. It has been defined as “the practice of medical care using interactive audio, visual and data communications; this includes medical care delivery, consultation, diagnosis and treatment, as well as education and the transfer of medical data” [8]. The term “education” covers both the education of the patient and the continuing education of the health care staff. To provide telemedicine services, 4 essential components

are required: medical knowledge in digital format, people (providers and recipients), data processing equipment and telecommunication facilities.

Telemedicine has become one of the most familiar applications of medical informatics and has spawned a number of specific services (tele-pathology, tele-radiology, tele-dermatology, tele-nursing, tele-pharmacy, etc). It makes full use of the computing and telecommunications features of this technology. A number of serious issues impact on telemedicine, however—some technological, others managerial and legal.

### EMRO's support for e-health

Based on its strategic vision and full understanding of the value and role of ICT in health, EMRO has introduced a number of initiatives and implemented a number of activities in support of e-health in the Region. Examples of these are outlined below.

#### Awareness-raising, policy-setting and working with decision-makers

Addressing decision-makers and leaders of the health care sector and medical education has been a priority for EMRO. The Regional Committee was approached twice through technical papers on health and medical informatics [5,9], with the aim of familiarizing ministers of health in understanding the e-health issues and helping them in defining priorities. A number of conclusions and recommendations were made after extensive discussions in these Regional Committees. EMRO participated in high level meetings and medical conferences to introduce e-health issues to health care managers, professionals and practitioners. EMRO developed and adopted

the "E-health code of ethics" which sets a number of guiding principles for health on the Internet [10].

#### Human resources development

Education and training of 3 categories of human resources (health care professionals, e-health operators and the public) were provided in the following formats:

- *Professional conferences, meetings and seminars.* EMRO has conducted a series of conferences on health over the last few years, the last of which was in the Islamic Republic of Iran and was dedicated to electronic health records [11].
- *National training courses.* Training events were organized in most of the member states to introduce different facets of e-health. These have included GIS, health statistics databases, electronic health records and Internet searching.
- *Fellowships and internships.* Training opportunities were provided to a number of people to undergo training in specific areas of e-health. These sessions were provided at EMRO or one of the specialized institutions in the Region or beyond.
- *Field visits and studies.* Opportunities were given to a number of people to visit institutions in the Region where one or more e-health applications are running. This has provided a hands-on experience for these professionals to understand the issues as they are on the ground.
- *Development of training materials.*
- *Development of model medical informatics curriculum.*
- *Collaboration with medical colleges to introduce medical informatics education.*



**Planning, monitoring and evaluation**

EMRO has assisted member states to plan and evaluate e-health projects. External funding was provided for a number of projects in the Region through donors and extra-budgetary resources. To allow for the best utilization of funds, EMRO was requested on a number of occasions to assist in planning future projects or evaluating ongoing projects. Setting criteria for evaluation and standards for quality control in collaboration with member states have resulted in high quality ICT products and services in the health care sector in the Region. A directory of projects has been established, allowing countries to enlist their activities and resources.

**Networking and communication**

In a sector that is information-intensive, networking and communication are critical for success. EMRO has provided a platform for a number of initiatives to support networking and communication among professionals working in the area of e-health and “communities of practice”. These have included:

- EMR networks, such as: Health Sciences Libraries; Health Care Informatics; Editors of Medical Journals; Translators of Medical Literature; Food Safety and Nutrition; Non-Communicable Diseases [9,12–15].
- Listservs and discussion groups, such as: Health Sciences Libraries; Health Care Informatics; Editors of Medical Journals; Translators of Medical Literature; Food Safety and Nutrition; Non-Communicable Diseases [16].
- Communities of practice. Sharing of information on e-health projects and activities constitutes an important way of learning from experience and sharing resources.

**Infrastructure development**

EMRO has been assisting countries to build the ICT infrastructure necessary to launch e-health services. This has included:

- support to establish Internet connections for health institutions;
- support to establish Internet presence (websites for ministries of health);
- training on Internet technology; and
- financial support to build local area networks and provision of data processing and telecommunication equipment.

**Consulting and advisory services**

Support has been provided to a number of countries to assess their needs, evaluate technical options and develop plans for e-health projects. A number of alternative solutions were proposed, based on EMRO’s evaluation and technical advice.

**Electronic publishing**

EMRO has adopted a policy of open access to its health information resources. This access can only be supported through electronic publishing using the available means, including:

- EMRO website [17]. The website was established in 1997 and has grown to include pages on all health topics in addition to health profiles of countries, health policies and information services. The website is available in both Arabic and English. The search engine *Google* has been used to index and search the site.
- Full text of books and journals. All issues of the *Eastern Mediterranean Health Journal* have been published on the Internet, allowing free access to all its contents [18]. A number of EMRO publications have also been published on the Internet [19].



- CD-ROM publishing and distribution. A CD-ROM version of EMRO publications has been produced and distributed to health care professionals and institutions.
- Hosting of medical library sites on the EMRO website.
- Digital "Institutional Memory" project.
- Databank of technical papers and *PowerPoint* presentations.
- Collaboration in the Epidemiology Supercourse (a library of PowerPoint lectures funded by the National Library of Medicine and available free on the Internet to support global health).

### Development and maintenance of systems

EMRO has assisted countries in the development and maintenance of a number of computer applications for health information management including:

- health statistics and surveillance system: *Regional Health Statistics Database* (a database to promote electronic collection, management and exchange of statistical data and to reach compatibility and uniformity of definition of health indicators);
- geographic information system: *Health-Mapper* (a surveillance and mapping application developed by WHO) [20];
- database management system for bibliographic data: the *Union Catalogue of Medical Journals and Library Database* (a database published on the EMRO Internet site with input from 175 libraries in 4 countries of the Region) [21];
- drug production quality control software;
- management information system: the *Regional Activity Management System* (a programme management component that provides information on planning, programming, implementation, monitoring and evaluation of EMRO activities);
- language processing: the *Unified Medical Dictionary* (an Arabic/English medical dictionary, originally compiled in the late 1960s and early 1970s in response to a recommendation of the Arab Medical Union) [22]; and
- directory systems: conferences, libraries, institutions, mailing lists.

### EMRO Virtual Health Sciences Library

Development of the EMRO Virtual Health Sciences Library, an on-line library service, has allowed for a substantial increase in knowledge management activities and information sharing among member states [23]. Among the activities that were implemented are:

- *Union Catalogue of Health Sciences Journals* in the Region;
- inter-library and document delivery services;
- portal of EMR health sciences journals;
- regional databases;
- directories of: collaborating centres; medical education institutions; health sciences libraries; WHO depository and reference libraries; and medical conferences.

### E-learning and WHO's Health Academy

The Health Academy is a WHO initiative developed since 2000 to harness modern technology to provide knowledge and know-how to the people of the world in the area of health and disease prevention [24]. The Health Academy uses e-learning techniques to deliver validated health informa-

tion for people of all ages and occupations, in a language that is easily understood. It not only increases knowledge but influences attitudes and behaviour. E-learning in the context of the Health Academy is a one-on-one interactive experience between the programme viewed on computer and the learner. It is now being extended into many areas in many disciplines. A pilot project has just been completed in 2 EMR countries, Egypt and Jordan, where 20 schools were involved. The support to the Health Academy project includes:

- development of training materials in appropriate languages and their adaptation to the local situation;
- preparation of materials in interactive mode for e-learning;
- planning the project in collaboration with the ministry of health, ministry of education and ministry of information technology;
- assess the e-readiness and needs at schools;
- selection of schools to participate in the project;
- awareness campaigns for schoolteachers and headteachers;
- training of mentors;
- pre-testing of participating students;
- deployment of materials either on CD-ROM or through the Internet;
- evaluation and post-testing.

### Telemedicine

Support to telemedicine projects in EMR has been provided in different ways and methods combining needs assessment, planning, training, provision of equipment and software, collaboration and networking. Examples of these are:

- needs assessment in the Islamic Republic of Iran, Sudan, Libyan Arab Jamahiriya and Egypt;
- provision of equipment in Yemen;
- training in the Libyan Arab Jamahiriya, Egypt, Yemen and Islamic Republic of Iran;
- collaboration with Saudi Arabia (designation of a WHO Collaborating Centre);
- development of an e-health portal [3]; and
- development of a directory of telemedicine projects in the Region.

EMRO launched the largest ever survey on "Use of Internet and e-mail by physicians in selected countries of the Region". The survey was conducted in 7 countries and revealed important results on attitudes to and extent of use of the Internet and e-mail by physicians. A multilingual site (in Arabic, English, Farsi and French) has been launched on the Internet for extend the survey to other physicians in the Region [25].

### Support to HINARI

The Health Information Network Access to Research Initiative (HINARI) is a collaborative effort between WHO and the private sector to provide access to medical literature free of charge or at a reduced rate [26]. Over 35 publishers of medical journals have agreed to provide access to their journals to countries that have a gross national product (GNP) less than US \$1000 and to charge US \$1000 per annum per institution in countries with GNP less than US \$3000.

Ten countries in EMR have made use of this initiative: Afghanistan, Djibouti, Iraq, Jordan, Morocco, Palestine, Tunisia, Somalia, Sudan, Syrian Arab Republic and

Yemen. The Regional Office provides support in the following ways:

- support registration and enrolling in HINARI in Yemen, Sudan, Iraq, Jordan, Morocco;
- provision of national training in Iraq, Jordan, Morocco, Syrian Arab Republic, Yemen and Sudan;
- provision of Internet access in many institutions in countries eligible for HINARI; and
- translation of training materials and promotion of HINARI.

### **Geographic information systems**

The Regional Office has been supporting GIS activities in the Region in a number of ways, including:

- development of a regional policy and plan for GIS implementation;
- capacity-building at EMRO and member states;
- building of the digital maps collection based on aerial images, mapping and global positioning and digitization;
- training of national staff. A series of national training courses were conducted for staff from most of the countries of EMR to use the *HealthMapper* software and to collect data;
- capacity-building at country level including hardware and software;
- software development and localization including updating the *HealthMapper* package, development of Arabic and Farsi versions and development of training materials.

### **Barriers to developing medical informatics in the EMR**

EMRO has been assessing the situation in its member states and has conducted

surveys about the level of use and impediments to implementation of e-health [27]. A number of issues have emerged, some institutional, others personal:

- *Lack of awareness.* Many of the health care institutions in the Region have not addressed the issue of ICT at a strategic level due to the fact that they do not fully appreciate the impact made by ICT on medical education and health/medical practice, nor do they appreciate the gravity of lagging behind in this field. When such awareness is present, the response is usually limited to attempts to introduce computer literacy among staff or students and seeking the use of the technology by senior staff for managerial or data analysis purposes.
- *Lack of vision.* Medical informatics and telematics is a multidisciplinary professional practice. It requires knowledge of both ICT and health sciences. Most health care leaders are health care professionals who have little knowledge in ICT. This has led to a lack of comprehensive and long-term planning for e-health applications. The response to needs for computerization is usually temporary and short-term in nature. Solving the current data processing problems has blinded many managers from thinking about long-term or strategic solutions.
- *Financial constraints.* Development and maintenance of a proper ICT infrastructure is expensive and the cost is beyond the budget of many institutions in the Region, particularly when technology is sought for large-scale institutional use. The economic situation and financial constraints in the health care sector has left many health care units and medical education institutions without proper funding to cater for their basic needs, let alone computerization. Dependence on external resources or funding from do-

nors has become the rule rather than the exception in the introduction of e-health in the Region.

- *Limited medical informatics expertise.* None of the countries in the Region offers any type of medical informatics education and training. Very few professionals have been lucky enough to receive any training abroad. As this area of expertise is still lacking in the Region, with little awareness of its value, health care institutions will continue to suffer. Medical informatics has to run in parallel with medical education. Before too long, the delivery of health care services will depend completely on ICT.
- *Poor communications infrastructure.* Many countries of the Region lack a basic ICT infrastructure. A lack of computerization policies, national information policies, telecommunications facilities,

information culture or qualified personnel have inhibited the adoption of ICTs in the health care sector.

- *Absence of legal, legislative, ethical, and constitutional frameworks.* Most of the countries of the Region have not introduced laws and regulations to regulate information technology in general and health informatics in particular. The legal frameworks are needed to regulate electronic data interchange, access to patients' files, electronic publishing, coding systems, confidentiality and privacy.

The Regional Office recognizes the serious constraints that hinder the full utilization of the power of e-health in the Region. For e-health to become an integral part of health care services there has to be awareness, education, finance, a legal framework and international support and collaboration.

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## Short communication

# Handsearching the *EMHJ* for reports of randomized controlled trials by UK Cochrane Centre (Bahrain)

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البحث اليدوي في المجلة الصحية لشرق المتوسط عن تقارير التجارب المُشَوَّهَة، في مركز كوكران الفرعي في البحرين

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**الخلاصة:** تم في هذه الدراسة استخدام البحث اليدوي للوصول عشوائياً إلى التقارير الخاصة بالتجارب المُشَوَّهَة controlled في المجلة الصحية لشرق المتوسط. كما أُجري بحث إلكتروني في قاعدة بيانات شرق المتوسط EMBASE، وقاعدة بيانات شبكة مدلاين MEDLINE، لمعرفة ما إذا كانت التقارير التي تم العثور عليها بالبحث اليدوي موجودة بالفعل في أيٍّ من هاتين القاعدتين. وقد تم تحديد تسعة تقارير: سبعة منها عبارة عن تجارب مختارة عشوائياً ومُشَوَّهَة، واثنان عبارة عن تجارب سريرية مُشَوَّهَة. وتمثلت القيمة المضافة للبحث اليدوي بالمقارنة مع البحث في قاعدة بيانات شرق المتوسط EMBASE في الحصول على ستة تقارير إضافية، وبالمقارنة مع البحث في قاعدة مدلاين MEDLINE في الحصول على أربعة تقارير. وتم إرسال هذه التقارير التسعة إلى مركز كوكران في المملكة المتحدة للتحقق منها ونشرها في السجل المركزي لمركز كوكران، والخاص بالتجارب المُشَوَّهَة.

**ABSTRACT** This study used handsearching to find reports of randomized controlled trials in the *Eastern Mediterranean Health Journal (EMHJ)*. EMBASE and MEDLINE were also searched electronically to identify if the reports found by the handsearch were already included in either of these databases. Nine reports were identified: 7 randomized controlled trials and 2 controlled clinical trials. The added value of the handsearch over EMBASE was 6 additional reports and over MEDLINE was 4. Reports identified were sent to the UK Cochrane Centre for verification and publication in The Cochrane Central Register of Controlled Trials (CENTRAL).

**Recherche manuelle de comptes rendus d'essais contrôlés randomisés dans *La Revue de Santé de la Méditerranée orientale* par la branche locale du Centre Cochrane du Royaume-Uni à Bahreïn**

**RÉSUMÉ** Cette étude a utilisé la recherche manuelle pour trouver des comptes rendus d'essais contrôlés randomisés dans *La Revue de Santé de la Méditerranée orientale*. Une recherche électronique a également été effectuée dans EMBASE et MEDLINE pour déterminer si les comptes rendus trouvés manuellement étaient déjà inclus dans l'une de ces bases de données. Neuf comptes rendus ont été identifiés : 7 essais contrôlés randomisés et 2 essais cliniques contrôlés. La valeur ajoutée de la recherche manuelle par rapport à EMBASE était de 6 articles supplémentaires, et de 4 par rapport à MEDLINE. Les comptes rendus identifiés ont été envoyés au Centre Cochrane du Royaume-Uni pour vérification et publication dans le Registre central Cochrane des essais contrôlés (CENTRAL).

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The views expressed in this paper represent those of the authors and are not necessarily the views or the official policy of The Cochrane Collaboration.



## Background

There is heightened interest in the scientific community in charting the publication of medical research by geographical region. A study of the number of MEDLINE-indexed publications in Arab countries indicated that these countries produce less than 1% of the biomedical citations in the world [1]. However, El Ansari [2] stressed that a count of publications indexed in MEDLINE does not accurately reflect the extent of biomedical output from Arab countries and suggested several explanations. Much of the research is published in the Arabic language (as of 20 July 2005, only 228 of 15 million citations in MEDLINE contain studies in Arabic), in formats not indexed (e.g. conference abstracts) and in journals that are not indexed in MEDLINE.

It is increasingly recognized that health care decision-making around the world needs to be informed by high quality and timely research evidence. The randomized controlled trial has long been considered the “gold standard” in the hierarchy of evidence and trials involving sufficient numbers of participants are essential to distinguish reliably between the effects of health care interventions and the effects of bias or chance. The synthesis of the results of these trials in systematic reviews can provide reliable evidence about the effects of these interventions. The Cochrane Collaboration is an international organization dedicated to improving health care for the world’s population by preparing, maintaining and promoting the accessibility of Cochrane systematic reviews of the evidence of the effects of health care interventions.

The validity of the results of a systematic review is highly dependent on the data included and one prerequisite is to ensure that the set of studies is as unbiased and complete as possible. The Cochrane

Collaboration has focused on the systematic electronic searching of MEDLINE and EMBASE and the systematic handsearching of currently over 2000 general and specialized health care journals for reports of randomized controlled trials. This handsearching involves reading each document in a journal to decide, according to the eligibility criteria set by Cochrane [3], if it might be a report of a randomized trial. The efforts of the many volunteers working within The Cochrane Collaboration have added a substantial number of previously “buried” reports of randomized controlled trials to the Cochrane Central Register of Controlled Trials (CENTRAL) published in The Cochrane Library. Some of these reports of trials may have been overlooked as a result of inconsistencies in indexing (indexing bias) [4], a lack of cover-to-cover indexing or because they have been published in journals not indexed in the major health care databases such as MEDLINE and EMBASE (database bias) [5] or in journals published in languages other than English (language bias) [6, 7].

The Bahrain Branch of the UK Cochrane Centre is actively seeking to minimize these effects of bias by addressing problems of study identification through a comprehensive handsearching programme of journals published in the Arab world. This study sought to identify reports of randomized controlled trials by handsearching the *Eastern Mediterranean Health Journal* (EMHJ) which is indexed in EMBASE (from 2002) and in MEDLINE (from 1999) and which includes studies published in the Arab world as well as from elsewhere. As part of our study we wished to check whether database indexers assigned to index the EMHJ index the studies consistently in MEDLINE and EMBASE so that all the reports of randomized controlled trials published in this Journal (some of which will be from the Arab

world) can be retrieved effectively. The study therefore also aimed to determine the added value of the handsearch in minimizing the effects of indexing bias by assessing the precision and sensitivity of the EMBASE index term “randomized controlled trial” and the MEDLINE Publication Types “randomized controlled trial” and “controlled clinical trial” as a means of confirming the reports found by handsearching.

## Methods

All issues of the *EMHJ* (1995 to 2003) were searched by hand from cover to cover for reports of trials. These were classified as randomized controlled trials or controlled clinical trials according to the Cochrane eligibility criteria for reports of randomized trials in which participants were definitely or possibly assigned prospectively to 1 of 2 or more alternative forms of health care using random allocation or some quasi-random method of allocation such as alternation, date of birth or medical record number. The handsearcher classified reports of trials as “randomized controlled trials” if the groups compared in the trial were established by random allocation. If the author(s) did not state explicitly that the trial was randomized but randomization could not be ruled out, the report was classified as a “controlled clinical trial”. Controlled clinical trial was also applied to quasi-randomized studies where the method of allocation was known but not considered strictly random (e.g. date of birth), and for possibly quasi-randomized studies.

Photocopies of the bibliographic details and of the pages describing the study design of the reports identified were sent to the UK Cochrane Centre for verification and to be processed for submission to the US Cochrane Center for publication in CENTRAL in The Cochrane Library.

EMBASE and MEDLINE, 2 major biomedical bibliographic databases, were also searched electronically to identify if the reports found by the handsearch were already included in either of these databases.

## Results

Nine (9) reports of trials were identified, 7 randomized controlled trials and 2 controlled clinical trials. Only 3 (33%) of these were indexed as randomized controlled trials in EMBASE and 5 (56%) in MEDLINE. The added value of the hand-search over EMBASE was therefore 6 additional reports (67%) and over MEDLINE was 4 (44%).

The distribution of the reports of trials found by the handsearch by country of principal investigator was highest for Egypt and Iraq (3 papers), followed by Jordan (2). One report from a non-Arab country was found: Pakistan.

Of the 9 reports of controlled trials found by the handsearch, 4 were in EMBASE and 3 (33%) of these had been given the index term “randomized controlled trial”. The overall added value of the handsearch in relation to EMBASE (defined as the total number of reports of trials published in this Journal but not indexed or not indexed as randomized controlled trials in EMBASE and therefore not easily identified except through the handsearch) was 6 of 9 (67%).

Of the 9 reports found by the handsearch, 5 were in MEDLINE and these were all indexed with the appropriate Publication Types for randomized or controlled clinical trials. The added value of the handsearch in relation to MEDLINE, defined as the total number of reports of trials published in *EMHJ* but not indexed in MEDLINE and therefore not easily identified except through the handsearch of this Journal was 4 of 9 (44%).

## Discussion

To minimize bias due to the selective availability of data, systematic reviewers need to identify as many relevant studies as possible to provide reliable evidence on which to base health care decisions. It has been shown previously that the identification of trials from bibliographic databases can be problematic [5]. In an effort to minimize the effects of lack of availability of appropriate indexing terms and inconsistencies in indexing (indexing bias), The Cochrane Collaboration has carried out systematic electronic searches of MEDLINE and EMBASE using extensive search strategies designed to be sensitive, i.e. to avoid missing reports of trials. The reports of trials, which were identified by an assessment of the titles and abstracts only, using these sensitive search strategies for MEDLINE and EMBASE are included in CENTRAL.

However, despite sensitive searching of electronic databases, it has been found that handsearching still provides additional reports of trials missed by the electronic searches [8,9]. The present study, based on the *EMHJ*, confirms this. It also reveals that for the reports of trials found by the handsearch and also indexed in EMBASE and MEDLINE, the indexing was consistent: 3 out of 4 in EMBASE were indexed as randomized controlled trials and 5 out of 5 in MEDLINE were indexed as randomized or controlled clinical trials. This finding contrasts with 2 recent studies [10,11] which compared the handsearch of journals published in Arab countries with electronic searches of EMBASE, where the indexing was found to be inconsistent and led to a number of reports being missed by the electronic search.

The reports missed by the electronic searches in our study almost all came from

issues of the *EMHJ* which were published before the Journal was indexed. This finding confirms the importance of hand-searching journals to make available the reports of trials from issues of journals published before a journal was indexed in electronic databases, thereby minimizing the effects of "database bias".

The handsearching programme of the newly established Bahrain Branch of the UK Cochrane Centre is already providing a valuable and unique contribution from the Arab region and elsewhere to the global effort by The Cochrane Collaboration. This will help to close the gap between the number of reports of trials that exist and the number of reports of trials accessible to authors of Cochrane reviews and others needing to make informed decisions about the effects of health care interventions. It will also contribute to a more comprehensive assessment of the biomedical research output of Arab countries.

The handsearch of this Journal in the programme should help reviewers to minimize the effects of publication bias by providing reports of trials not previously identified. Although *EMHJ* is indexed in EMBASE and MEDLINE, the handsearch has ensured that reports of trials will not remain "buried" because of incomplete coverage of this Journal in these databases.

Further research is required to assess the quality of the trials identified and to assess how many trials were duplicated. Additionally, comparisons need to be made in the quality of trials and the treatment effects of trials reported in Arabic with those reported in English to determine whether there might be differences which could lead to bias being introduced into reviews based exclusively on English language reports [12].

## Conclusions

Handsearching can identify reports of trials not found by electronic searches. If resources for handsearching are limited,

it is beneficial to target issues of journals published before a journal was indexed in major electronic databases or journals that are not indexed.

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*Meeting report*

## Summary report of the Regional Consultation to follow up on the Mexico Ministerial Summit on Health Research, Rawalpindi, Pakistan, 29–30 November 2005

### Introduction

The 2004 Ministerial Summit on Health Research, Mexico City, Mexico, 16–20 November 2004, emphasized global cooperation to reduce the disparities in health between developing and developed countries. Representatives of 58 ministries of health, half of them ministers, called for greater commitment to health research. It was a global initiative to strengthen national health systems and to increase efforts towards attaining the United Nations millennium development goals [1,2]. The Mexico Summit on Health Research served as a global platform to underscore persisting inequalities in health research (including the 10/90 gap in health research expenditure); it called upon all countries/stakeholders to develop the political will and commitment to share resources, information and experiences to ensure that public health policies are developed according to the real needs of the people [3].

The statement of the Mexico Ministerial Summit, in highlighting the plight of the world's poor, is a global resolve to turn words into action now [4]. The 58th World Health Assembly adopted a resolution calling upon all stakeholders, including World Health Organization (WHO) Member States, to take all necessary steps and

follow the recommendations of the Mexico Summit [5]. The Regional Office for the Eastern Mediterranean held a consultation of experts comprising senior health researchers, scientists, policy-makers, public health specialists, health academics, non-governmental organizations and WHO. Over 20 participants from 10 countries gathered in Rawalpindi, Pakistan to discuss the implications of the summit statement and the World Health Assembly resolution; advise on future strategic directions for health research for the Regional Office and Member States; determine how operational research can best be integrated into the policy development processes; collect evidence to serve as the catalyst for practice and policy changes; and suggest specific choices/options for action.

### Key message from Dr H.A. Gezairy, Regional Director

In his message to the participants, Dr Hussein A. Gezairy, Regional Director, WHO Regional Office for the Eastern Mediterranean, elaborated on the support of the Regional Office to Member States, and called upon Member States to formulate policies and develop strategic directions to chart the future course of action to address specifically the needs of the poor in a way that



would truly capture the spirit of the ministerial summit and the World Health Assembly resolution on Health Research.

This consultation has been organized with the objective to discuss and take forward the health research agenda as spelled out by the World Health Assembly resolution (WHA58.34). The challenge is to steer the direction of future health research within the countries of the Eastern Mediterranean Region towards bridging not only the knowledge gap but also the know-do gap by making sure that proven interventions are implemented where they are needed.

There is a need for clear, empirically driven policy directions and strategic action plans that are strongly focused on priority options and interventions.

### **The consultation**

The consultation format included keynote presentations followed by open discussion, plenary discussions and group work by the participants. The debate was intense. A full report of the Consultation is available from WHO/EMRO.

#### **What did the researchers say (to the policy-makers)?**

We do the best quality research. We publish the information and results in the best journals of the world. You do not read it. You do not implement the findings that we work so hard to obtain. All the knowledge and information is there on the Internet for all to read. Use it.

#### **What did the policy-makers say (to the researchers)?**

But you do not focus on the problems we are faced with. You work in insulated compartments focusing on your own priorities and agendas. You publish your results in a language we do not understand. You protect the validity of your results through things such as *P*-values, confidence limits, and odds ratios, etc. which do not help us. Please tell us better ways of implementing interventions that are effective, what their impacts are, how much they would cost and how we can improve costs, access and equitable distribution.

#### **What did the countries say?**

Health care inequities are forcing people to spend huge sums of money from their pockets, driving them deeper into the abyss of poverty. Rural areas, households with children, the elderly, unemployed breadwinners and the uninsured bear the brunt of catastrophic expenditure for health (Dr H. Salehi, WHO Regional Office for the Eastern Mediterranean, Cairo).

There are huge gaps in the knowledge and understanding of the role of social determinants of ill health, and there is a paramount need to redefine research priority settings from the disease burden perspective to include societal influences and population behaviours that adversely affect health. Greater emphasis is needed on population-based research and its thorough analysis (Professor H. Rashad, American University in Cairo, Cairo).



### Key messages from the technical sessions

- WHO establishes evidence-informed policies networks (EVIPNets). The aim is to bridge the research-to-policy gaps through improved access to quality evidence by decision-makers influencing partnerships and stakeholders through shared knowledge (Dr U. Panisset, WHO, Geneva).
- Millions of children are dying each year in the developing countries, including many Member States in the Region, because existing, known and proven interventions do not reach them. Research must inform health systems which in turn must deliver. Only then will the countries meet their millennium development goals targets (Professor Z. Bhutta, Aga Khan University, Karachi).
- Developing countries that are investing in research are gaining ground. Health systems development is intrinsically linked to increased investment in research, with a particular focus on health problems of the poor (Dr Abdul Ghaffar, Global Forum for Health Research, Geneva).
- There is urgent need for research to focus on improving equity and reducing poverty. Decision-making on health policies and interventions should be based on conscientious, explicit and judicious use of best evidence (N. Valentine, Commission on the Social Determinants of Health, WHO, Geneva).
- For effective utilization of research and its contribution to the development of society, researchers and decision-makers must strive to balance the need for attaining excellence and relevance in health research (Dr J. Simon, Boston University, Boston, Massachusetts).
- Nongovernmental organizations can play a significant role in national health

research through influencing the processes of priority setting, advocacy, stimulating political commitments and capacity-building. Procedural clarity in public-private partnerships is central for the effectiveness of this relationship (Dr S. Nishtar, Heartfile, Pakistan).

- People affected by disasters, conflicts and crisis have special needs that have to be met by urgent humanitarian relief and development. This requires special research (Dr K. Bile, WHO, Pakistan).

### Recommendations of the Regional Consultation

The Group emphasized the need to make recommendations actionable, pragmatic and feasible on the one hand, and on the other sufficiently flexible to allow for local adaptation.

The participants called upon the Regional Office and the Member States to focus on:

- enhancing research capacities to undertake health research in order to improve the performance of their health systems to meet Millennium Development Goals.
- improving linkages between researchers and policy-makers to enable empirical evidence-based policy development and practices.

### Role of WHO

- WHO support for Health Policy and Systems Research (HPSR) should aim to:
  - advocate for mainstreaming HPSR in the health agendas of countries at policy and operational levels and generate evidence relating to the benefits of HPSR in the context of overall human development;

- increase resource allocations to support sustainable development of HPSR in Member States with a particular emphasis on capacity building;
- utilize its normative function in order to develop an overarching policy position and norms for HPSR and an associated code of ethics;
- assist with the dissemination of information and foster experience-sharing relating to capacity-strengthening and research results;
- promote and assist with the identification of HPSR priorities at country level.
- WHO country offices should be strengthened with dedicated staff to coordinate health research efforts with all the national stakeholders and other partners.
- Capacities of stakeholders should be mapped to integrate the role of the entire spectrum of stakeholders involved to make national research relevant to national needs.
- Increased investments should be made in building dedicated capacity and a supportive environment, including appropriate incentives for HPSR.
- Proactive efforts should be made in order to demonstrate the critical linkages of HSPR with internationally agreed targets such as the Millennium Development Goals.

### Action points

The participants of the consultation strongly suggested to the WHO Regional Office to undertake the following two activities.

### Role of countries

- High-level political commitment is required for HPSR within Member States and the national leadership should take the responsibility of putting into place conducive environments to foster research.
- Develop a dedicated training programme to sensitize the media on health and development.
- Support strategic research in HPSR within Member States to improve the performance of national health systems, to be reported at the next summit scheduled to be held in Africa in 2008.

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