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World AIDS Day, 2011

"Stigma and discrimination against people living with HIV are still massive barriers against accessing prevention and care services. As people in charge of the health of our populations, we should not tolerate the denial of health care to the people who need it".

Source: Television Message from Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean

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المجلة الصحية لشرق المتوسط

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EASTERN MEDITERRANEAN HEALTH JOURNAL

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EST une revue de santé officielle publiée par le Bureau régional de l'Organisation mondiale de la Santé pour la Méditerranée orientale. Elle offre une tribune pour la présentation et la promotion de nouvelles politiques et initiatives dans le domaine des services de santé ainsi qu'à l'échange d'idées, de concepts, de données épidémiologiques, de résultats de recherches et d'autres informations, se rapportant plus particulièrement à la Région de la Méditerranée orientale. Elle s'adresse à tous les professionnels de la santé, aux membres des instituts médicaux et autres instituts de formation médico-sanitaire, aux ONG, Centres collaborateurs de l'OMS et personnes concernés au sein et hors de la Région.

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Letter from the Editor

World AIDS Day is held on 1 December. It aims to raise awareness about HIV/AIDS around the world to help advance HIV/AIDS prevention, treatment and care.

While most countries in our Region report low prevalence rates of HIV infection ($< 1\%$) in the general population and $< 5\%$ in at-risk groups, reliable data are lacking. According to the available evidence, it is estimated that between 400 000 and 530 000 people were living with HIV in the Middle East and North Africa at the end of 2009, an increase of around 165% from 2001.

Certain groups are considered at risk of or vulnerable to HIV infection, including prisoners and young people. Increasing awareness and knowledge and behaviour change interventions among such groups can slow the spread of the infection. Included in this issue is a paper on the knowledge, attitudes and beliefs related to HIV/AIDS among 1760 prisoners in the Islamic Republic of Iran. While the results showed that respondents had fairly good knowledge about HIV/AIDS, misconceptions were evident. Around 40% of prisoners believed they would never be infected with HIV/AIDS under any circumstances and 34% believed that HIV/AIDS does not affect the Islamic Republic of Iran.

The theme of World AIDS Days between 2011 and 2015 is "Getting to zero: zero new HIV infections. Zero discrimination. Zero AIDS related deaths". Stigma associated with AIDS and discrimination against people infected with HIV still prevail; even some health workers may hold prejudices and deny care to HIV-infected people. Therefore the focus of World AIDS Days 2011 within the Region is on addressing such discrimination among health-workers as highlighted in the Message of Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean, on the occasion of World AIDS Day, which is published in this issue.

رسالة من المحرر

سيُقدّم اليوم العالمي لمكافحة الإيدز في الأول من كانون الأول/ديسمبر، وهو يستهدف رفع مستوى الوعي حول مرض الإيدز والعدوى بفيروسه في جميع أرجاء العالم، من أجل إحراز التقدم في الوقاية من الإيدز، ومعالجة مرضاه، وتقديم الرعاية لهم.

وعلى الرغم من أن معظم بلدان الإقليم تبلغ عن مستويات انتشار منخفضة للعدوى بالإيدز (تقل عن 1%) بين مجمل السكان، وتقل عن 5% بين المجموعات المعرضة لاختطار مرتفع للعدوى، فإن المعلومات الموثوقة لاتزال شحيحة. فوفقاً للبيانات المتوافرة، يُقدّر أن 400 000-530 000 من السكان كانوا متعايشين مع فيروس الإيدز في الشرق الأوسط وشمال أفريقيا في نهاية عام 2009، مما يشكل ازدياداً بمقدار 165% عما كان عليه العدد عام 2001.

وهناك مجموعات تعتبر مُخَطَّرة أو سهلة التعرّض للعدوى بفيروس الإيدز، بمن فيهم السجناء والشباب. ويمكن لزيادة مستوى الوعي والمعارف وللتدخلات التي تستهدف تغيير السلوك لدى هذه المجموعات أن تبطئ من وتيرة انتقال العدوى. ويتضمن هذا العدد مقالة حول المواقف والمعارف والمعتقدات حول مرض الإيدز والعدوى بفيروسه، تستهدف 1760 سجيناً في إيران. وفي حين أظهرت النتائج وجود معارف جيدة نوعاً ما حول الإيدز والعدوى بفيروسه، فإن المفاهيم المغلوطة كانت كثيرة. إذ يعتقد ما يقرب من 40% من المساجين في إيران أنهم لن يصابوا بالإيدز تحت أي ظروف كانت. ويعتقد 34% أن فيروس الإيدز والعدوى بفيروسه لا تؤثر على جمهورية إيران الإسلامية.

سيكون شعار الأيام العالمية لمكافحة الإيدز في الأعوام بين 2011 و2015 "إحراز الصفر: صفر من حالات العدوى الجديدة بالإيدز، صفر من التمييز، صفر من الوفيات الناجمة عن الإيدز"، فالوصمة المصاحبة للإيدز والتمييز ضد المصابين بعدوى الإيدز لا يزالان منتشرين على نطاق واسع، حتى إن بعض العاملين الصحيين يتحيزون ضد المصابين بالإيدز ويحرّمونهم من تقديم الرعاية لهم. ومن هنا جاء التركيز على الأيام العالمية لمكافحة الإيدز في عام 2011 في الإقليم على التصدي للتمييز الذي يمارسه العاملون الصحيون ضد المصابين بالإيدز، ويتضح ذلك في الرسالة التي وجهها الدكتور حسين عبد الرزاق الجزائري، المدير الإقليمي لشرق المتوسط، في اليوم العالمي لمكافحة الإيدز، والمنشورة في هذا العدد.

Message by Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean, on the occasion of World AIDS Day 2011

In the past few years, efforts and resources invested in expanding the health sector response to the HIV epidemic in the Region have resulted in noticeable achievements in terms of increased access to HIV prevention and care services. All countries have made efforts to increase access to life-saving antiretroviral therapy. Between 2008 and 2010, the number of people living with HIV (PLHIV) on ART increased by 55%, and several countries doubled the number of PLHIV receiving ART. However, since, in our Region, most people living with HIV do not know that they are HIV infected, or are not known to the health system, regional treatment coverage is still the lowest globally.

Stigma and discrimination against people living with HIV and those at increased risk of HIV transmission still exist to varying degrees across the Region and remain massive barriers to people accessing prevention and care services. Of particular concern are stigma and discrimination in health care settings and by health care workers. These are major impediments when it comes to encouraging stigmatized population groups to seek and access health services and adhere to health interventions.

The health care community has witnessed women in labour not being allowed to deliver in hospitals because of their HIV positive status. Men, women and children living with HIV in dire need of surgery have been denied this right. Even with non-invasive procedures, some health care workers have refused to care for people living with HIV. Public and institutional measures have enacted mandatory HIV testing on individuals upon their admission to health care services, often resulting in denial of access to these who test positive, unnecessary isolation or, at the least, gossip.

The right to health is fundamental. For this reason, the regional theme for the World AIDS Campaign 2011 is stigma and discrimination in health care settings, asking us all to reflect on human rights in the context of universal access to HIV prevention, treatment and care.

The right to the highest attainable level of health for every human being is a core value in WHO's Constitution. We should not, as people in charge of the health of our populations, tolerate the denial of health care to people who need it, whether on the basis of an HIV positive status or on the basis of our moral judgement of their behaviour. We must re-double our efforts to challenge and change policies that breach the right of individuals living with or at risk of HIV to quality health care. People should not be tested for HIV without their consent. And positive HIV status should not negatively affect the ability of individuals to access health services. A human rights-based approach is the only way to achieve universal access to HIV prevention, treatment and care.

Knowledge, attitudes and practices towards HIV/AIDS among Iranian prisoners in Mazandaran province in the south-coast area of the Caspian Sea

M.R. Majdi,¹ H. Khani,² E. Azadmarzabadi,³ A. Montazeri,⁴ E. Hallajian,⁵ F. Babamahmudi⁶ and M.H. Kariminasab⁶

المعارف والمواقف والممارسات تجاه مرض الإيدز والعدوى بفيروسه بين السجناء الإيرانيين في مقاطعة مازاندران الواقعة على الساحل الجنوبي لبحر قزوين

محمد رضا مجدي، حسن خاني، اسفنديار آزادمرزابادي، علي منتظري، إبراهيم حلاجيان، فرهنك بابامحمودي، محمد حسين كريميناسب

الخلاصة: تتركز العدوى بفيروس الإيدز في جمهورية إيران الإسلامية أساساً بين معاقري المخدرات حقناً. وتستقصي هذه الدراسة المعارف، والمواقف، والممارسات تجاه الوقاية من مرض الإيدز والعدوى بفيروسه في عينة عشوائية من السجناء في خمسة سجون في مقاطعة مازاندران الواقعة على الساحل الجنوبي لبحر قزوين. من بين 1760 سجيناً في عمر 18-65 سنة أكملوا الاستبيان، بلغ متوسط أعمارهم 30.1 سنة (الانحراف المعياري 8.1) وبلغ مجال أعمارهم (من 18 حتى 59 سنة)؛ وكان 95.8٪ منهم ذكوراً. كانت معارف المستجيبين حول الإيدز والعدوى بفيروسه جيدة في المتوسط بدرجة ما، وتراوحت النسب المئوية للإجابات الصحيحة بين 11.9٪ و85.9٪. إلا أن العديد منهم كان لديهم أفكار خاطئة من قبيل «أن مرض الإيدز والعدوى بفيروسه لا يؤثران على إيران»، و«أنني لن أصاب بمرض الإيدز أو العدوى بفيروسه تحت أي ظروف»، ووافق 63.6٪ على أن عدم الالتزام الديني والأخلاقي يؤدي إلى نشر العدوى بالإيدز. وتُخلص الدراسة إلى أن هناك حاجة لجهود الوقاية من الإيدز والعدوى بفيروسه لدى السجناء في مقاطعة مازاندران.

ABSTRACT HIV infection in the Islamic Republic of Iran is concentrated primarily among intravenous drug users. This study investigated the knowledge, attitudes and practices towards HIV/AIDS prevention of a random sample of prisoners in 5 prisons in Mazandaran province. Of 1760 individuals aged 18–65 years old completing the questionnaire, the mean age was 30.1 (SD 8.1) years (range 18 to 59 years); 95.8% were male. Respondents had an average to fairly good knowledge about HIV/AIDS, with the percentages answering correctly ranging from 11.9% to 85.9%. However many had the misconception that “HIV/AIDS does not influence Iran” and “I will not be infected with HIV/AIDS under any conditions” and 63.6% agreed that lack of religious and moral commitment could spread AIDS infection. HIV/AIDS prevention efforts are needed for prisoners in Mazandaran province.

Connaissances, attitudes et pratiques concernant le VIH/sida chez les prisonniers iraniens de la province de Mazandaran sur la côte sud de la mer Caspienne

RÉSUMÉ L'infection à VIH en République islamique d'Iran est principalement concentrée chez les usagers de drogues injectables. La présente étude a évalué les connaissances, attitudes et pratiques concernant la prévention du VIH/sida chez des prisonniers sélectionnés aléatoirement dans cinq établissements pénitentiaires de la province de Mazandaran. Au total, 1760 personnes, âgées de 18 à 65 ans, ont rempli le questionnaire. L'âge moyen était 30,1 ans (E.T. 8,1) (extrêmes 18-59 ans) ; 95,8 % étaient de sexe masculin. Les répondants possédaient un niveau de connaissances moyen à satisfaisant concernant le VIH/sida. Les pourcentages de réponses correctes allaient de 11,9 % à 85,9 %. Toutefois, ils étaient nombreux à avoir des conceptions erronées sur le sujet, par exemple en pensant que « le VIH/sida n'avait pas d'impact sur l'Iran » et « qu'ils ne seraient jamais infectés par le VIH/sida ». De plus, 63,6 % étaient d'accord pour affirmer qu'un engagement moral et religieux défaillant pouvait contribuer à propager l'infection à VIH. Des mesures de prévention contre le VIH/sida sont nécessaires pour les prisonniers dans la province de Mazandaran.

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Introduction

Acquired immunodeficiency syndrome (AIDS) caused by the human immunodeficiency virus (HIV) has profoundly changed medical practice, contemporary society and public health initiatives worldwide [1]. Moreover, with no treatment or cure in sight, the disease continues to spread at an alarming rate [2]. Globally it has been estimated that 33 million people are living with HIV and 2 million people died of AIDS-related illnesses in 2007 [3].

An official report by the Iranian Ministry of Health in 2009 indicated that there were 20 130 HIV-positive individuals and 2097 AIDS cases in the country [4]. Among the individuals with HIV/AIDS, 69.8% acquired the disease through intravenous drug use, 8.5% through sexual infection, 1.2% through blood transfusion, 0.6% as newborns from infected mothers and 19.9% from unknown causes. These numbers, however, are considered inaccurate due to the inadequacy of the registration system and because people with sexually transmitted diseases do not generally attend health centres. According to the information provided by the Iranian Ministry of Health, HIV/AIDS is considered to be in its beginning phases.

Based on HIV/AIDS distribution models in human society, many epidemiologists believe that prevention of high-risk behaviours, including unsafe sexual activities and intravenous drug use, is critical for the reduction of AIDS-associated morbidity and mortality [5–7]. Prevention of high-risk behaviours in human society is related to increased knowledge and improved attitudes and beliefs concerning HIV/AIDS [8–11]. The World Health Organization (WHO) has advocated an important role for education in spreading knowledge about HIV/AIDS transmission [12].

The development and implementation of HIV/AIDS prevention programmes has been relatively slow in prisons in the area around the southern coast of the Caspian Sea [13]. As in other countries [14–16], inmates may fear that, by expressing an open interest in learning about HIV/AIDS prevention strategies or requesting testing, they are openly admitting to engaging in homosexual activities or using drugs, which may cause others to view them in a negative light [17–19]. This paper reports on data derived from an investigation of the knowledge, attitudes and practices towards HIV/AIDS prevention among prisoners in Mazandaran province, Islamic Republic of Iran.

Methods

Study design

This was a cross-sectional descriptive study investigating the state of knowledge, attitudes and practices towards HIV/AIDS of Iranian prisoners living in prisons along the southern coast of the Caspian Sea between 2006 and 2008. The study protocol was approved by the ethics review committees of 5 institutions to which the authors are affiliated, and all participants gave written informed consent.

Participants

In view of the lack of previous statistical data on acceptable knowledge about AIDS among prisoners in Mazandaran province, we estimated that 400 subjects were required for each cluster to achieve a suitable sample size. A random sample of 2000 individuals aged between 18 and 65 years old who were incarcerated in 5 prisons in 5 cities in Mazandaran province (Amole, Babol, Behshahr, Ghaemshahr and Sari) were selected and invited to participate in this study. Every prisoner had the same probability of being sampled.

Data collection

Data for the main study was collected by a group of trained interviewers in face-to-face interviews. Prisoners who agreed to participate were given a 4-page self-administered questionnaire. Those who had difficulty in reading the questionnaire were provided with assistance.

Questionnaire

The questionnaire used in this survey was adopted from the knowledge, attitudes, beliefs and practices survey of the WHO HIV/AIDS programme [20] and the previous literature [2,21–23]. However, some items related to sexual habits were modified in to suit Iranian culture and norms. The questionnaire consisted of 44 questions in 5 broad sections:

- Sociodemographic information: age, sex, marital status, educational level, employment status, self-reported economic status, number of family members, and type of criminal behaviour (8 items).
- Questions about HIV/AIDS-related knowledge covering 4 main topics: general information, diagnosis, risk of HIV/AIDS transmission and treatment (25 items).
- Statements about the individual's attitudes towards HIV/AIDS, covering social and cultural issues (6 items).
- Questions about the individual's participation in practices concerning HIV/AIDS prevention (2 items).
- Questions about the individual's source of information on HIV/AIDS and information needs (3 items).

The response categories for the section on knowledge were in a yes/no/I don't know format, and items on attitudes were assessed using a 5-point Likert scale ranging from strongly agree to strongly disagree.

Table 1 Respondents' characteristics (n = 1760)

Characteristic	No.	%
Age (years)		
≤ 24	442	25.1
25–34	846	48.1
35–44	360	20.5
≥ 45	112	6.4
Sex		
Male	1686	95.8
Female	74	4.2
Marital status		
Single	640	36.4
Married	1054	59.9
Widowed	66	3.8
Education level		
Illiterate	582	33.1
Primary	392	22.3
Secondary	632	35.9
Higher education	154	8.8
Employment status^a		
Employed	846	48.1
Housewife	74	4.2
Student	60	3.4
Unemployed	780	44.3
Family's total annual income level^a		
Low	688	39.1
Average	1002	56.9
High	70	4.0
Household size (no. of people)^b		
1–3	534	30.3
4–5	766	43.5
≥ 6	460	26.1
Reason for imprisonment		
Drug abuse/addiction	594	33.8
Theft/ethical	630	35.8
Financial/penal	536	30.5

^aParticipants' self-reported estimates; ^bBefore imprisonment.

Panels of 4 health professionals from 4 institutions (Baqhyatallah University of Medical Sciences, Iranian Institute for Health Sciences Research, Mazandaran University of Medical Sciences and Islamic Azad University) examined and validated the questionnaire. Following approval, the questionnaire was pre-tested on a sample of 75 participants (15 individuals per prison). Alpha coefficients for reliability and internal

consistency of the questions were 0.82 and 0.68 for knowledge and attitudes respectively.

Statistical analysis

Descriptive statistics—percentages, mean and standard deviation (SD)—were used to report frequencies. Chi-squared analysis was used to test for the associations of knowledge, attitudes and practices with age, sex, educational level,

marital status, employment status, total family income level, number of those living at home and type of criminal behaviour.

Results

Respondents' characteristics

Of the 2000 eligible participants, 1760 (88.0%) completed the questionnaire. The characteristics of the respondents are shown in Table 1. The mean age of the respondents was 30.1 (SD 8.1) years (range 18 to 59 years); 95.8% were male, 59.9% were married and 91.2% had received secondary education or lower. Most respondents (96.0%) identified themselves as having low or intermediate income and 44.3% were unemployed before imprisonment. One-third (33.8%) had been imprisoned for drug abuse/addiction.

Respondents' knowledge

On most items, respondents had an average to fairly good knowledge about HIV/AIDS, with the percentages answering correctly ranging from 11.9% to 85.9% (Table 2). The great majority knew that AIDS was caused by a virus (81.6%), that HIV/AIDS can be transmitted by sharing a razor blade with an infected person (85.8%) or using a needle previously used by an infected person (85.2%) and that HIV/AIDS can be transmitted from an infected person to his or her partner during sexual intercourse (85.9%). However, over 30% of respondents thought that AIDS was not a contagious disease (34.8%), that urine, X-ray, blood and biochemistry tests were used to check for the HIV virus in the blood (56.9%), that HIV virus can be transmitted through the bite of a mosquito (49.2%) or by using an infected person's belongings, such as clothes, combs, underwear and towels (35.9%).

On 19 of 25 knowledge items, HIV/AIDS related knowledge was significantly associated with age group; the

Table 2 Respondents' knowledge about HIV/AIDS (n = 1760)

Knowledge item	Correct		Incorrect		Don't know	
	No.	%	No.	%	No.	%
General knowledge						
A virus causes AIDS	1436	81.6	166	9.4	158	9.0
AIDS is an infectious disease	1006	57.2	612	34.8	142	8.1
AIDS is a hereditary disease	1218	69.2	362	20.6	180	10.2
AIDS is mostly seen in developing or undeveloped countries, unable to afford to care for infected people	1132	64.3	230	13.1	398	22.6
AIDS is not a serious disease. It is a simple disease like the common cold	1422	80.8	226	12.8	112	6.4
The appearance of HIV carriers does not differ from that of the normal population	1034	58.8	546	31.0	180	10.2
Resistance to other diseases in an individual with AIDS is rather low	1336	75.9	232	13.2	192	10.9
Diagnosis						
A person infected with HIV is usually diagnosed with symptoms of the disease	1040	59.1	504	28.6	216	12.3
An ELISA test is used to check for the HIV virus in the blood	848	48.2	184	10.5	728	41.4
Urine, X-ray, total blood count and biochemistry analyses are used to check for the HIV virus in the blood	210	11.9	1002	56.9	548	31.1
Risk of transmission						
Sharing public toilets and swimming pools with an infected person	946	53.8	542	30.8	272	15.5
Using an infected person's belongings such as clothes, comb, underwear and towel	936	53.2	632	35.9	192	10.9
Sharing a razor blade with an infected person	1510	85.8	114	6.5	136	7.7
Sharing an injection needle or surgical instrument previously used by an infected person	1500	85.2	140	8.0	120	6.8
Sharing the food utensils of an infected person	872	49.5	620	35.2	268	15.2
Touching an infected person, such as hugging, holding and shaking hands	1350	76.7	264	15.0	146	8.3
From a mosquito bite	586	33.3	866	49.2	308	17.5
Donating blood, organs or tissue of an infected person to another person	1432	81.4	172	9.8	156	8.9
From an infected pregnant woman to her unborn baby	1410	80.1	168	9.5	182	10.3
From an infected person to his/her partner during sexual intercourse	1512	85.9	130	7.4	118	6.7
From to an infected person who coughs or spits	930	52.8	570	32.4	260	14.8
From the urine, tears, mucus or nasal fluid of an infected person	748	42.5	674	38.3	338	19.2
From the breast milk of an infected person	1154	65.6	316	18.0	290	16.5
Treatment						
There is an active treatment for AIDS	1134	64.4	362	20.6	264	15.0
There is a vaccine for AIDS	1084	61.6	462	26.3	214	12.2

percentage of respondents aged 25–34 years with correct answers on all items was higher than that of respondents aged ≥ 45 years. On 9 items, the percentage

of males responding correctly was significantly higher than that of females. On 24 items, respondents with a higher level of education were significantly

more knowledgeable than those with a lower level of education. There were also significant differences relative to other demographic characteristics on most

Table 3 Respondents' attitudes towards HIV/AIDS (*n* = 1760)

Attitudes item	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree	
	No.	%	No.	%	No.	%	No.	%	No.	%
Lack of religious and moral commitment could spread AIDS infection	670	38.1	448	25.5	304	17.3	244	13.9	94	5.3
AIDS is a punishment from God	236	13.4	162	9.2	390	22.2	536	30.5	436	24.8
AIDS does not influence Iran	222	12.6	380	21.6	514	29.2	376	21.4	268	15.2
Married couples do not contract AIDS	280	15.9	276	15.7	384	21.8	524	29.8	296	16.8
I will not be infected with AIDS	322	18.3	388	22.0	406	23.1	390	22.2	254	14.4
You cannot be infected with HIV/AIDS if you engage in sport and are well-nourished	226	12.8	124	7.0	318	18.1	638	36.3	454	25.8

knowledge items (data not shown, but available from the corresponding author).

Respondents' attitudes

The data concerning respondents' attitudes are listed in Table 3. The majority of respondents had negative attitudes toward HIV/AIDS. There were also a number of misconceptions: 34.2% of the respondents agreed (i.e. answered agree/strongly agree) with the statement

"HIV/AIDS does not influence Iran", 40.3% agreed that "I will not be infected with HIV/AIDS under any condition" and 63.6% agreed that "lack of religious and moral commitments could cause HIV/AIDS infection". Overall, there were significant differences for almost all attitude items according to the demographic characteristics of the respondents (data not shown, but available from the corresponding author).

Respondents' practices

Of the respondents, 73.4% (*n* = 1292) reported that their sexual practices were safe, and based on religious and moral commitments to prevent HIV/AIDS. In addition, 92.7% (*n* = 1632) would agree to undergo a blood test to check for the HIV virus. Overall, there were significant demographic differences in responses to both practices items, except for marital status and number of family members (data not shown, but available from the corresponding author).

Table 4 Respondents' source of information about HIV/AIDS and their informational needs (*n* = 1760)

Item	No.	%
Level of information about HIV/AIDS^a		
Excellent	244	13.9
Good	538	30.6
Average	638	36.3
Low	214	12.2
Very low	126	7.2
Source of information about HIV/AIDS		
Television	958	50.4
Newspapers	468	26.6
Friends	262	14.9
Books	182	10.3
Radio	112	6.4
Family	82	4.7
Information needs		
Transmission modes	722	41.1
General information	632	35.9
Prevention	574	32.6
Other	60	3.4

^aParticipants' self-report.

Respondents' source of information and their informational needs

As shown in Table 4, the majority of the respondents indicated that mass media (radio, television, and newspapers) were their major source of their information about HIV/AIDS (83.4%). Many, however, indicated that they needed more general information about HIV/AIDS (35.9%), as well as information on prevention (32.6%) and modes of transmission (41.1%).

Discussion

The prevention of HIV infection remains an important task for public health professionals. Understanding the dynamics of HIV infection within a

country, how it changes over time and who is currently at greatest risk is essential for guiding decisions about effective prevention programmes [24]. HIV infection in the Islamic Republic of Iran is concentrated primarily among intravenous drug users, suggesting an urgent need for prevention approaches targeted to this group [22]. Prisons and prison inmates are important targets for HIV/AIDS prevention interventions. Inmates often have a history of high-risk behaviour that place them at risk of contracting HIV/AIDS, and rates of HIV/AIDS tend to be much higher in this population. The present study therefore investigated the knowledge, attitudes and practices towards HIV/AIDS prevention among a sample of Iranian prisoners.

Our findings indicated that prisoners in Mazandaran province demonstrated average to fairly good knowledge about HIV/AIDS. However, misconceptions were present. For example, 34.8% of respondents believed that HIV/AIDS was not an infectious disease, 49.2% that mosquitoes were a vector of the virus and 31.0% that HIV carriers differed in appearance from non-infected individuals. In addition, the respondents showed limited knowledge about how HIV and AIDS can be transmitted. For example, only 52.8% said that AIDS could not be transmitted through coughing or spitting by an infected person. Overall, those who had higher levels of education and young adults (aged 25–34

years) were more knowledgeable about HIV/AIDS. Similar findings have been reported in other countries [9,10].

A study among prisoners in Lagos, Nigeria, showed that almost all of them had heard of AIDS, although only a few had seen or known a person with AIDS [25]. Although many knew the correct modes of HIV transmission, many indulged in high-risk behaviours. The study concluded that well designed information, education and communication programmes on HIV/AIDS were urgently needed for prisoners in low-income countries to work towards reducing the risk of HIV/AIDS transmission among prison inmates [25]. It has been argued that HIV/AIDS education interventions for male prisoners reduce the rate of high-risk behaviours [26]. Since the level of general education among our Iranian prisoners was only average, health education interventions may help to improve safe practices, especially as many of the respondents had been involved in high-risk behaviours (over a quarter had unsafe sex practices and one-third were imprisoned for drug abuse/addiction).

Most respondents had erroneous attitudes. For example many had the misconception that “HIV/AIDS does not influence Iran” and “I will not be infected with HIV/AIDS under any conditions”. Several studies have shown that people with good knowledge about HIV/AIDS become more tolerant of people with HIV/AIDS [27]. Also 63.6% of the

respondent agreed that “lack of religious and moral commitments could cause HIV/AIDS infection”. Further investigation of the role of religion in HIV/AIDS prevention is needed, especially in countries such as Islamic Republic of Iran where religion has an important role in everyday life [22].

The majority of respondents (83.4%) indicated that their main source of information about HIV/AIDS was the mass media, especially television, showing that these methods have succeeded in raising AIDS awareness in Islamic Republic of Iran. In contrast, only 4.7% said that their main source of information was their family. A recent study in the Islamic Republic of Iran indicated that many people could not correctly identify the main message of anti-HIV/AIDS campaigns [28].

Our findings indicate the urgent need for HIV/AIDS prevention efforts for prisoners throughout Mazandaran province to increase their knowledge of HIV/AIDS, and to improve their attitudes and practices concerning this disease.

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References

1. Schreirman T, Friedland G. Human immunodeficiency virus infection prevention: strategies for clinicians. *Clinical Infectious Diseases*, 2003, 36:1171–1176.
2. Unal A. AIDS knowledge and attitudes in Turkish population: an epidemiological study. *BMC Public Health*, 2005, 5:95.
3. *Report on the global HIV/AIDS epidemic*. Geneva, Joint United Nations Programme on HIV/AIDS and World Health Organization, 2008.
4. *HIV/AIDS statistics*. Tehran, Ministry of Health, 2009 [in Farsi].
5. Seekoe E. Reproductive health needs and the reproductive health behavior of the youth in Mangaung in the Free State province: a feasibility study. *Curationis*, 2005, 28:20–30.
6. Miller JE, Guarnaccia PJ, Fasina A. AIDS knowledge among Latinos: the roles of language, culture, and socioeconomic status. *Journal of Immigrant Health*, 2002, 4:63–72.
7. Rotily M et al. Connaissances et attitudes du personnel de surveillance pénitentiaire face au VIH et/ou SIDA: une enquête européenne. [Knowledge and attitudes of prison staff towards HIV/AIDS: a European study.] *Santé publique*, 2001, 13:325–338.
8. HELLERINGER S, KOHLER HP. Social networks, perceptions of risk, and changing attitudes towards HIV/AIDS: new evidence from a longitudinal study using fixed-effects analysis. *Population Studies*, 2005, 59:265–282.

9. Zhao M et al. Risk behaviors and HIV/AIDS prevention education among IDUs in drug treatment in Shanghai. *Journal of Urban Health*, 2005, 82(Suppl. 4):84-91.
10. Amirkhanian YA et al. A randomized social network HIV prevention trial with young men who have sex with men in Russia and Bulgaria. *AIDS*, 2005, 19:1897-1905.
11. Al-Mazrou YY, Abouzeid MS, Al-Jeffri MH. Impact of health education on knowledge and attitudes of Saudi paramedical students toward HIV/AIDS. *Saudi Medical Journal*, 2005, 26:1788-1795.
12. Rashed A et al. Knowledge, attitudes, beliefs and practices of the population in Kuwait about AIDS: a pilot study. *Eastern Mediterranean Health Journal*, 1995, 1:235-240.
13. *Statistical yearbook*. Mazandaran, Islamic Republic of Iran, Management and Planning Organization of Mazandaran Province, 2006 [in Farsi].
14. Polonsky S et al. HIV prevention in prisons and jails: obstacles and opportunities. *Public Health Reports*, 1994, 109:615-625.
15. Grinstead OA et al. Reducing postrelease HIV risk among male prison inmates. *Criminal Justice and Behavior*, 1999, 26:453-459.
16. Heckman TG et al. HIV risk differences between African-American and White men who have sex with men. *Journal of the National Medical Association*, 1999, 91:92-100.
17. Arriola KRJ et al. Development and implementation of the cross-site evaluation of the CDC/HRSA Corrections Demonstration Project. *AIDS Education and Prevention*, 2002, 14(Suppl. A):107-118.
18. L.Braithwaite R and J.Arriola K.R. Male prisoners and HIV prevention. a call for action ignored. *American Journal of Public Health*, 2003, 93:759-763.
19. McCusker J et al. Demographic characteristics, risk behaviors, and HIV seroprevalence among intravenous drug users by site of contact: results from a community-wide HIV surveillance project. *American Journal of Public Health*, 1990, 80:1062-1067.
20. *Interview schedule on knowledge, attitudes, beliefs, and practices on AIDS/KABP survey*. Geneva, World Health Organization, 1988.
21. Tavossi A et al. Knowledge and attitude toward HIV/AIDS among Iranian students. *BMC Public Health*, 2004, 4:17.
22. Montazeri A. AIDS knowledge and attitudes in Iran: results from a population-based survey in Tehran. *Patient Education and Counseling*, 2005, 57:199-203.
23. Nakhaee FH. Prisoners' knowledge of HIV/AIDS and its prevention in Kerman, Islamic Republic of Iran. *Eastern Mediterranean Health Journal*, 2002, 8:725-731.
24. Pisani E et al. Back to basics in HIV prevention: focus on exposure. *British Medical Journal*, 2003, 326:1384-1387.
25. Odujinrin MT, Adebajo SB. Social characteristics, HIV/AIDS knowledge, preventive practices and risk factors elicitation among prisoners in Lagos, Nigeria. *West African Journal of Medicine*, 2001, 20:191-198.
26. Ronald LB, Kimberly RJA. Male prisoners and HIV prevention: a call for action ignored. *American Journal of Public Health*, 2003, 93:759-763.
27. Maswanya E et al. Knowledge and attitudes toward AIDS among Female college students in Nagasaki. *Health Education Research*, 2000, 15:5-11.
28. Montazeri A et al. World AIDS Day campaign in Iran: a population-based study. *Iranian Journal of Public Health*, 2009, 38:1-3.

Seroprevalence of hepatitis B and C among barbers and their clients in the Rabat region of Morocco

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الانتشار المصلي لالتهاب الكبد "بي" و"سي" في الحلاقين وزبائنهم في منطقة الرباط بالمغرب

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الخلاصة: أجريت دراسة مستعرضة في منطقة الرباط - سلا - زمّور - زعير في المغرب عام 2007 على 267 حلاقاً و529 من زبائنهم، جميعهم من الرجال وليس لديهم سابقة تلقيح ضد فيروس التهاب الكبد «بي». وقد بلغ إجمالي معدل انتشار إيجابية المصل لفيروس التهاب الكبد «بي» بين الحلاقين 28.1٪، و25.1٪ بين الزبائن؛ وبلغ انتشار إيجابية المصل للمستضد السطحي لفيروس التهاب الكبد «بي» بين الحلاقين 1.9٪، و1.7٪ بين الزبائن. واشتملت عوامل اختطار الإصابة بفيروس التهاب الكبد «بي» كبر العمر، وانخفاض مستوى التعليم، والمعيشة في المناطق الحضرية، والزواج، وسوابق نقل الدم، وعدم وجود علاقات جنسية مغايرة، والأعراض المرضية ذات الصلة بالكبد. ودلت المشاهدات على أن إيجابية المصل لفيروس التهاب الكبد «بي» كانت أقل في دكاكين الحلاقة النظيفة والتي تستخدم الشب كمطهر. وبلغ معدل التفاعل السلسلي للبولىميراز لفيروس التهاب الكبد «سي» في الحلاقين 1.1٪ وفي الزبائن 1.3٪ فقط، وارتبط ذلك بزيادة العمر، وإدمان المخدرات، وسوابق إجراء الجراحات، وأعراض مرض الكبد. ولم يكن الحلاقون وعي بأن فيروس التهاب الكبد «بي» و«سي» هما عاملان مسببان لمرض الكبد أو اليرقان، اللهم إلا أقل من 1٪ منهم.

ABSTRACT A cross-sectional seroepidemiological study was conducted in the Rabat-Salé-Zemmour-Zaër region of Morocco in 2007 among 267 barbers and 529 clients, all men with no history of hepatitis B (HBV) vaccination. The overall prevalence of HBV seropositivity was 28.1% in barbers and 25.1% in clients; 1.9% and 1.7% respectively had active HBV (HBsAg positive). Risk factors for HBV included older age, low educational level, urban living, being married, history of transfusion, lack of current heterosexual relationship and liver-associated symptoms. Observations showed that HBV seropositivity was lower in clean barbershops and those using alum as an antiseptic. The rate of PCR-confirmed hepatitis C virus (HCV) was only 1.1% and 1.3% in barbers and clients respectively, and was associated with increased age, drug use, history of surgery and symptoms of liver disease. Less than 1% of barbers were aware of HBV or HCV as causative agents of liver disease or jaundice.

Séroprévalence de l'hépatite B et C chez les barbiers et leurs clients dans la Région de Rabat (Maroc)

RÉSUMÉ Une étude séro-épidémiologique transversale a été menée dans la Région de Rabat-Salé-Zemmour-Zaër (Maroc) en 2007 auprès de 267 barbiers et 529 clients. Aucun d'entre eux n'avait été vacciné contre l'hépatite B. La prévalence globale de la séropositivité pour l'hépatite B était de 28,1 % chez les barbiers et 25,1 % chez les clients ; 1,9 % et 1,7 % d'entre eux respectivement étaient porteurs d'une infection active par le virus de l'hépatite B (Ag HBs positifs). Les facteurs de risque pour le virus de l'hépatite B comprenaient un âge avancé, un niveau d'études faible, un lieu de résidence urbain, le fait d'être marié, des antécédents de transfusion sanguine, l'absence de relation hétérosexuelle au moment de l'étude et la présence de symptômes hépatiques. Les observations ont révélé que la séropositivité pour l'hépatite B était plus faible dans les établissements propres et dans les salons utilisant de l'alun en antiseptique. Le taux des infections par le virus de l'hépatite C confirmées par amplification génique (PCR) était de seulement 1,1 %, et 1,3 % chez les barbiers et les clients, respectivement, et était associé à un âge avancé, la consommation de drogues, des antécédents de chirurgie et les symptômes d'une affection hépatique. Moins d'un pour cent (1 %) des barbiers savaient que les virus de l'hépatite B et C étaient des agents pathogènes des affections hépatiques et des ictères.

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Introduction

Hepatitis B (HBV) and C virus (HCV) infections are a serious global public health problem [1,2]. They are leading causes of chronic hepatitis, cirrhosis and hepatocellular carcinoma [3,4]. Worldwide, 2 billion people have been infected with HBV over their lifetime; of these, more than 350 million have chronic infection [2]. An estimated 170 million persons are chronically infected with HCV, and 3 to 4 million are newly infected each year [1]. Although treatment regimens exist for HBV and HCV, their efficacy is suboptimal, and problems with the cost and availability limits their use in low-resource settings [5]. Therefore, prevention is the best, and sometimes only, strategy for combating HBV and HCV. HBV vaccination is 95% effective in preventing HBV, but there is currently no effective vaccine against HCV.

In Morocco, HBV vaccination was introduced in 1999, and today, over 90% of infants are vaccinated. However, adults are still at risk for both HBV and HCV. In particular, acquisition and transmission of bloodborne pathogens has been shown to be an occupational risk among traditional barbers in many countries [6–12]. In Morocco, barbers are commonly exposed inadvertently to the blood and body fluids of their customers [13,14]. The objectives of our study were to determine the prevalence of HBV and HCV among traditional barbers and their clients in the Rabat region of Morocco, to determine their risk factors for HBV and HCV and to assess their knowledge of this occupational risk.

Methods

Study design and sample

A cross-sectional epidemiological study evaluating risk factors for HBV and HCV and seropositivity for these viruses was conducted during 2007

in traditional barbershops in the Rabat–Salé–Zemmour–Zaër region of Morocco. Men who provide traditional barber services were identified and enrolled in the study, and 2 clients who received services from each barber were also enrolled.

To be able to estimate the seroprevalence of HBV among barbers and clients with a precision of 5%, given a population prevalence of HBsAg among blood donors of 3% and a barber:client ratio of 1:2, we estimated that we would need to enrol 286 traditional barbers and 571 clients. Participants were chosen from 3 provinces in this region. Barbers providing shaving and haircut services at rotating daily open markets in rural areas or at standing but unregistered barbershops in periurban or urban areas were chosen for the study. Specifically, in Khemisset, a rural province, all barbers were invited to participate. In Salé and Témara-Skhirat, urban provinces, barbers in areas of low socioeconomic level were chosen preferentially.

Data collection

Questionnaires were administered by trained study personnel to elucidate the medical and socioeconomic risk factors for hepatitis. The questionnaire was supplied by the World Health Organization Eastern Mediterranean Regional Office (EMRO). It was designed and tested for a multi-country project on hepatitis in Egypt, Pakistan and Morocco as part of the Special Programme for Research and Training in Tropical Diseases (TDR) [7,11]. Some minor adaptations were made to suit the local context. In addition, a subset of barbers and clients were observed under routine conditions to evaluate the conditions of their shops and their shaving practices.

Serum hepatitis tests including hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (anti-HBs), hepatitis B core antibody (anti-HBc) and hepatitis C antibody (anti-HCV) were performed. Polymerase chain reaction (PCR) assay was performed

on samples from subjects with positive anti-HCV tests to detect hepatitis C viral RNA for confirmation of HCV infection.

Subjects with positive serological tests were referred to the university hospital in Rabat for further evaluation and treatment. This study was approved by the Directorate of Epidemiology and Disease Control of the Ministry of Health of Morocco. All subjects gave written informed consent for participation.

Definitions

HBV seropositivity was defined as a positive HBsAg or anti-HBs test, indicating past or current infection with HBV in this unvaccinated population. Subjects with a positive anti-HCV test confirmed by PCR were considered to have current active hepatitis C.

Serological testing

Blood samples were centrifuged at provincial laboratories, and serum samples were transported to the National Institute of Hygiene and stored at –20 °C until analysis. HBsAg, anti-HBs and anti-HBc infection markers were determined using commercially available enzyme-linked immunosorbent assays (ELISA) (Dia Pro Diagnostic Bioprobes). Samples that were positive by ELISA were confirmed by the neutralization test according to the manufacturer's instructions. Antibodies to HCV were tested using ELISA (Diagnostic Bioprobes). For those with a positive test, HCV RNA by reverse transcription was performed to confirm HCV infection (Cobas Ampliprep/Cobas Amplicor).

Statistical analysis

Data analyses were performed in *Epi-Info*, version 3.3.2, except for multivariate logistic regressions, which were performed using *STATA* software, version 10.0 (StataCorp LP). Demographic, medical and shop characteristics were compared using Pearson chi-squared

or Fisher exact tests for categorical variables. Because there were no significant differences in HBV and HCV seromarker positivity comparing barbers with clients, these groups were combined for the purposes of HBV and HCV risk factor analysis. Variables known to be risk factors for HBV as well as factors found to be associated with HBV in univariate analyses were included in a multivariable logistic regression model. Multivariable logistic regression analysis was not performed for HCV seropositivity because of the low number of cases. Significance tests were 2-sided, with *P*-values of < 0.05 considered statistically significant.

Results

Population and shop characteristics

A total of 267 barbers and 529 clients were identified and included in the study. Of the barbers, 75 (28.1%) were seropositive for HBV and 3 (1.1%) were positive for HCV (Table 1). Among clients, the prevalence was similar: 133 (25.1%) were positive for HBV and 7 (1.3%) positive for HCV. Active HBV, as evidenced by a positive HBsAg, was present in 1.9% of barbers and 1.7% of clients.

The mean ages of barbers and clients were 41 and 43 years respectively. The majority of study participants (69.9%) were illiterate or had only completed

primary school education, and most (94.2%) had low socioeconomic status, earning less than 1500 dirhams per month. The majority (56.6%) of barbershops were located in a rural setting (Table 2).

Information about barber shop characteristics and shaving practices was collected by direct observation for 546 subjects. New razors were used 96.3% of the time (Table 3).

Knowledge and beliefs about HBV and HCV and their transmission

Among barbers and clients combined, 539/796 (67.7%) were familiar with jaundice as a sign of liver disease. Less than 1% of barbers had heard of HBV or HCV infection. Those familiar with viral hepatitis reported that their main information sources about this disease were word of mouth (38.1%), television (20.0%), radio (8.7%) and, less commonly, print media (2.0%). Almost all the study participants (barbers and their clients) (97.0%) did not know the modes of transmission of viral hepatitis. Among clients, 100% reported that they insisted that barbers use new blades but 47.1% reported trusting the other shaving conditions to the barber.

Risk factors for HBV and HCV

Among traditional barbers and their clients, the odds of HBV seropositivity were higher in individuals with the following characteristics: age > 45 years,

low educational level, urban address, married status, history of blood transfusion, not currently in a heterosexual relationship (with wife or girlfriend) and symptoms of liver disease (Table 4). In the final multivariable model, adjusting for history of surgery or recent dental procedures, increased age (OR 1.63, 95% CI: 1.29–2.06), urban living (OR 1.47, 95% CI: 1.12–1.92) and lack of current heterosexual relationship (OR 1.59, 95% CI: 1.09–2.31) were independent risk factors for hepatitis B.

Observation of barber's shop characteristics and shaving techniques is shown in Table 3. In a multivariate model, after adjusting for use of a new razor, barbers still had a lower risk of HBV with use of alum as an antiseptic (RR 0.81, 95% CI: 0.30–0.92) and in well-decorated shops (RR 0.44, 95% CI: 0.21–0.89).

In univariate analyses, HCV was associated with increased age and low level of education (Table 5). Multivariate analysis could not be performed due to the small number of subjects with positive HCV.

Surprisingly, observations showed that the use of disinfectant on cuts was associated with increased risk of HCV seropositivity (RR 7.71); other barber practices and shop conditions were not statistically significantly associated with HCV in the univariate analyses (Table 3).

Table 1 Distribution of hepatitis B and C virus infection markers among barbers (*n* = 267) and their clients (*n* = 529)

Positivity	Barbers		Clients		RR (95% CI)	<i>P</i> -value ^a
	No. of cases	%	No. of cases	%		
HBsAg and anti-HBc	5	1.9	9	1.7	1.10 (0.37–3.25)	0.86
Anti-HBs and anti-HBc	28	10.5	63	11.9	0.88 (0.57–1.34)	0.55
Only anti-HBc	61	22.8	112	21.2	1.07 (0.81–1.42)	0.58
Only anti-HBs	42	15.7	83	15.7	1.00 (0.71–1.40)	0.98
HBV seropositive	75	28.1	133	25.1	1.11 (0.87–1.42)	0.37
HCV seropositive	3	1.1	7	1.3	0.84 (0.22–3.25)	0.81

^aChi-squared test.

RR = relative risk; CI = confidence interval.

HBsAg = hepatitis B surface antigen; anti-HBc = hepatitis B core antibody; anti-HBs = hepatitis B surface antibody; HBV = hepatitis B virus; HCV = hepatitis C virus.

Table 2 Sociodemographic characteristics of barbers (*n* = 267) and their clients (*n* = 529)

Characteristic	Barbers		Clients		Total ^a	
	No.	%	No.	%	No.	%
Age (years)						
15–29	89	33.6	157	30.8	246	31.8
30–44	83	31.3	132	25.9	215	27.8
45–75	93	35.1	220	43.2	313	40.4
Level of education						
University	4	1.5	9	1.7	13	1.7
Secondary	89	34.2	133	25.5	222	28.4
Primary	52	20.0	93	17.9	145	18.6
No education	115	44.2	286	54.9	401	51.3
Area of residence						
Urban	37	14.0	51	9.9	88	11.3
Suburban	87	33.0	164	31.7	251	32.1
Rural	140	53.0	302	58.4	442	56.6
Marital status						
Unmarried/ divorced	90	34.0	165	32.5	255	33.0
Married	175	66.0	343	67.5	518	67.9
Monthly income						
< US\$ 150	202	97.6	370	92.5	572	94.2
≥ US\$ 150	5	2.4	30	7.5	35	5.8

^aData missing in some categories.

Discussion

The prevalence of HBV and HCV infection varies from country to country and even from one region to another, depending on environmental factors and host characteristics. The prevalence of HBV and HCV has been widely investigated in many occupational groups, but relatively few data are available on the prevalence in barbers who regularly come into contact with blood and body fluids of clients and may be expected to have an elevated risk of exposure to bloodborne pathogens [15,16]. In our study, 28.1% of traditional barbers and 25.1% of their clients had evidence of current or past HBV infection (all were unvaccinated against HBV), 1.9% and 1.7% respectively had active HBV and 1.1% of barbers and 1.3% of clients had chronic HCV. Our study corroborates a previous study in Casablanca in Morocco, in 2001, which showed that 2% of

barbers were positive for HBsAg, indicative of active hepatitis B, and 5% were positive for HCV antibody, indicative of chronic hepatitis C [14]. Given the highly infectious nature of hepatitis B, the rarity of vaccination and, thus, high susceptibility to HBV among Moroccan adults and the very large proportion of the population using traditional barber services, the fact that over a quarter of barbers have or have had hepatitis B is concerning.

Based on epidemiological data demonstrating an HBsAg seroprevalence of 3.7% in blood donors and 3.1% in health care workers [9], Morocco is classified as a country with moderate hepatitis B burden. Given that HBsAg seroprevalence is similar in barbers and in the general population in Morocco [13], working as a barber may not present a significant increased threat of active HBV in Morocco. This is in contrast to studies in China, Turkey, Egypt

and Italy showing an increased risk of HBV among traditional barbers or their clients [9,15,17,18]. HBV seropositivity among barbers and clients aged 45–70 years was significantly higher than among younger age groups. Higher rates of HBV in older individuals probably reflect the increased time at risk for the disease over a lifetime.

The HCV seropositivity rates in our study were similar to the prevalence in the general population in Morocco [13]. This seroprevalence is significantly lower than that found by Zahraoui-Mahadji et al. in Casablanca (5%) [2] and among barbers elsewhere [11,17]. Individuals giving or receiving traditional barber services have been shown to be at higher risk of HCV in most, but not all, settings [6,7,10,12,19]. In spite of the poor hygiene conditions in many barbershops in this study, we observed a near-universal practice of changing of blades between clients. In Janjua et al.'s study 45.8% of Pakistani barbers reused razors, presumably contributing to the dissemination of the virus [20]. It is unclear how long using new blades for each client has been a routine part of shaving practices in Morocco. However, the spread of HCV can be promoted by the sharing of razor blades within families or by using instruments cleaned only by antiseptics that do not destroy HCV [14]. Attention to sterility of blades for facial shaving is clearly crucial.

Knowing that traditional barbers and their clients may be at higher risk for HBV or HCV is useful information from a public health standpoint, and identifying additional risk factors for HBV and HCV in these groups may further inform strategies to minimize the incidence of these diseases in the population. Our analysis showed that older age, urban living and lack of a current heterosexual relationship were risk factors for HBV. The associations between some factors, such as marriage or low educational status, and HBV in univariate analyses, were likely confounded by

Table 3 Observed shaving practices of barbers and characteristics of barbershops and the risk of hepatitis B virus (HBV) and hepatitis C virus (HCV) infection (combined data, $n = 796$)

Variable	Total by category	HBV risk factors				HCV risk factors			
		HBV positive	%	RR (95% CI)	P-value ^a	HCV positive	%	RR (95% CI)	P-value ^b
Barber shaving practices									
<i>Washes the razor with antiseptic solution</i>									
Yes	234	53	22.6	1.00 (0.73–1.38)	0.99	5	2.1	2.03 (0.48–8.40)	0.26
No	283	64	22.6			3	1.1		
<i>Uses a new razor for each client</i>									
Yes	502	109	21.7	0.55 (0.33–1.27)	0.25	7	1.4	–	0.78
No	18	6	33.3			0	0.0		
<i>Sterilizes instruments properly</i>									
Yes	309	68	22.0	1.04 (0.72–1.46)	0.86	2	0.6	0.39 (0.06–2.34)	0.26
No	183	39	21.3			3	1.6		
<i>Uses alum as antiseptic for skin cuts</i>									
Yes	407	83	20.4	0.56 (0.45–0.93)	0.02	6	1.5	1.31 (0.16–11.1)	0.63
No	89	28	31.5			1	1.1		
<i>Disinfects skin cuts properly</i>									
Yes	123	33	26.8	1.45 (0.92–1.89)	0.12	5	4.1	7.71 (1.46–37.9)	0.01
No	366	74	20.2			2	0.5		
Barbershop characteristics									
<i>Shop situated at an open-air market area</i>									
Yes	346	97	28.0	1.92 (1.16–2.37)	0.004	6	1.7	3.44 (0.41–28.0)	0.21
No	196	33	16.8			1	0.5		
<i>Shop clean and neat</i>									
Yes	204	31	15.2	0.42 (0.35–0.73)	< 0.001	1	0.5	0.23 (0.02–1.92)	0.13
No	341	102	29.9			7	2.1		
<i>Shop decorated and attractive</i>									
Yes	95	13	13.7	0.45 (0.30–0.88)	0.01	1	1.1	0.66 (0.08–5.35)	0.57
No	443	116	26.2			7	1.6		
<i>Shop with good bathing facilities</i>									
Yes	158	26	16.5	0.52 (0.40–0.88)	0.007	2	1.3	0.78 (0.16–3.85)	0.56
No	373	102	27.3			6	1.6		
<i>Shop with adequate sink for washing hands and face</i>									
Yes	160	26	16.3	0.60 (0.40–0.89)	0.008	1	0.6	0.39 (0.04–3.21)	0.32
No	375	101	26.9			6	1.6		

^aChi-squared test; ^bFisher test/corrected Yates.

RR = relative risk; CI = confidence interval; – = undefined.

age and were not statistically significant in the multivariate model. Interestingly, in our study, being in a current heterosexual relationship was protective against HBV, perhaps because this group largely consisted of married men at low risk of sexual acquisition of HBV. Risk factors for HCV included, not surprisingly, drug use, history of surgery and older age.

One key goal of the present study was to assess knowledge about hepatitis and its mode of transmission. Our study suggests that traditional barbers and their clients in Morocco are unfamiliar with HBV and HCV and are mostly unaware of the transmission of blood-borne pathogens through shaving tools. Since the majority of infections with HBV or HCV are asymptomatic, this is

not a surprising finding. Asymptomatic carriage, however, brings a high risk of primary liver cancer and chronic active hepatitis, which can progress to cirrhosis or death [21,22]. Increased awareness of the risks of unsterile facial shaving practices would help both barbers and their customers avoid this unnecessary but potentially life-threatening risk.

Table 4 Potential risk factors for hepatitis B virus (HBV) infection among barbers and clients (combined data, *n* = 796)

Variable	HBV positive		OR ^a (95% CI) ^a	P-value ^a
	No. of cases	% by risk category		
<i>Age (years)</i>				
15–29	40	16.3	1.00	< 0.001 ^b
30–44	53	24.7	1.68 (1.04–2.74)	
45–70	110	35.1	2.79 (1.82–4.30)	
<i>Level of education</i>				
University	4	30.8	0.74 (0.62–0.69)	0.002
Secondary	40	18.0		
Primary	37	25.5		
No education	123	3.7		
<i>Area of residence</i>				
Urban	37	42.0	1.22 (0.97–1.53)	0.087
Suburban	52	20.7		
Rural	115	26.0		
<i>Marital status</i>				
Unmarried or divorced	50	19.6	1.72 (1.19–2.47)	0.003
Married	153	29.5		
<i>Smoking</i>				
Yes	94	24.1	0.81 (0.59–1.12)	0.20
No	113	28.0		
<i>Alcohol use</i>				
Yes	48	22.2	0.75 (0.52–1.08)	0.12
No	157	27.7		
<i>Drug use</i>				
Yes	17	18.3	0.61 (0.35–1.06)	0.08
No	181	26.8		
<i>History of blood transfusion</i>				
Yes	56	32.6	1.46 (1.01–2.12)	0.04
No	147	24.7		
<i>Used traditional healer</i>				
Yes	47	30.7	1.35 (0.92–2.00)	0.12
No	144	24.7		
<i>History of past surgery</i>				
Yes	73	29.2	1.28 (0.91–1.79)	0.15
No	29	24.4		
<i>History of dental procedure</i>				
Yes	123	25.8	0.99 (0.71–1.38)	0.95
No	74	26.0		
<i>Current heterosexual relationship</i>				
Yes	80	19.8	0.54 (0.39–0.76)	< 0.001
No	106	31.1		
<i>Symptoms of liver disease</i>				
Yes	28	36.8	1.76 (1.07–2.90)	0.025
No	170	24.9		

^aLogistic regression analysis (global model); ^bChi-squared test for linear trend.
OR = odds ratio; CI = confidence interval.

Table 5 Potential risk factors for hepatitis C virus (HCV) infection among barbers and clients (combined data, $n = 796$)

Variable	HCV positive		RR ^a (95% CI) ^a	P-value ^b
	No. of cases	% by risk category		
<i>Age (years)</i>				
15–29	1	0.4	1.00	0.002 ^c
30–44	1	0.5	1.14 (0.07–18.2)	
45–70	8	2.6	6.29 (0.79–49.9)	
<i>Level of education</i>				
University	0	0.0	1.00	0.03 ^c
Secondary	0	0.0	–	
Primary	2	1.4	–	
No education	8	2.0	–	
<i>Area of residence</i>				
Urban	0	0.0	1.00	0.15 ^c
Suburban	2	0.8	–	
Rural	7	1.6	–	
<i>Marital status</i>				
Unmarried or divorced	2	0.8	1.73 (0.36–8.40)	0.49
Married	7	1.4		
<i>Monthly income</i>				
< US\$ 150	8	1.4	–	0.95
≥ US\$ 150	0	0.0		
<i>Smoking</i>				
Yes	5	1.3	1.03 (0.29–3.59)	0.95
No	5	1.2		
<i>Drink alcohol</i>				
Yes	1	0.5	0.29 (0.03–2.29)	0.24
No	9	1.6		
<i>Drug use</i>				
Yes	3	3.2	3.71 (0.92–15.1)	0.06
No	6	0.9		
<i>History of transfusion</i>				
Yes	1	0.6	0.49 (0.06–4.00)	0.50
No	7	1.2		
<i>Traditional healer</i>				
Yes	2	1.3	0.95 (0.20–4.54)	0.73
No	8	1.4		
<i>History of surgery</i>				
Yes	6	2.4	3.22 (0.90–12.5)	0.07
No	4	0.8		
<i>History of dental procedure</i>				
Yes	5	1.0	0.59 (0.17–2.07)	0.41
No	5	1.8		
<i>Current heterosexual relationship</i>				
Yes	3	0.7	0.49 (0.11–2.09)	0.34
No	5	1.5		
<i>Symptoms of liver disease</i>				
Yes	3	3.9	3.97 (1.01–15.7)	0.049
No	7	1.0		

^aChi-squared test; ^bFisher test/corrected Yates; ^cChi-squared test for linear trend
RR = relative risk; CI = confidence interval; – = undefined.

Facial shaving from barbers has been repeatedly documented as a risk factor for transmission of HBV and HCV in various countries and is well known to cause abrasions and small cuts [23]. When it is done with unsterilized instruments, such as razors or scissors, it can spread bloodborne pathogens [7,24]. According to the observed practices in our study, barbers changed blades for each client. However, barbers had a poor understanding of the processes necessary for complete sterilization of used instruments. Thus, if new blades are not consistently used, as may be the case when barbers are not being observed by a research team, the risk of contamination is still present. Consequently, using alum for disinfecting skin cuts further increases shaving safety. This study also showed that there was a significant association between a lower risk of viral hepatitis and the neatness and cleanliness of the barbershop, as has been demonstrated in other studies [16,25]. These shop characteristics may be markers for overall attention to

cleanliness and sterility that extends to shaving instruments and practices.

Our study had several limitations. We were unable to do a multivariable logistic regression for risk factors for HCV because of the small number of cases. Given the low prevalence of hepatitis C in Morocco, a case-control study may be a good way to look at risk factors for HCV, as has been done by investigators in other settings [7]. Also, barbers may change their behaviour when they know a researcher is watching, so changing blades before each client may be less than 100% in real practice conditions.

In conclusion, current or past infection with HBV (and less commonly HCV) is frequent among barbers and their clients in Morocco, particularly among those over 45 years of age. Despite this, few people were aware of the risk posed by unsafe shaving practices. For these reasons, awareness campaigns are imperative and should be focused on both barbers and the general population. Because barbers are sometimes engaged in other traditional practices

such as circumcision, dentistry and bloodletting, educating barbers about the health risks of HBV and HCV and strategies for minimizing risk of transmission of bloodborne pathogens can help reduce transmission of HBV and HCV both inside and outside the barber shop.

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References

1. *Hepatitis C. Fact sheet no. 164*. Geneva, World Health Organization, 2000 (<https://apps.who.int/inf-fs/en/fact164.html>, accessed 23 October 2011).
2. *Hepatitis B. Fact sheet no. 204*. Geneva, World Health Organization, 2000 (<https://apps.who.int/inf-fs/en/fact204.html>, accessed 23 October 2011).
3. Lee W. Hepatitis B virus infection. *New England Journal of Medicine*, 1997, 337:1733-1745.
4. Zuckerman JN, Zuckerman AJ. Current topics in hepatitis B. *Journal of Infection*, 2000, 41:130-136.
5. Gitlin N. Hepatitis B: diagnosis, prevention and treatment. *Clinical Chemistry*, 1997, 43:1500-1506.
6. Junjua NZ et al. Health care risk factors among women and personal behaviours among men explain the high prevalence of hepatitis C virus infection in Karachi, Pakistan. *Journal of Viral Hepatitis*, 2009, 17(5):317-326.
7. Makheja KD, Abro AH, Kumar S. Sero-prevalence of hepatitis C antibodies in the people visiting roadside barbers. *Pakistan Journal of Medical Sciences*, 2010, 26:402-406.
8. Nuchprayoon T, Chumnijarakij T. Risk factors for hepatitis B carrier status among blood donors of the National Blood Center, Thai Red Cross Society. *Southeast Asian Journal of Tropical Medicine and Public Health*, 1992, 23:246-253.
9. Paez Jimenez A et al. Community transmission of hepatitis B virus in Egypt: results from a case-control study in Greater Cairo. *International Journal of Epidemiology*, 2009, 38:757-765.
10. Qureshi H et al. Determination of risk factors for hepatitis B and C in male patients suffering from chronic hepatitis. *BMC Research Notes*, 2009, 2:212.
11. Shalaby S et al. Hepatitis B and C viral infection: prevalence, knowledge, attitude and practice among barbers and clients in Gharbia governorate, Egypt. *Eastern Mediterranean Health Journal*, 2010, 16(1):10-17.
12. Thakral B et al. Prevalence and significance of hepatitis C virus (HCV) seropositivity in blood donors. *Indian Journal of Medical Research*, 2006, 124:431-438.
13. Boutayeb H, Aamoum A, Benchemsi N. [Knowledge about hepatitis B and C viruses and HIV among blood donors in Casablanca.] Connaissances sur les virus des hépatites B et C et le VIH chez des donneurs de sang à Casablanca. *Eastern Mediterranean Health Journal*, 2006, 12(5):538-547.
14. Zahraoui-Mehadji M et al. Infectious risks associated with blood exposure for traditional barbers and their customers in Morocco. *Santé (Montrouge, France)*, 2004, 14:211-216.
15. She SL et al. A seroepidemiologic study of hepatitis B virus infection among barbers in Huangshi city, Hubei, China. *Microbiology and Immunology*, 1988, 32:229-233.
16. Tummenelli F et al. Shaving as potential source of hepatitis C virus infection [letter]. *Lancet*, 1995, 327:658.
17. Candan F et al. Prevalence of hepatitis B and C virus infection in barbers in the Sivas region of Turkey. *Occupational Medicine (Oxford, England)*, 2002, 52:31-34.

18. Mariano A et al. Role of beauty treatment in the spread of parenterally transmitted hepatitis viruses in Italy. *Journal of Medical Virology*, 2004, 74:216–220.
19. Sawayama Y et al. Hepatitis C virus infection in institutionalized psychiatric patients: possible role of transmission by razor sharing. *Digestive Diseases and Sciences*, 2000, 45:351–356.
20. Janjua NZ, Nizamy MA. Knowledge and practices of barbers about hepatitis B and C transmission in Rawalpindi and Islamabad. *Journal of the Pakistan Medical Association*, 2004, 54:116–119.
21. Esteban JI et al. Molecular biology, pathogenesis, epidemiology, clinical features, and prevention. *Progress in Liver Diseases*, 1992, 10:253–282.
22. Francisci D et al. Risk factors for acute parentally transmitted viral hepatitis: a 20 year study. *European Journal of Epidemiology*, 1993, 9:625–628.
23. Shapiro CN. Transmission of hepatitis viruses. *Annals of Internal Medicine*, 1994, 120:82–84.
24. Khaliq AA, Smego RA. Barber shaving and blood-borne disease transmission in developing countries. *South African Medical Journal*, 2005, 95:94–96.
25. Mele A et al. Beauty treatments and risk of parenterally transmitted hepatitis. Results from the hepatitis surveillance system in Italy. *Scandinavian Journal of Infectious Diseases*, 1995, 27:441–444.

Hepatitis B and C key facts

Hepatitis B

Hepatitis B is a liver disease caused by the hepatitis B virus (HBV).

HBV is transmitted through contact with the blood or other body fluids (i.e. semen and vaginal fluid) of an infected person, by for example unsafe injection practices, blood transfusions and sexual contact.

Hepatitis B is not spread through food or water or by casual contact with an infected person.

About 2 billion people worldwide have been infected with HBV and about 350 million live with chronic infection. Around 600 000 people die each year due to the consequences of hepatitis B.

Chronic hepatitis B can be treated with drugs, including interferon and anti-viral medications.

Hepatitis B is preventable with a safe and effective vaccine.

Hepatitis C

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV).

HBC is most commonly transmitted through exposure to infectious blood. It can be transmitted through sex with an infected person and sharing personal items contaminated with infectious blood.

Hepatitis C is not spread through food or water or by casual contact with an infected person.

About 130–170 million people worldwide are chronically infected with HCV, and more than 350 000 people die from hepatitis C-related liver diseases each year.

HCV infection is curable using increasingly effective antiviral medications.

There is currently no vaccine to prevent hepatitis C virus infection.

Source: WHO Fact sheets No. 204 and No. 164

Leprosy elimination campaign in Qazvin province, Islamic Republic of Iran (2006–07)

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حملة التخلص من الجذام في مقاطعة قزوین في جمهورية إيران الإسلامية (2006-2007)

رضا قاسمي برقي، بهزاد بیجانی، علی اصغر بهلوان

الخلاصة: تتمثل استراتيجية التخلص من الجذام في المعالجة بالأدوية المتعددة، وفي حملات التخلص من الجذام. وقد سجل الباحثون نتائج حملة التخلص من الجذام التي أجريت في عام 2006 في مقاطعة قزوین. وتم فحص إجمالي 1987 شخصاً للكشف عن حالات الجذام الجديدة (1379 من المخالطين في الأسر لـ 319 من المرضى المسجلين المصابين بالجذام، و608 من أشخاص في ثلاث قرى يتوطن فيها المرض وانتشار الجذام فيها مرتفع). وقد أعطيت جميع الحالات الجديدة علاجاً متعدد الأدوية، وروجعت حالتهم بعد عام. كان هناك 256 حالة مشتبه في إصابتها بالجذام، ثلاثة عشر حالة منها تأكدت إصابتها واعتبرت حالات جديدة (منها سبع حالات صُنفت على أنها كثيرة العَصَوِيَّات). ولم يُكشَف أيُّ تشوُّه مرئي، ولم يكن عمر أيٍّ من المرضى أقل من 20 سنة. وقد أكمل جميع المرضى المقرر العلاج الموصى به بالأدوية المتعددة. وتدل قلة الحالات المكتشفة في المناطق ذات الانتشار المنخفض، على أن الأسلوب الطويل الأمد لخدمات الجذام المتكاملة ومعالجة الإعاقات يمكن أن يكون أنسب من حملة التخلص من الجذام، كاستراتيجية للتخلص من الجذام.

ABSTRACT Multi-drug therapy (MDT) and Leprosy Elimination Campaigns (LEC) are the major strategies for eliminating leprosy. We report the results of a LEC conducted in 2006 in Qazvin. A total of 1987 individuals (1379 household contacts of 319 registered leprosy patients and 608 people from 3 endemic villages with a high prevalence of leprosy) were examined for detection of new cases of leprosy. All new cases were given MDT and were reviewed after a year. There were 256 suspected cases of leprosy, 13 of whom were confirmed as new cases (7 were classified as multibacillary leprosy). None had visible deformity nor was < 20 years old. All patients completed the recommended MDT course. The few cases detected suggest that in low prevalence areas, a long-term approach of integrated leprosy services and disability management may be more appropriate than LEC as a leprosy elimination strategy.

Campagne pour l'élimination de la lèpre dans la province de Qazvin de 2006 à 2007 (République islamique d'Iran)

RÉSUMÉ La polychimiothérapie et les campagnes d'élimination de la lèpre sont des stratégies importantes pour vaincre la maladie. Nous présentons les résultats de la campagne d'élimination de la lèpre conduite en 2006 dans la province de Qazvin. Au total, 1987 personnes (1379 contacts issus du même foyer que les 319 patients enregistrés comme atteints de la lèpre et 608 personnes provenant de trois villages endémiques à forte prévalence) ont été examinées à des fins de dépistage de nouveaux cas de lèpre. Tous les nouveaux cas ont reçu une polychimiothérapie, puis ont été réexaminés après un an. Au cours de ce suivi, 256 cas suspects de lèpre ont été détectés, et 13 d'entre eux étaient des nouveaux cas confirmés (7 ont été classés comme des cas de lèpre multibacillaire). Aucun d'entre eux n'était porteur d'une déformation visible, ni âgé de moins de 20 ans. Tous les patients ont suivi le traitement de polychimiothérapie recommandé jusqu'à son terme. Le nombre réduit de cas détectés laisse à penser que dans les zones de faible prévalence, une approche sur le long terme comprenant des services de lutte antilépreuse intégrés et de prise en charge de l'incapacité serait une stratégie plus appropriée qu'une campagne d'élimination de la lèpre.

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Introduction

In 2004, data from 114 countries indicated that 407 791 new cases of leprosy were detected, and globally there were altogether 286 063 cases at the beginning of 2005 [1]. Approximately 2 to 3 million people are currently affected by active leprosy infection or post-infection sequelae worldwide [2].

Elimination of leprosy (reducing the prevalence of leprosy to less than 1 leprosy case per 10 000 population) is the goal of the World Health Organization (WHO) [3]. By reducing the prevalence of leprosy to this level, it is expected that the transmission of *Mycobacterium leprae* will be interrupted leading to a gradual disappearance of the disease, although a number of authorities are less optimistic about such a hypothesis [4]. An alternative paradigm to controlling of leprosy that has been proposed is to live with leprosy while rendering it harmless [4].

The current approach to elimination of leprosy as a public health problem relies primarily on detection of patients with untreated hidden leprosy and treating sufferers with a multi-drug therapy (MDT) protocol. The WHO leprosy control programme is reported to have successfully accelerated the percentage of patients with leprosy who are receiving anti-leprosy drugs, which has resulted in a reduction in the prevalence of the disease worldwide [5].

In 1995, the WHO introduced a new initiative, Leprosy Elimination Campaign (LEC), which aims to detect and treat patients with hidden leprosy [6]. A review of LECs in 24 countries in 1999 showed that > 500 000 new cases of leprosy were detected by LECs [6]. LECs also succeeded in promoting community awareness, reducing stigma and improving the accessibility of MDT and the skills of general health workers for diagnosis and treatment, especially in areas with poor care services [6]. After elimination of leprosy at the global

level, the next challenge is to eliminate the disease at the national and district levels from every single country in the world [6].

The province of Qazvin is situated in north of the Islamic Republic of Iran in the southern part of the Alborz Mountains. It has a population of around 1 140 000 (2006 census) living in 20 cities with 4 major cities comprising 18 sections, 44 rural districts and 1543 villages. The national health services network in Qazvin province includes 289 rural health houses and 83 rural and urban health centres [7].

Leprosy control activities in the Islamic Republic of Iran began in 1958. This started in Qazvin through administration of dapsone monotherapy followed by the introduction of MDT in 1989 for treatment of leprosy. The prevalence of leprosy in the country in 2008 was calculated at 0.008 per 10 000 population and Qazvin was one of the 3 provinces with a high detection rate [8].

The main purpose of this study was to identify whether the performance of a LEC had the potential to increase the detection of hidden cases in an endemic area compared to routine leprosy case detection activities.

Methods

This campaign was carried out between 1 March 2006 and 30 June 2006. The names and addresses of all patients with leprosy registered during 1958–2005 were obtained from the Qazvin Health Center (QHC) records (319 patients). The household contacts of the 319 cases were traced; there were 2871 contacts of whom 1379 were available. The 1379 household contacts together with 608 individuals from 3 endemic villages with a high prevalence for leprosy were examined by an expert team consisting of a general practitioner qualified in leprosy and a health technician qualified in both the clinical and laboratory

aspects of leprosy with about 30 years of experiences.

All suspected cases were referred to the Infectious Diseases Ward, Bou-Ali General Hospital, Qazvin University of Medical Sciences and re-examined by a monitoring team (an infectious diseases specialist and a dermatologist). Suspicion of a case was based on observation of cutaneous manifestations (either with hypo- or hyperpigmented lesions). Cutaneous smears were taken from suspected individuals. Following acid fast staining, all smears were studied by an experienced microbiologist. Confirmed diagnosis was based on the Iranian Ministry of Health and Education guide, which was based on the WHO guide [9].

The cases with a confirmed diagnosis of leprosy were treated with MDT immediately. Duration of the treatment was according to WHO MDT guidelines [9].

Clinical examination of all the patients treated with MDT was carried out a year after LEC to assess the outcome of therapy.

Results

There were 258 suspected cases, of whom 13 were confirmed as new cases with 7 of the 13 classified as multi-bacillary (MB). None of the new cases was under 20 years of age or showed any visible deformities, all grade 0 (Table 1).

The reasons these 13 individuals were considered new cases of leprosy were: a) none of them had a history of anti-leprosy treatment (occurrence of relapse), and b) none of them had grade 2 disability (Table 1).

The incidence of leprosy in the Qazvin in 2005 was 0.03/10 000 population. During the LEC, 319 registered leprosy cases were found from 1958 to 2005. The incidence after the study at the end of the year 2006 was 1.1/10 000 population.

Table 1 Distribution of the new leprosy cases detected through the leprosy elimination campaign by age and disability grade

Variable	New cases (No.)
Age (years)	
0–10	0
11–20	0
21–30	3
31–40	3
41–50	2
51–60	1
> 60	4
Disability grade	
0	13
1	0
2	0
Total	13

All 13 patients confirmed with leprosy completed the recommended course of MDT (6 months for paucibacillary leprosy and 12 months for multibacillary leprosy according to the treatment guidelines of the National Leprosy Programme) with no need for further treatment [9].

The 13 patients after the completion of the anti-leprosy therapy, as with other leprosy patients, entered a support system including a state-run medical follow-up division and a social and economic advocacy facility, which gives support for leprosy patients through a

charity foundation and also direct government financial aid.

Discussion

We found 13 new cases of leprosy in LEC, which is a considerable increase (4 in 2005 against 13 in 2006). Hence, this demonstrates the potential of LEC in detecting the hidden cases and indicates that LEC is a valuable strategic procedure for detecting hidden cases of leprosy in endemic area and also for household contacts. Despite

the large increase in case detection, the prevalence of leprosy in Qazvin province is lower than the limit defined by WHO (1/10 000) [3]. We failed to trace around 50% of the contacts of the leprosy cases and this represents a limitation of our study as and we may have missed other cases.

Some experts suggest that BCG vaccination plays a role in preventing leprosy [10,11]. All neonates in this region receive BCG vaccination at the time of birth and because of the widespread distribution of primary health care (PHC) centres, the coverage of BCG vaccination has been > 99% since 1995. Therefore if BCG does play a role, this may explain the low number of cases in this area.

The main goal of the world leprosy programme is the elimination of leprosy at the global, national and district levels. Although some hypotheses indicate the possibility of infectious sources as well as patients [12], leprosy elimination is possible and the global strategy for this achievement is to detect and treat hidden cases of leprosy by MDT. MDT has been made available by WHO free of charge to all patients worldwide since 1995 and provides a simple yet highly effective cure for all types of leprosy [13]. Currently, MDT and LECs in high prevalence areas are considered the 2 major strategies for controlling and eliminating leprosy.

In a LEC programme in Nigeria during an 8-week case finding period in 1998, 323 new cases were detected, 24 of whom (6.8%) were children, 236 (67%) were multibacillary and 64 (18%) had visible deformities [6]. Follow-up of patients placed on MDT in December 1999 revealed cure rates of 97% for paucibacillary leprosy and 96% for multibacillary leprosy. The authors concluded that LEC is cost-effective especially because it could be performed in a short period of time and utilized continuous media campaign to ensure that everyone learns about the signs of leprosy and its cure [6].

Table 2 Annual leprosy case detection in Qazvin province, 1996–2008

Year	New leprosy cases (No.)
1996	5
1997	7
1998	5
1999	12
2000	6
2001	14
2002	7
2003	6
2004	6
2005	4
2006	13
2007	3
2008	4

Table 3 Annual leprosy control indicators in Qazvin province, 1996-2008

Indicator	Year										
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Disability grade 2 (No.)	1	1	0	0	0	0	0	0	1	1	0
Proportion children ^a (%)	17	28	0	8	0	0	0	0	0	0	0

^aUp to 20 years.

Similarly, in a modified LEC in the state of Orissa in India in 1998, 28.9 million people were examined and 62 804 cases of leprosy were confirmed by experienced observers [14]. The total number of new cases detected and put on MDT treatment during only 7 days was approximately equal to that of a routine population survey by the leprosy services that would be recorded over a period of 2 years. In the 5 months following the completion of the campaign, the voluntary reporting rate increased from 50% to 90% [14].

In another LEC in 15 endemic areas of Amazonas state in Brazil in 1997, only 40 new cases were found. Compared to results in other states of Brazil, this number was low, possibly due to the development of health education activities and regular community services in the states of Amazonas [15].

In Table 2, the annual detected cases of leprosy found in the province of Qazvin (1996-2008) are shown. During this 13-year period, although 2 LECs were carried out throughout the province (2001 and 2006), there was no marked increase in the number of new leprosy cases found. Hence, it seems that in low prevalence areas such as Qazvin, LEC is not the most appropriate case-finding strategy.

All new cases detected in our LEC were over 20 years old. The absence of any patient < 20 years in our study as well as the absence of any patients with grade 2 disability or higher (Tables 1 & 3) suggest that transmission of *M. leprae* in Qazvin is under control and those with current leprosy are people who were infected many years ago. This indicates that the leprosy elimination programme in this province has been successful over the past 2 decades (Tables 2 & 3). A report by WHO indicated that at the end of 2005, 9.25% of new cases in African regions and 8.2% in American regions were under 15 years of age [16,17].

Although some authors believe that the disease is too complex to be eliminated by simple elimination programmes [18], we believe that the goal of elimination of leprosy is achievable and the key element is the integration of leprosy services into general health services in countries with a low prevalence. In the meantime, the performance of occasional LEC in

endemic areas and among household contacts could increase the detection rate. Hence, the follow-up of household contacts and the residents in endemic areas through LEC activities by the health system is recommended.

In the post-elimination situation, WHO recommends a new strategy – WHO Global Strategy 2006-2010 for Control of Leprosy. In addition to case detection and MDT, the new strategy emphasizes the prevention of leprosy-related disabilities and rehabilitation through shifting from a campaign-oriented elimination strategy toward a long-term approach of sustaining integrated quality leprosy services, disability management, reduction of stigma and discrimination through increased advocacy. The recently published global strategy has included new indicators for monitoring and evaluation of leprosy control activities, such as newly detected patients with grade 2 disability, treatment completion rate, and proportion of children among new cases [19].

Conclusion

LEC is considered to be of major importance in the elimination of leprosy, particularly in areas with a high prevalence of the disease. However, in low prevalence regions, it may not be the most appropriate and cost-effective approach. Instead, in such areas, efforts should be shifted from a campaign-oriented strategy to long-term comprehensive and supportive (both medical and economic) services.

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References

1. *Report of the seventh meeting of the WHO Technical Advisory Group on the Elimination of Leprosy (TAG)*. New Delhi, World Health Organization Regional Office for South-East Asia, 2005 (<http://www.who.int/lep/resources/TAG7RPT.pdf>, accessed 31 October 2011).
2. Kwan-Gett TSC, Kemp C, Kovarik C. *Infectious and tropical diseases*. St Louis, Elsevier Scientific, 2005:324.
3. World Health Organization Regional Office for South-East Asia. Leprosy frequently asked questions (<http://www.searo.who.int/en/Section10/Section20/Section2000.htm>, accessed 31 October 2011).
4. Rinaldi A. The global campaign to eliminate leprosy. *PLoS Medicine*, 2005, 2(12):e341.
5. Scollard DM et al. The continuing challenges of leprosy. *Clinical and Microbiology Reviews*, 2006, 19 (2):338–381.
6. Ebenso BE, Tureta SM, Udo So, Treatment outcome and impact of leprosy elimination campaign in Sokoto and Zamfara States, Nigeria. *Leprosy Reviews*, 2001, 72(2):192–198.
7. Iran 2006 Census (http://en.wikipedia.org/wiki/Qazvin_Province, accessed 31 October 2011)
8. ILEP. Leprosy situation, IR Iran – 2008 (http://www.ilep.org.uk/fileadmin/uploads/Country_Pages/Iran/Iran_01.pdf, accessed 31 October 2011).
9. *A guide to eliminating leprosy as a public health problem*, 2nd ed. Geneva World health Organization, 1997 [translated into Farsi by the Iranian Ministry of Health as a domestic guideline to eliminate leprosy.
10. Zodpey SP, Ambadekar NN, Thakar A. Effectiveness of Bacillus Calmette Guérin (BCG) vaccination in the prevention of leprosy: a population-based case-control study in Yavatmal District, India. *Public Health*, 2005, 119(3):209–216.
11. Cunha SS et al. Neonatal BCG protection against leprosy: a study in Manaus, Brazilian Amazon. *Leprosy Reviews*, 2004, 75(4):357–366.
12. Lockwood DN. Leprosy elimination – a virtual phenomenon or a reality? *British Medical Journal*, 2002, 324(7352):1516–1518.
13. Novartis Foundation For Sustainable Development. Q&A about the Novartis MDT leprosy donation (<http://www.novartisfoundation.org/page/content/index.asp?MenuID=364&ID=1010&Menu=3&Item=43.2.4>, accessed 31 October 2011).
14. Patnik PKB. Modified Leprosy Elimination Campaign (MLEC) in the state of Orissa, India. *Leprosy Reviews*, 1999, 70(4):440–443.
15. Dos S et al. Leprosy elimination campaign, Amazonas-Brazil 1997. *Leprosy Reviews*, 2000, 71(1):77–80.
16. African region: leprosy situation at the end of 2006 (www.who.int/lep/situation/AFROStatsEnd2006.pdf, accessed 31 October 2011).
17. American region: leprosy situation at the end of 2006. www.who.int/entity/lep/situation/AMROStatsEnd2006.pdf, accessed 31 October 2011).
18. Lockwood DNJ, Suneetha S. Leprosy too complex a disease for a simple elimination paradigm. *Bulletin of the World Health Organization*, 2005, 83:230–235.
19. *Global strategy for further reducing the leprosy burden and sustaining leprosy control activities 2006–2010*. Geneva, World Health Organization, 2005.

Presence of *Helicobacter* spp. DNA in the gallbladder of Egyptian patients with gallstone diseases

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وجود دنا أنواع الملوّيات في مرارة المرضى المصريين المصابين بأمراض الحصاة الصفراوية عبر غزال، نهى الصباغ، محمد الرويني

الخلاصة: لقد أظهرت التقارير الأولية عن اكتشاف دنا الملوّيات في أنسجة المرارة في المرضى بأمراض الطرّق الصفراوية نتائج غير متسقة. وتهدف هذه الدراسة إلى اكتشاف وجود الملوّية البوابية في حصى المرارة، وأنسجة المرارة، وعينات الصفراء من الأشخاص المصابين بالتهاب المعدة بالملوّية البوابية المصحوب بالتّحصى الصفراوي. وقد تأكد وجود الملوّية البوابية في خزعات غار المعدة عن طريق اختبار اليورياز السريع أو الفحص الهستوباثولوجي أو كليهما. وجرى استخلاص الدنا من عينات المرارة، والصفراء، وحصى المرارة من 50 مريضاً أُجريَ لهم استئصال المرارة. وجرى تحديد وجود الدنا الخاص بجنس الملوّية (الجينات 16S rRNA) بواسطة مقايضة التفاعل السلسلي للبوليميراز. واكتشف دنا الملوّية في 28% من أنسجة المرارة، وفي 18% من الصفراء في المرضى، ولكنه لم يكتشف في أيّ من حصيات المرارة. وهذه النتائج لا تستبعد احتمال أن تكون العدوى بالملوّية عاملاً مساهماً أو مساعداً في تكوّن الأمراض الصفراوية.

ABSTRACT Earlier reports on the detection of *Helicobacter* DNA in the gallbladder tissue of patients with biliary diseases have shown discordant results. This study aimed to detect the presence of *Helicobacter* in gallstone, gallbladder tissue and bile specimens from subjects with *H. pylori*-positive gastritis with cholelithiasis. The presence of *H. pylori* in antrum biopsies was confirmed by rapid urease test and/or histopathological examination. DNA was extracted from gallbladder, bile and gallstone samples from 50 patients undergoing cholecystectomy. The presence of *Helicobacter* genus-specific DNA (16S rRNA genes) was determined by nested polymerase chain reaction assay. *Helicobacter* DNA was detected in the gallbladder tissue and bile of 28% and 18% respectively of the patients, but was not detected in any of the gallstones. These results do not rule out the possibility of *Helicobacter* infection as a contributing agent or cofactor in the development of biliary diseases.

Présence d'ADN d'*Helicobacter* spp. dans la vésicule biliaire de patients égyptiens porteurs de calculs biliaires

RÉSUMÉ De précédentes études sur la détection d'ADN d'*Helicobacter* dans les tissus de la vésicule biliaire de patients porteurs de calculs ont produit des résultats discordants. L'étude visait à détecter la présence d'*Helicobacter* dans les échantillons de calcul, de tissu de la vésicule biliaire et de bile prélevés chez des sujets atteints d'une gastrite à *H. pylori* associée à une lithiase biliaire. La présence d'*H. pylori* dans les biopsies de l'antrum a été confirmée par un test rapide à l'uréase et/ou un examen histopathologique. L'ADN a été extrait des échantillons de tissus de la vésicule, de bile et de calculs prélevés chez 50 patients ayant subi une cholécystectomie. La présence de l'ADN spécifique du genre *Helicobacter* (gènes codant l'ARN ribosomique 16S) a été déterminée au moyen de l'amplification en chaîne par polymérase nichée. L'ADN d'*Helicobacter* a été détecté dans les tissus de la vésicule biliaire et dans la bile de 28 % et 18 % respectivement des patients, mais n'était présente dans aucun des calculs. Ces résultats ne permettent pas d'éliminer la possibilité d'une infection à *Helicobacter* comme agent favorisant l'apparition des maladies biliaires ou comme cofacteur de leur développement.

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Introduction

The rediscovery of the bacterium in the stomach by histological examination of gastric biopsies and its first isolation by Warren and Marshall in 1983 led to new approaches to the management of various gastroduodenal disorders [1]. Its relevance to human disease, specifically to peptic ulcer disease, gastritis and gastric malignancy, is indisputable [2]. *H. pylori* infection has also now been implicated as a risk factor for various extraintestinal diseases and *Helicobacter* species have been suggested as a cause of hepatobiliary diseases in some animals [3].

Figura et al. proposed that *H. pylori* present in human bile samples might represent a risk factor for gallstone formation [4]. These reports stimulated interest as to whether these organisms colonize the biliary tract of humans and cause hepatobiliary diseases. The evidence, however, concerning the presence of *Helicobacter* DNA in the bile and biliary tissue of human beings with biliary diseases is controversial [5–8]. In some studies, the presence of intestinal *Helicobacter* spp. or *H. pylori* DNA was detected in bile and or gallbladder tissue from patients with benign or malignant biliary diseases [9]. In contrast, other authors did not detect any *Helicobacter* DNA in the biliary trees of patients with the same diseases [10]. The role of *Helicobacter* in the pathogenesis of gallbladder disease in humans, or even its presence in gallbladder tissue, therefore remains unclear. The objective of this study was to investigate the presence of *Helicobacter* in the gallbladder, bile and gallstones of a group of Egyptian patients with *H. pylori*-positive gastritis with cholelithiasis who had undergone cholecystectomy.

Methods

Patients

A total of 50 patients with gallbladder stones admitted to University of Alexandria main hospital for cholecystectomy

during the period November 2008 to June 2010 were included in this study. All patients were off any antiulcer therapy and antimicrobial drugs for at least 2 weeks before enrolment in the study. Patients with chronic pancreatitis, inflammatory bowel disease, liver cirrhosis, underlying malignancy or familial hypercholesterolaemia were excluded from the study. The study was approved by the ethics committee of each institution, and informed consent was obtained from all patients.

Data collection

Clinical studies

All patients received diagnostic upper gastrointestinal endoscopy and gastric biopsies were taken to confirm the bacterial etiology of the gastritis. Two biopsies were taken from the antrum to detect *H. pylori*, one for the rapid urease test [11] and the other for histopathological examination. Biopsies for histology were immediately fixed in 10% buffered formalin. The samples were then embedded in paraffin wax and histological sections were stained with haematoxylin and eosin for histological analysis.

Molecular studies

Gallbladder tissue specimens, gallstone and bile samples were obtained from each patient after cholecystectomy. The samples were immediately frozen at -20°C for DNA extraction.

Extraction from gallstones [12]: DNA was extracted with a QIAamp DNA mini kit (Qiagen) according to the manufacturer's recommendations, with minor modifications. After washing with phosphate-buffered saline, each gallstone was cut into small pieces by scraping into a clean culture dish. Then 25–30 mg was put in 1.5 mL Eppendorf tubes and 200 μL sterile digestive buffer [20 mM Tris-HCl, EDTA- Na_2 (pH 8.0), 2 mM; 1.2% Triton X100], was added to each tube. The content of the tubes was homogenized using a sterile plastic syringe, then 7 μL

lysozyme (50 mg/mL) was added to each tube and incubated at 37°C for 1 h, this was followed by the addition of 200 μL of ATL buffer and 20 μL proteinase K (20 mg/mL) and incubated at 56°C overnight. To each sample, 200 μL of AL buffer were added and the samples were centrifuged at 8000 rpm for 10 min. The supernatant was transferred to a new sterile Eppendorf tube and the pellets were resuspended in 100 μL of AL buffer, vortexed and centrifuged as before. The combined supernatants were incubated at 70°C for 10 min then 300 μL ethanol were added and the samples was applied to the QIAamp spin column in a 2 mL collection tube were processed according to Qiagen protocol. Finally, the DNA was eluted with 50 μL of AE buffer.

Extraction from gallbladder tissue or bile [13]: 25 mg samples of gallbladder mucosa were washed with phosphate-buffered saline and 500 μL samples of refrigerated bile were pelleted by centrifugation for 10 minutes at 14 000 rpm. Gallbladder tissue or bile sediments were then suspended in 180 μL of lysis buffer (ATL buffer) and homogenized by vortexing, and the samples were processed according to Qiagen protocol but the column material was washed twice (250 μL each time) with the first buffer (AW1 buffer) and twice (250 μL each time) with the second washing buffer (AW2 buffer) provided in the kit.

B-PCR amplification

B-PCR amplification was done using *Helicobacter* genus-specific primers [13]. The 16S rRNA gene of the genus *Helicobacter* was amplified by a nested polymerase chain reaction (PCR) assay. The outer primer pair (B37 and C70) was used to generate 16S rRNA amplicons of approximately 1500 bp. The nested inner primer pairs, which are specific for the *Helicobacter* genus, amplified fragments of 400 bp (primer pair C97 and C98). Table 1 shows the

nucleotide sequences of the 4 primers, the PCR conditions, and the size of the amplified fragments. Ten μ L of eluted DNA was used with the outer primer (C70/B37) in the first amplification. In the second round, 5 μ L of the PCR product was added to the reaction mixture using the nested inner primer pairs (C97/C98). PCRs were performed in a total volume of 50 μ L using $2 \times$ PCR master mix (Qiagen) containing 0.05 units/mL of Taq DNA polymerase, PCR buffer, 2 mM $MgCl_2$, 0.2 mM of dNTPs, with 50 pmole of each primer. A negative control was included in the reaction using sterile distilled water instead of DNA to exclude the possibility of contamination. PCR products were analysed by electrophoresis using 1.5% (w/v) agarose gel stained with ethidium bromide. The sizes of the PCR products were estimated by comparison with 100 bp DNA size markers (Fermentas).

Results

A total of 50 patients diagnosed with gastritis presenting with gallbladder

stones to the Alexandria University hospital were enrolled in this study. They were 36 females (72%) and 14 (28%) males with ages ranging from 24–68 years, mean age 42.6 (SD 12.6) years.

Histological examination of antrum tissue specimens showed that 42 (84%) were positive for *H. pylori*, while the rapid urease test gave positive results in 34 (68%) of cases (Table 2). *H. pylori* was confirmed by both tests in 26 (52%) cases. However, the urease test was negative in 16 (32%) cases that were histologically positive for *H. pylori* and the urease test was positive in 8 (16%) cases that were histologically negative for *H. pylori*.

Helicobacter DNA was detected by nested PCR in the gallbladder tissue and bile from 14 (28%) and 9 (18%) patients respectively (Table 3 and Figure 1). PCR was positive in both gallbladder tissue and bile in 6 (12%) patients, while PCR was positive in gallbladder tissue only in 8 (6%) cases and was only positive in bile in 3 (6%) cases. No gallstones (0%) were positive for *Helicobacter* DNA by nested PCR.

Discussion

The presence of *Helicobacter* spp./*H. pylori* DNA in the gallbladder epithelium of patients with cholelithiasis and cholecystitis has been addressed by several investigators. However, the results are conflicting and some investigators have detected the presence of *H. pylori* DNA [13] while others have not [8,14]. Accordingly, whether *H. pylori* participates in the pathogenesis of biliary diseases is a question that remains unresolved. For this reason, the presence of *Helicobacter* DNA in gallbladder tissue, gallstone and bile from 50 patients with cholelithiasis who had undergone cholecystectomy was investigated by nested-PCR assay using the 16S rRNA gene of the genus *Helicobacter*.

In this study, *Helicobacter* DNA was detected in the gallbladder mucosa in 28% of patients with cholelithiasis. This figure agrees with 2 other studies identifying DNA of *Helicobacter* spp. in 22%–27.7% of gallbladder samples [15,16]. While Silva et al. detected *Helicobacter* DNA in gallbladder tissue in 31.3% of their cases, they pointed out the possibility that *H. pylori* had

Table 1 Nucleotide sequences of the 4 primers, the polymerase chain reaction (PCR) conditions and the size of the amplified fragments

Primer [12]	Sequence (5′–3′)	Amplicon size (bp)	PCR programme
<i>Outer primers</i>			
Forward (C70)	AGAGTTTGATYMTGGC	1500	Initial denaturation for 5 min. at 94 °C, followed by 25 cycles of (denaturation at 94 °C for 45 s, annealing at 50 °C for 45 s, with final extension at 72 °C for 3 min.), followed by 1 cycle of final extension at 72 °C for 5 min.
Reverse (B37)	TACGGYTACCTTGTTACGA		
<i>Inner primers</i>			
Forward (C97)	GCTATGACGGGTATCC	400	Initial denaturation for 5 min. at 94 °C, followed by 34 cycles of (denaturation at 94 °C for 1 min., 55 °C for 2 min., with final extension at 72 °C for 3 min.), followed by 1 cycle of final extension at 72 °C for 5 min.
Reverse (C98)	GATTTTACCCCTACACCA		

bp = base pair.

Table 2 Results of histological examination and rapid urease test on antrum tissue specimens in gastritis patients with cholelithiasis (n = 50)

Rapid urease test	Histological examination		Total
	Positive No.	Negative No.	
Positive	26	8	34
Negative	16	0	16
Total	42	8	50

colonized a previously damaged epithelium [13]. In contrast, our rate was much lower than that of Apostolov et al., who reported positive *H. pylori* DNA in the gallbladder tissue of 73% of Ukrainian patients with cholecystitis [17], and it was much higher than Méndez-Sánchez et al., who found a very low incidence (3%) of *Helicobacter* colonization in the gallbladder epithelium of a Mexican population (detected using *Helicobacter*-specific 16S rRNA primers) [8]. Méndez-Sánchez et al. argued that the existence of uncommon *Helicobacter* spp in gallbladder epithelium and its association with gallstone pathogenesis could not be discarded.

Moreover, in our study, *Helicobacter* DNA could be detected in the bile of 18% of patients presenting with gallbladder stones. Similar data was reported by Lee et al., who found *Helicobacter*

DNA in 25% of the bile from patients with gallstones [15]. Still higher rates (42.9% and 96.7%) were reported in the bile of patients diagnosed with various hepatobiliary diseases by other authors [1,13]. Fox et al. reported that bile samples from 56.5% of 23 Chilean patients with chronic cholecystitis were positive for *Helicobacter* spp [7]. These were analysed by DNA sequencing and were found to be bile-resistant hepatic *Helicobacter* spp. (*H. bilis*, *H. pullorum* and *Flexispira rappini*), known to be closely associated with gallbladder cancer. Intestinal *Helicobacter* spp. are bile-resistant, a property that may confer protection against the deleterious effects of bile *in vivo* and allow them to adapt better to the hepatobiliary surroundings [13].

In this study, the presence of *Helicobacter* spp. DNA in gallbladder tissue or

bile could be linked with the presence of *H. pylori* in the antrum. Chen et al. reported that *Helicobacter* spp. DNA are commonly present in the gallbladder of patients with gallstone diseases and in controls, implying that *Helicobacter* infection alone may not play a significant role in the formation of gallstones [18]. However their results did not exclude the possibility of *Helicobacter* infection as a cofactor in the development of gallstones. Also, in a German study no *Helicobacter* spp. were found in bile samples, suggesting that there may be racial and demographic differences in the etiology of gallstones [14].

It has been proposed that the presence of *H. pylori* in bile may represent an increased risk of gallstone formation [4]. A possible consequence of colonization by *Helicobacter* spp. is a chronic inflammation in the gallbladder mucosa. This inflammation may impair gallbladder mucosa acid secretion and acidification of the contents [19], reducing the solubility of calcium salts in gallbladder bile and increasing the risk of their precipitation in the lumen [20]. *Helicobacter* spp. were assessed by PCR in gallstones in several studies. In a study from Sweden, Monstein et al. detected *H. pylori* in 55% of cholesterol gallstones, in addition to other bacteria [12]. In our study, *Helicobacter* could not be detected by PCR in any gallstones. However Farshad et al. reported the presence of *H. pylori* DNA in 18.1% of stone samples and suggested that *H. pylori* infection may serve as an initiating factor or play other important roles in the development of gallstones [21].

The reasons for observed discrepancies in the detection rate of *Helicobacter* among different studies are currently unclear, but differences in PCR sensitivities between laboratories and geographical variations in human exposure to *H. pylori* are 2 possible explanations. These differences reflect the need for prospective studies using accurate tests designed to clarify the clinical role of *Helicobacter*

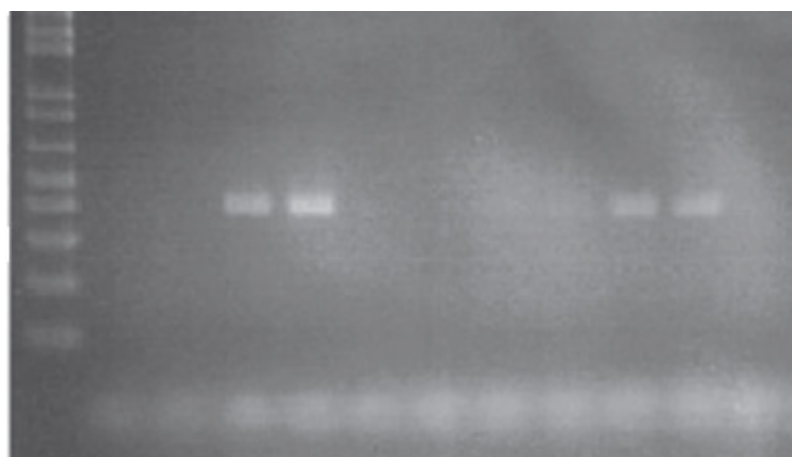


Figure 1 Ethidium bromide stained gel electrophoresis showing polymerase chain reaction products of the 400-bp fragments of the 16S rRNA gene of *Helicobacter* spp. (lanes 4,5,10 and 11). Lane 1 represents 100-bp molecular weight marker, and lane 12 represent reaction negative control

Table 3 Results of polymerase chain reaction (PCR) amplification on gallbladder tissue and bile samples in gastritis patients with cholelithiasis (n = 50)

Bile PCR results	Gallbladder PCR results		Total
	Positive No.	Negative No.	
Positive	6	3	9
Negative	8	33	41
Total	14	36	50

spp. in gallbladder disease. Also, the small number of patients enrolled in all these studies, including ours, may be a factor. Therefore larger patient and

control groups are needed to ascertain whether this microorganism is an innocent bystander or active participant in gallstone formation.

In conclusion, the results of the present study revealed the presence of *Helicobacter* DNA in gallbladder tissue and bile from patients with gallbladder diseases. Further studies are needed to determine whether *Helicobacter* spp. is a causative agent of biliary diseases or a cofactor.

References

1. Tiwari SK et al. *Helicobacter pylori* and other *Helicobacter* species DNA in human bile samples from patients with various hepato-biliary diseases. *World Journal of Gastroenterology*, 2006, 12:2181-2186.
2. Hardin FJ, Wright RA. *Helicobacter pylori*: review and update. *Hospital Physician*, 2002, May:23-31.
3. Ward JM et al. Chronic active hepatitis in mice caused by *Helicobacter hepaticus*. *American Journal of Pathology*, 1994, 145:959-968.
4. Figura N et al. Most *Helicobacter pylori*-infected patients have specific antibodies, and some also have *H. pylori* antigens and genomic material in bile. Is it a risk factor for gallstone formation? *Digestive Diseases and Sciences*, 1998, 43:854-862.
5. Myung SJ et al. Detection of *Helicobacter pylori* DNA in human biliary tree and its association with hepatolithiasis. *Digestive Diseases and Sciences*, 2000, 45:1405-1412.
6. Roosendaal R et al. *Helicobacter* species are not detected by 16SrDNA PCR in bile from Dutch patients with common bile duct stones. *Digestion*, 2002, 66:89-91.
7. Fox JG et al. Hepatic *Helicobacter* species identified in the bile and gallbladder tissue from Chileans with chronic cholecystitis. *Gastroenterology*, 1998, 114:755-763.
8. Mendez-Sanchez N et al. Lack of association between *Helicobacter* sp. colonization and gallstone disease. *Journal of Clinical Gastroenterology*, 2001, 32:138-141.
9. Bulajic M et al. *Helicobacter pylori* and the risk of benign and malignant biliary tract disease. *Cancer*, 2002, 95:1946-1953.
10. Bulajic M et al. Modalities of testing *Helicobacter pylori* in patients with nonmalignant bile duct diseases. *World Journal of Gastroenterology*, 2002, 8:301-304.
11. Malfertheiner P et al. Modified rapid urease test for detection of *Helicobacter pylori* infection. *European Journal of Gastroenterology and Hepatology*, 1996, 8(1):53-56.
12. Jonsson Y, Zdolsek J, Svanvik J. Identification of *Helicobacter pylori* DNA in human cholesterol gallstones. *Scandinavian Journal of Gastroenterology*, 2002, 37:112-119.
13. Silva CP et al. Association of the presence of *Helicobacter* in gallbladder tissue with cholelithiasis and cholecystitis. *Journal of Clinical Microbiology*, 2003, 41:5615-5618.
14. Rudi J et al. *Helicobacter* sp. are not detectable in bile from German patients with biliary disease. *Gastroenterology*, 1999, 116:1016-1017.
15. Lee JW et al. Identification of *Helicobacter pylori* in gallstone, bile, and other hepatobiliary tissues of patients with cholecystitis. *Gut and Liver*, 2010, 4:60-67.
16. Salih BA et al. *Helicobacter pylori* DNA in gallbladder tissue of patients with cholelithiasis and cholecystitis. *Journal of Infection in Developing Countries*, 2009, 3:856-859.
17. Apostolov E et al. *Helicobacter pylori* and other *Helicobacter* species in the gallbladder and liver of patients with chronic cholecystitis detected by immunological and molecular methods. *Scandinavian Journal of Gastroenterology*, 2005, 40:96-102.
18. Chen DF et al. Common presence of *Helicobacter* DNA in the gallbladder of patients with gallstone diseases and controls. *Digestive and Liver Disease*, 2003, 35:237-243.
19. Nilsson B et al. Inflammation reduces mucosal secretion of hydrogen ions and impairs concentrating function and luminal acidification in feline gallbladder. *Scandinavian Journal of Gastroenterology*, 1995, 30:1021-1026.
20. Cetta F et al. *Helicobacter pylori* in the bile could play a facilitating role in the pathogenesis of some types of gallstones [Abstract]. *Gastroenterology*, 2000, 118(Suppl. 2):7a.
21. Farshad SH et al. Identification of *Helicobacter pylori* DNA in Iranian patients with gallstones. *Epidemiology and Infection*, 2004, 132:1185-1189.

Le profil épidémiologique et biologique du cancer du sein à Fès-Boulemane (Maroc)

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المرتسم الوبائي والبيولوجي لسرطان الثدي في فاس - بولمان، المغرب

فؤاد عباس، سناء بنيس، كوثر زناقي، يسرى أقصبي، جوطي خالد عمراني، عمر المصباحي، عفاف عمارتي

الخلاصة: شملت هذه الدراسة الاستيعادية 265 مريضة بسرطان الثدي، واستمرت ثلاثة أعوام (كانون الثاني/يناير 2007 – أيلول/سبتمبر 2009)، ودرس الباحثون فيها المرتسم الوبائي لسرطان الثدي للتعرف على أثر العوامل البيولوجية والتشخيصية على البقاء على قيد الحياة على مدى ثلاثة أعوام، وعلى السمات الوبائية لهذا النمط من السرطان. وأجرى الباحثون تقديراً للاستروجين والبروجستيرون وعوامل النمو البشرية الإنسانية مع التعرف على النسب في ما بينها. ووجد الباحثون أن المريضات كنّ من الشابات (ناصف العمر 45 عاماً). وأن الأورام المُرْتَشَحَة قد وُجِدت في 95.5% منهن. وأن الحجم الوسطي للأورام كبير (2.6 ± 3.6 سم)، وأن 14% من الأورام كانت من الدرجة النسيجية الأولى. أما كبر حجم الأورام وارتفاع الدرجات النسيجية فيها، فقد كانت مستقلة عن عمر المريضات. وقد كان المعدل الإجمالي للبقاء على قيد الحياة بعد 3 سنوات لا يزيد عن 49% في النمط الفرعي السلبي الاستروجين، السلبي البروجستيرون والسلبي لعامل النمو البشري الإنساني، ووصل إلى 75% في النمط الفرعي السلبي الاستروجين، السلبي البروجستيرون، والإيجابي لعامل النمو البشري الإنساني. ويمكن تفسير كل من العمر الشاب، والورم الضخم، والدرجة النسيجية العالية في هذه المجموعة المدروسة بانخفاض مستوى الوعي لدى النساء حول سرطان الثدي.

RÉSUMÉ Dans une étude rétrospective de 265 patientes atteintes d'un cancer du sein étalée sur trois ans (janvier 2007-septembre 2009), nous avons examiné le profil épidémiologique du cancer du sein afin de déterminer l'impact des facteurs pronostiques et biologiques des tumeurs sur la survie globale sur une période de trois ans, et sur l'épidémiologie de ce type de cancer. Les récepteurs œstrogène (RE), progestérone (RP) et facteurs de croissance épidermiques humains (HER2) ont été évalués et le statut RE/RP/HER2 a été déterminé. La population étudiée est jeune (âge médian 45 ans). Les tumeurs infiltrantes sont présentes chez 95,5 % des femmes. La taille moyenne des tumeurs est élevée (3,6 [ET 2,6] cm) et la proportion du grade histologique I est faible (14%). La taille tumorale est importante et le grade histologique est élevé quelle que soit la tranche d'âge des patientes. Le taux de survie globale à trois ans n'est que de 49 % pour le sous-type RE-/RP-/HER2- et de 75 % pour le sous-type RE-/RP-/HER2+, alors qu'il est de 96 % pour le sous-type RE+/RP+/HER2-. L'âge jeune, la taille tumorale importante et le grade histologique élevé qui caractérisent notre population s'expliquent par l'absence de sensibilisation au cancer du sein.

Epidemiological and biologic profile of breast cancer in Fez-Boulemane, Morocco

In a retrospective study of 265 patients with breast cancer over 3 years (January 2007–September 2009) we examined the epidemiological profile of breast cancer to determine the impact of biological and prognostic factors on survival over 3 years and on the epidemiology of this cancer. Estrogen (RE), progesterone (RP) and human epidermal growth factor receptors (HER2) were evaluated and RE/RP/HER2 status determined. The patients were young (median age 45 years). Invasive tumours were found in 95.5% of the women. The average tumour size was big [3.6 (SD 2.6) cm] and only 14% were histological grade I. Large tumour size and high histological grade were independent of patient's age. Overall survival at 3 years was only 49% for the RE-/RP-/HER2- subtype and 75% for the RE-/RP-/HER2+ subtype, while it was 96% for the RE+/RP+/HER2- subtype. The young age, large tumour size and high histological grade in our population suggest a lack of awareness of women about breast cancer.

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Introduction

Le cancer du sein est la première cause de mortalité chez la femme en Europe. C'est un cancer qui touche plus de 37 000 nouveaux cas par an en France et est responsable de plus de 11 000 décès estimés en 2000 [1]. Il est également considéré comme étant le premier cancer de la femme au Maroc avec la particularité d'affecter fréquemment la femme jeune (âge médian de 45 ans), comme cela a été rapporté en Jordanie [2,3]. Ainsi, le Maroc rejoint la plupart des pays occidentaux puisque la fréquence du cancer du sein est en augmentation régulière depuis la dernière décennie, et représente un problème majeur de santé publique. L'âge jeune - moins de 40 ans - est considéré comme l'un des principaux facteurs de mauvais pronostic [1], mais il y a également la taille de la tumeur, le grade histologique de Scarff, Bloom et Richardson (SBR) et l'envahissement ganglionnaire qui sont des facteurs pronostiques péjoratifs et qui orientent la prise en charge thérapeutique. La détermination et l'exploration d'autres facteurs pronostiques et prédictifs de la réponse aux traitements basés sur l'expression des récepteurs des œstrogènes, de la progestérone et de la protéine HER2/neu (statut RE/RP/HER2) favorisent une sélection des patientes en vue du meilleur choix thérapeutique. Les tumeurs positives aux récepteurs hormonaux sont susceptibles de répondre à l'hormonothérapie et cette réponse est associée à un bon pronostic [4-7], alors que l'amplification du gène HER2 dans les tumeurs invasives rend le pronostic mauvais avec une augmentation des récives et une survie diminuée, comme cela a été rapporté dans la littérature [4-8]. Donc la détermination des sous-types biologiques basés sur le statut RE/RP/HER2 serait incontournable puisque ceux-ci s'associent à la durée de survie et

au développement des métastases [9]. Par ailleurs, il a été prouvé que le diagnostic du cancer du sein à un stade précoce du développement assurerait une prise en charge thérapeutique beaucoup plus efficace [10] et moins lourde [11] et permettrait ainsi une amélioration du pronostic global. Grosclaude et al. [12] estimaient la survie à cinq ans à 88 % pour un stade initial T1 (taille tumorale), 74 % à T2, 62 % à T3 et 44 % à T4 [1]. Cependant, cette estimation de survie est réduite en présence d'un grade histologique élevé ou d'un envahissement ganglionnaire [9].

L'objectif de cette étude, réalisée pour la première fois au Maroc, était d'évaluer le profil épidémiologique du cancer du sein dans la région de Fès à travers les patientes recrutées dans le Centre hospitalier universitaire (CHU), puis de déterminer les facteurs cliniques, biologiques et pathologiques qui conditionnaient la survie globale et enfin de montrer l'intérêt de la mise en place d'un programme de dépistage organisé.

Méthodes

C'est une étude rétrospective réalisée sur 265 patientes de la région Nord-Est du Maroc, âgées de 18 à 80 ans et colligées dans le CHU entre janvier 2007 et septembre 2009. Chaque tumeur a été analysée et gradée par un pathologiste du CHU selon le système de Scarff, Bloom et Richardson (SBR) [13,14] puis une étude immunohistochimique (IHC) a été réalisée pour la classification biologique des tumeurs invasives.

Étude immunohistochimique (IHC)

Des coupes de 4 µm sont traitées et incubées avec l'anticorps (RE : clone ER1D5 ; RP : clone PR10A9 [Immunotech]) selon le

protocole de Dako. L'expression des récepteurs hormonaux est évaluée en pourcentage du marquage nucléaire des cellules tumorales et un pourcentage de plus de 10 % est considéré comme positif. L'expression du HER2/neu est évaluée selon le protocole du kit HercepTest® (Dako) et les résultats sont exprimés en score selon les recommandations de l'American Society of Clinical Oncology (ASCO) [15]. Les scores 2 sont validés positifs ou négatifs par la technique d'hybridation in situ par fluorescence (FISH).

Hybridation fluorescente in situ (FISH)

Le protocole Vysis avec le kit Path Vysion HER-2 DNA Probe (Vysis-Abbott) est utilisé dans l'évaluation de l'expression du gène HER2 qui est considéré amplifié si le rapport des signaux de LSI-HER2/CEP-17 est supérieur à 2.

Analyse statistique

Les données issues des dossiers cliniques et des comptes rendus anatomo-pathologiques sont recueillies, puis codées et saisies sur Microsoft Office Excel 2003. L'analyse est réalisée au moyen du logiciel Epi Info version 3.4 sur tous les cancers invasifs.

Les différentes variables sont examinées à l'aide du test χ^2 ou du test Fisher. Le taux de survie globale (OS) a été évalué par la méthode de Kaplan-Meier, et le test log-rank. ($p \leq 0,05$) est une valeur statistiquement significative.

Résultats

L'étude a porté sur 265 patientes recrutées entre janvier 2007 et septembre 2009. L'analyse histologique a révélé que 4,5 % des tumeurs (soit 12 patientes) montrent un carcinome in situ (CIS) et 95,5 % (soit 254 patientes) présentent un carcinome mammaire invasif. L'analyse qui suit

a intéressé uniquement les tumeurs invasives, soit 254 patientes, dont toutes les variables sont notées (âge, taille tumorale, grade histologique et statut RE/RP/HER2).

Cette population provenant de la région Nord-Est du Maroc est caractérisée par un âge jeune, avec un âge médian de 45 ans, et des extrêmes allant de 18 à 80 ans. En outre, 17 % ont moins de 35 ans et 75 % moins de 55 ans.

L'étude histologique a montré que le type histologique prédominant des tumeurs était le carcinome canalaire infiltrant (CCI) dans 87,8 % des cas, suivi du carcinome lobulaire infiltrant (CLI 4,7 %), puis le carcinome métaplasique (2,4 %) et le carcinome médullaire (2 %). Les autres types histologiques étaient plus rares.

La taille tumorale moyenne est de 3,6 (ET 2,6) cm, avec 30 % des tumeurs ayant une taille très importante « T3 ». La proportion des grades histologiques II et III est élevée : elle est de 56,1 %

et 39,4 % respectivement, alors que la proportion du grade histologique I est faible, estimée à 14 %.

L'étude immunohistochimique a révélé que 72 % des tumeurs sont positives aux récepteurs hormonaux avec 54,7 % positives aux RE, 66 % positives aux RP ; 26 % des tumeurs surexpriment la protéine HER2 (score 3), et 8 % ont une expression *douteuse* (score 2). Ces derniers (8 %) sont validés par cytogénétique moléculaire (FISH) et 25 % de ces tumeurs se sont révélées positives.

L'expression des RE augmente avec l'âge, passant de 50 % chez les patientes âgées de 18-40 ans à 65 % chez les patientes âgées de 61-80 ans. Cependant, l'expression des RP reste relativement stable quelle que soit la tranche d'âge des patientes (65 %). La surexpression de la protéine HER2 est estimée à 30 % jusqu'à l'âge de 60 ans, puis elle baisse à 21 % pour la tranche d'âge de 61-80 ans (Figure 1).

La figure 1 montre que, quel que soit l'âge, la proportion des grades SBR II et III est élevée, particulièrement pour les patientes de 18-40 ans chez lesquelles le pourcentage est estimé à 56 % pour SBR II et 29 % pour SBR III. La proportion des tumeurs grade SBR I augmente avec l'âge ; en revanche l'inverse se produit avec les tumeurs grade SBR III.

Dans cette étude, la taille tumorale est corrélée significativement avec le grade SBR ($p = 0,012$) ; 47 % des tumeurs T1 sont de grade SBR I, 32 % des tumeurs T3 sont de grade SBR II et 33 % des T3 sont de grade SBR III (Figure 2). Toutefois, l'expression des RE baisse significativement avec les grades SBR II et III ($p = 0,0002$).

La recherche par immunohistochimie du statut RE/RP/HER2 dans les tumeurs a permis de distinguer huit sous-types biologiques, que nous avons classés selon l'ordre de la meilleure durée de survie comme cela

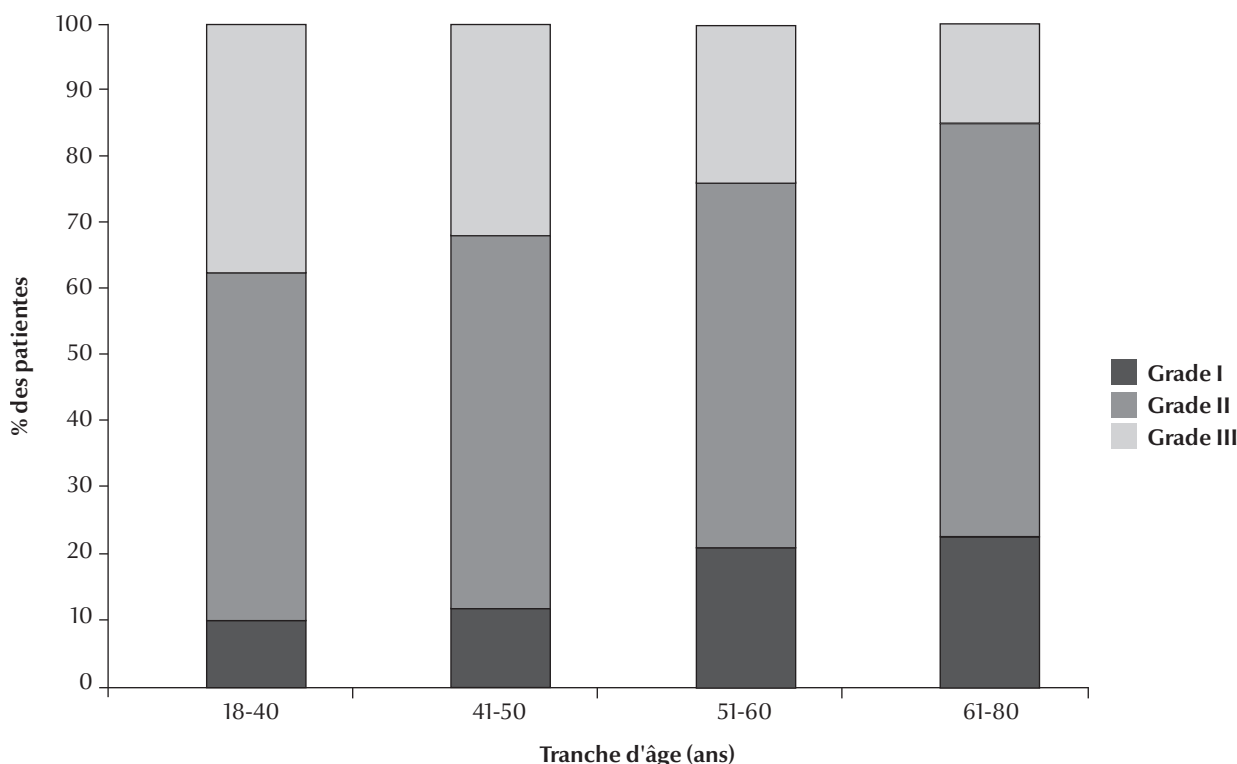


Figure 1 Détermination du grade histologique en fonction de l'âge des patientes

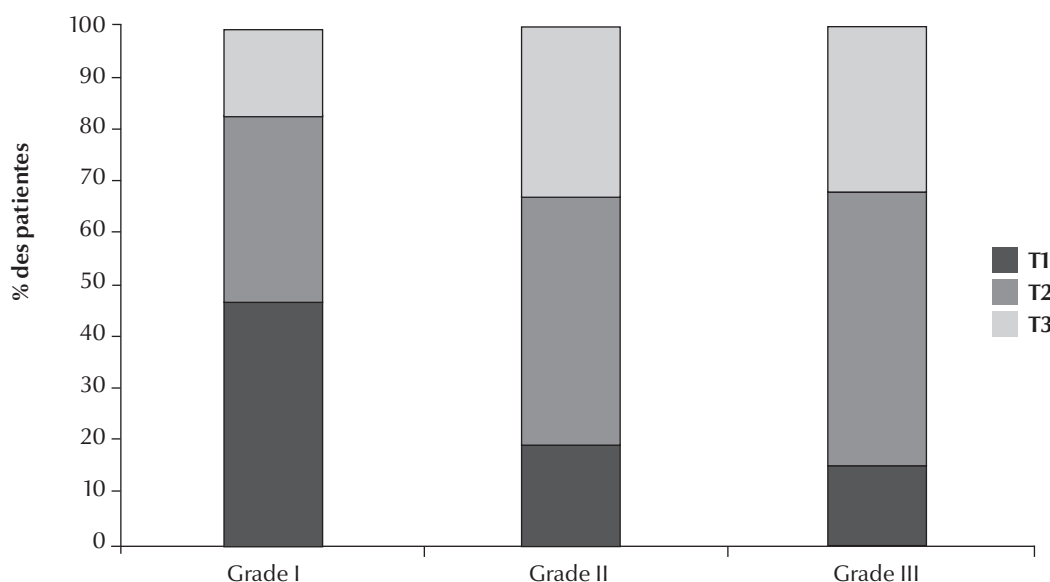


Figure 2 Corrélation du grade Scarff, Bloom et Richardson (SBR) avec la taille tumorale

a été décrit précédemment [16]: RE+/RP+/HER2-, RE+/RP-/HER2-, RE+/RP+/HER2+, RE+/RP-/HER2+, RE-/RP+/HER2-, RE-/RP+/HER2+, RE-/RP-/HER2-, RE-/RP-/HER2+.

Le sous-type RE+/RP+/HER2- représente la majorité des cas (38,6 %) suivi du type RE-/RP-/HER2- avec 19,3 % alors que les sous-types RE+/RP-/HER2+, RE+/RP-/HER2- et RE-/RP+/HER2+ sont faiblement représentés (1,2 %, 4,3 % et 6,3 % respectivement), ne permettant pas une analyse statistiquement fiable et donc, pour une clarté des résultats, ces sous-types biologiques ne figurent pas par la suite.

Dans cette étude, c'est l'âge jeune et la taille tumorale importante qui prédominent dans tous les sous-types biologiques. La classification de ces sous-types biologiques en fonction des tranches d'âge montre toujours une prédominance du sous-type RE+/RP+/HER2-, suivi du sous-type RE-/RP-/HER2-. Les sous-types RE-/RP-/HER2+ et RE-/RP+/HER2- sont représentés dans une proportion assez importante, particulièrement pour un âge de moins de 50 ans (Figure 3). La

proportion du sous-type RE+/RP+/HER2+ est de 5 à 10 % quelle que soit la tranche d'âge. Si on corrèle les sous-types biologiques RE+/RP+/HER2-, RE-/RP-/HER2-, RE-/RP-/HER2+ avec la taille tumorale et le grade histologique SBR, on remarque que le sous-type RE+/RP+/HER2- est caractérisé par une proportion élevée de T2 (48 %) et de grade SBR I (23 %) ; par contre le sous-type RE-/RP-/HER2- montre une proportion élevée de T3 (44 %) et de grade SBR III (33 %). Le sous-type RE-/RP-/HER2+ montre plutôt une proportion élevée de T2 (60 %) et de grade SBR II (39 %). Les tumeurs de grade SBR II sont largement représentées dans les trois sous-types biologiques (plus de 48 %). L'étude statistique des relations entre les trois facteurs (l'âge médian, la taille moyenne des tumeurs, le grade SBR, l'expression des protéines RE/RP/HER2) montre que, quel que soit le sous-type biologique, les patientes sont jeunes (âge médian inférieur ou égal à 51 ans), les tumeurs ont une taille moyenne supérieure à 2,6 cm et les grades SBR II et III sont importants (Tableau 1).

La détermination de la survie globale des patientes à trois ans montre qu'elle est très faible pour le sous-type RE-/RP-/HER2- (49 %), suivi du sous type RE-/RP+/HER2- (53 %) puis RE-/RP-/HER2+ (75 %). En revanche, cette survie est significativement élevée pour les sous-types RE+/RP+/HER2- et RE+/RP+/HER2+, estimée à 96 % et 92 % respectivement (test log-rank, $p = 0,035$).

Discussion

Les critères pronostiques clinico-pathologiques et biologiques sont reconnus depuis longtemps comme indispensables à la prise en charge du cancer du sein. L'expression des récepteurs hormonaux est un facteur prédictif de ce cancer [17,18] et les tumeurs montrant une surexpression de la protéine HER2 sont de mauvais pronostic ; donc la distinction des différents sous-types biologiques basés sur le statut RE/RP/HER2 et l'établissement des caractéristiques biologiques et clinico-pathologiques sont nécessaires pour assurer une meilleure prise en charge des patientes. En outre, une étude américaine réalisée

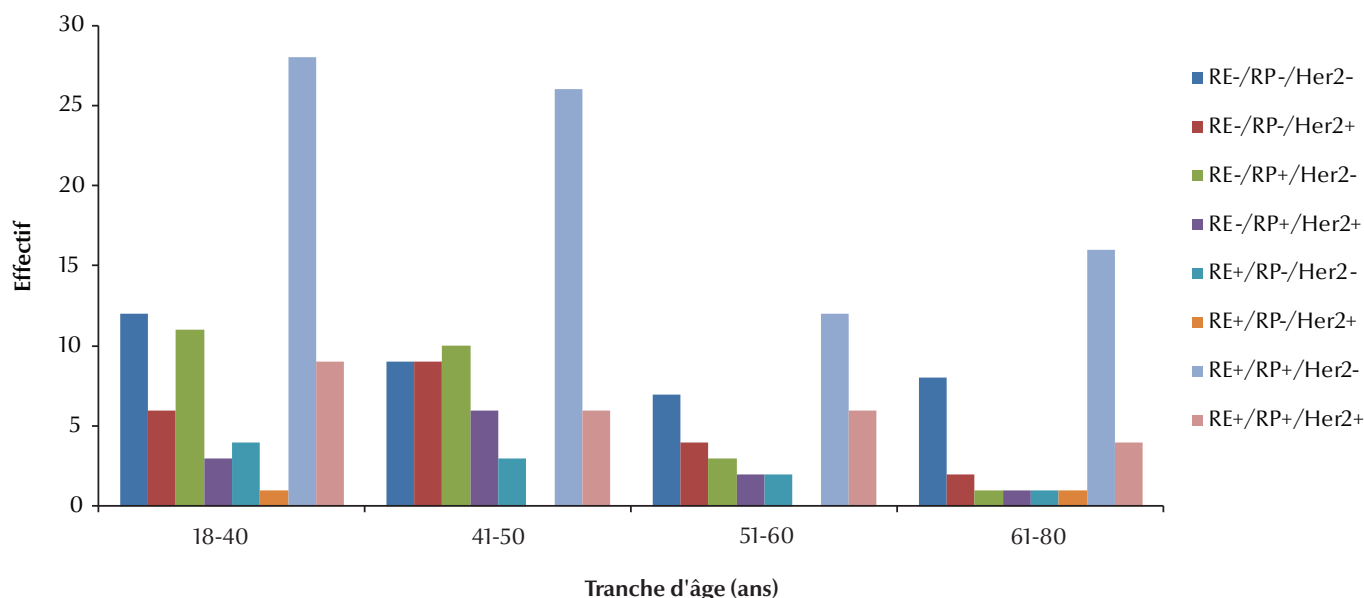


Figure 3 Distribution des sous-types biologiques en fonction de l'âge (RE : récepteurs des oestrogènes ; RP : récepteur de la progestérone ; HER2 : récepteur pour les facteurs de croissance épidermique humains ; SBR : Scarff, Bloom et Richardson)

en 2009 sur quatre ethnies différentes a montré que le statut RE/RP/HER2, l'âge et l'origine des patientes influencent le pronostic du cancer du sein [19].

L'objectif de cette étude rétrospective étalée sur une période de 3 ans (janvier 2007 - septembre 2009), réalisée pour la première fois au Maroc sur des patientes atteintes de cancer du sein et colligées dans le centre hospitalier universitaire de Fès, était d'abord d'évaluer le profil épidémiologique du cancer du sein dans cette région, puis de déterminer les facteurs

pronostiques caractéristiques de ces tumeurs.

Après analyse histologique des différentes tumeurs, nous avons constaté qu'il y a une faible proportion de carcinomes in situ (4,5 %), alors que les tumeurs infiltrantes sont les plus prépondérantes (95,5 %) dont 87,8 % sont des CCI, 4,7 % des cas correspondent à des CLI puis 2,4 % sont des carcinomes métaplasiques et 2 % sont des carcinomes médullaires. L'âge médian des patientes atteintes de ce cancer est particulièrement bas (45 ans), avec 17 % des cas ayant moins de 35 ans et 75 % ont moins

de 55 ans ; c'est un âge jeune, comme cela a été décrit pour la population jordanienne [3,20]. En revanche, le cancer du sein en Occident survient à un âge plus avancé (âge médian de 55 ans) et seulement 3 % des patientes ont moins de 35 ans [21].

La taille moyenne des tumeurs est élevée, supérieure à 3,6 (ET 2,6) cm, valeur également similaire à celle retrouvée en Jordanie, mais très différente de celle observée dans les études européennes [21] et américaines [19] où la taille moyenne est inférieure à 2 cm. Par ailleurs, le pourcentage des tumeurs de grade I

Tableau 1 Caractéristiques des différents sous-types biologiques : fréquence, taille moyenne et âge médian

Statut RE/RP/HER2	%	Age médian (ans)	Taille moyenne (cm)
RE+RP+HER2-	38,6	45	3,2
RE+RP-HER2-	4,3	45	5,9
RE+RP+HER2+	10,6	44	3,2
RE+RP-HER2+	1,2	51	3,0
RE-RP+HER2-	10,2	42	4,6
RE-RP+HER2+	6,3	44	4,3
RE-RP-HER2-	19,3	47	4,0
RE-RP-HER2+	9,4	45	2,6

RE : récepteurs des oestrogènes ; RP : récepteur de la progestérone ; HER2 : récepteur pour les facteurs de croissance épidermique humains.

au diagnostic est très faible (14 % au lieu de 30 % en Europe), alors que les grades III sont du même ordre de grandeur (30,5 % *versus* 30 %). Les tumeurs de grade II sont les plus fréquentes, mais de façon plus marquée au Maroc (55,5 %) qu'en Europe (42 %) [21]. Nous avons également constaté que les proportions des grades SBR II et III sont élevées quelle que soit la tranche d'âge (56 % et 29 %) et ces grades histologiques élevés sont corrélés, d'une part, avec les tailles tumorales importantes (T2 et T3) et d'autre part, avec une baisse d'expression des RE. L'importance des facteurs de mauvais pronostic, retrouvée dans les tumeurs des patientes de la région de Fès, ne peut s'expliquer que par le diagnostic tardif dû à l'absence d'un programme de dépistage.

L'étude IHC basée sur le statut RE/RP/HER2 révèle la présence de huit sous-types biologiques avec la prévalence du sous-type RE+/RP+/HER2- (38,6 %), suivi du sous-type RE-/RP-/HER2- avec 19,3 % des cas. Ce sous-type triple négatif (RE-/RP-/HER2-) est présent à un pourcentage élevé chez les femmes âgées de moins de 40 ans (33,3 %), comme cela

a été trouvé dans la population afro-américaine [19].

Dans cette étude, quel que soit le sous-type biologique, c'est l'âge jeune, la taille tumorale moyenne importante (allant de 2,6 à 5,9 cm) et le grade histologique SBR II et III qui prédominent. Cela encore s'explique par l'absence de sensibilisation des femmes (particulièrement les femmes du milieu rural) et l'absence d'une stratégie nationale de dépistage.

Après détermination de la survie globale à trois ans, nous avons montré que malgré la taille importante des tumeurs, le grade histologique avancé, nos résultats sont concordants avec la littérature [19] : les sous-types RE+/RP+/HER2+ et RE+/RP+/HER2- sont de bons pronostics, alors que le sous-type triple négatif est très agressif et le sous-type RE-/RP+/HER2- est d'agressivité modérée. Cependant, notre analyse est limitée vu qu'on s'est basé sur un recul de trois ans.

À travers cette étude, nous avons pu constater que le Maroc est en retard de quelques années par rapport à l'Europe et aux États-Unis. En effet, dans ces pays industrialisés où le dépistage organisé est en place depuis 20 à

30 ans, celui-ci a contribué à un diagnostic précoce des cancers infiltrants (petite taille tumorale, faible grade histologique et absence d'envahissement ganglionnaire) [1,22,23], puis à une augmentation de l'incidence des cancers in situ. Cela a pour conséquence l'amélioration de la survie et la baisse de morbidité des patientes atteintes de cancer du sein. Dans notre contexte, il semble que la mise en place d'un programme de dépistage au Maroc, particulièrement dans la région de Fès, est une nécessité. Par ailleurs, notre population est très jeune (75 % ont moins de 50 ans) et donc l'établissement d'un programme de dépistage serait plus efficace si celui-ci est instauré à l'âge de 40 ans au lieu de 50 ans. D'autres études dans ce sens ne peuvent qu'apporter une réponse et permettre des analyses comparatives à nos résultats.

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Références

- Molinié F *et al.* Incidence et facteurs pronostiques des cancers du sein découverts au cours et en dehors du programme de dépistage organisé en Loire-Atlantique (1991-2002) [Incidence and prognostic factors of breast cancer diagnosed within and outside the organised screening program in the department of Loire-Atlantique (1991-2002)]. *Revue d'Épidémiologie et de Santé Publique*, 2008, 56:41-49.
- Dajani YF, Al-Jitawi SA. A study of 405 breast tumors in Jordanians using the Revised WHO classification. *Tropical and Geographical Medicine*, 1987, 39:182-186.
- Abalkail AA *et al.* The role of young population structure in determining age distribution of breast cancer in Jordan. *Journal of the Bahrain Medical Society*, 2003, 15:28-33.
- Lamy PJ *et al.* Classification moléculaire des cancers du sein : utilité en clinique [Molecular classification of breast cancers: clinical utility]. *Médecine nucléaire*, 2010, 34(1):32-43.
- Osborne CK *et al.* The value of estrogen and progesterone receptors in the treatment of breast cancer. *Cancer*, 1980, 46(Suppl.):2884-2888.
- Clark GM, McGuire WL. Steroid receptors and other prognostic factors in primary breast cancer. *Seminars in Oncology*, 1988, 15(Suppl. 1):20-25.
- Early Breast Cancer Trialists' Collaborative Group. Systemic treatment of early breast cancer by hormonal, cytotoxic, or immune therapy. 133 randomised trials involving 31,000 recurrences and 24,000 deaths among 75,000 women. Early Breast Cancer Trialists' Collaborative Group. *Lancet*, 1992, 339:71-85.
- Ross JS, Gray GS. Targeted therapy for cancer: the HER-2/neu and Herceptin story. *Clinical Leadership & Management Review*, 2003, 17:333-340.
- Belkacémi Y *et al.* Intérêt des classifications moléculaires pour prédire la rechute locale et la diffusion métastatique des cancers du sein [The use of breast cancer subtype classification to predict local and distant recurrence. A review]. *Cancer Radiothérapie*, 2008, 12:2577-2583.
- Engel J *et al.* The process of metastatisation for breast cancer. *European Journal of Cancer (Oxford, England)*, 2003, 39:1794-1806.
- Fédération nationale des Centres de Lutte contre le Cancer (FNCLCC). *Comprendre le cancer du sein. Guide d'information*

- et de dialogue à l'usage des patientes et de leurs proches, mise à jour 2002* [Understanding breast cancer. An information and dialogue guide for patients and their families, 2002 update]. Paris, Fédération nationale des Centres de Lutte contre le Cancer, Collection SOR SAVOIR PATIENT (Standards, Options et Recommandations pour le Savoir des Patients), 2002:1-160.
12. Grosclaude P et al. Survival of women with breast cancer in France: variation with age, stage and treatment. *Breast Cancer Research and Treatment*, 2001, 70:137-143.
 13. Tavassoli FA, Devilee P, eds. *Pathology and genetics of tumours of the breast and female genital organs*. Lyon, IARC Press, 2003 (World Health Organization classification of tumours, No. 4).
 14. Elston CW, Ellis IO. Pathological prognostic factors in breast cancer. I. The value of histological grade in breast cancer: experience from a large study with long-term follow-up. *Histopathology*, 1991, 19:403-410.
 15. Wolff AC et al. American Society of Clinical Oncology; College of American Pathologists. American Society of Clinical Oncology/College of American Pathologists guideline recommendations for human epidermal growth factor receptor 2 testing in breast cancer. *Journal of Clinical Oncology*, 2007, 25:118-145.
 16. Parise C et al. Breast cancer subtypes as defined by the estrogen receptor (ER), progesterone (RP), and the human epidermal growth factor receptor2 (Her2) among women with invasive breast cancer subtypes in California 1999-2004. *Breast Journal*, 2009, 15:593-602.
 17. Grann VR et al. Hormone receptor status and survival in a population-based cohort of patients with breast carcinoma. *Cancer*, 2005, 103:2241-2251.
 18. Dunnwald LK, Rossing MA, Li CI. Hormone receptor status, tumor characteristics, and prognosis: a prospective cohort of breast cancer patients. *Breast Cancer Research*, 2007, 9:R6.
 19. Parise C, Bauer K, Caggiano V. Variation in breast cancer subtypes with age and race/ethnicity. *Critical Reviews in Oncology/Hematology*, 2010, 76(1):44-52.
 20. Almasri NM, Al Hamad M. Immunohistochemical evaluation of human epidermal growth factor receptor 2 and estrogen and progesterone receptors in breast carcinoma in Jordan. *Breast Cancer Research*, 2005, 7:R598-R604.
 21. Blamey RW et al. ONCOPOOL - a European database for 16,944 cases of breast cancer. *European Journal of Cancer*, 2010, 46:56-71.
 22. Ernst MF et al. Breast cancers found by screening: earlier detection, lower malignant potential or both? *Breast Cancer Research and Treatment*, 2002, 76:19-25.
 23. Gill PG et al. Detection by screening mammography is a powerful independent predictor of survival in women diagnosed with breast cancer. *Breast*, 2004, 13:15-22.

Les femmes et la santé

Le présent rapport, *Les femmes et la santé*, utilise les données actuellement disponibles pour faire le bilan de la santé des filles et des femmes dans le monde entier et pour attirer l'attention sur les conséquences à attendre et ce qu'il en coûte si les problèmes de santé des femmes ne sont pas pris en charge au bon moment. Il montre que bien que la santé des filles et des femmes se soit beaucoup améliorée au cours des 60 dernières années, les progrès sont très inégalement répartis. Dans de nombreuses parties du monde, la vie des femmes - de l'enfance à la vieillesse - est amputée par les maladies évitables et les décès prématurés. Le rapport met en lumière les points communs entre les problèmes de santé auxquels doivent faire face les femmes dans le monde entier mais attire aussi l'attention sur les différences qui découlent de modes de vie très variés.

Le rapport donne une idée des mesures à prendre pour améliorer la santé des filles et des femmes et il a pour but de livrer les informations nécessaires au dialogue politique et d'encourager les pays, les institutions et les partenaires du développement à agir. Il met en particulier l'accent sur le besoin urgent d'un leadership politique et institutionnel plus cohérent et sur la nécessité de parler davantage de la santé des femmes et de mobiliser des ressources suffisantes pour sauver plus de vies et améliorer la santé des filles et des femmes. Comme l'indique le rapport, s'occuper de la santé des femmes est une approche nécessaire et utile pour renforcer les systèmes de santé d'une façon générale, dans l'intérêt de tous.

Total homocysteine levels and cardiovascular risk factors in healthy Tunisians

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إجمالي مستويات الهوموسيستين وعوامل الاختطار القلبية الوعائية في التونسيين الأصحاء

مبروك العوضي، زيد عوني، شكيب مزيغ، سالم مشغول

الخلاصة: يعد فرط الهوموسيستين عامل اختطار مستقلاً هاماً لأمراض التصلب العصيدي والأمراض الخثارية. وتحدد هذه الدراسة توزيع مستويات الهوموسيستين في التونسيين الأصحاء وتقيم العلاقة بين مستويات الهوموسيستين وبعض عوامل الاختطار القلبية الوعائية. وقد أدرج في الدراسة أشخاص جرى اختيارهم عشوائياً من مختلف مناطق تونس (592 رجلاً، و114 امرأة). وبلغ متوسط إجمالي مستوى الهوموسيستين 12.6 ± 5.4 مكرومول بالتر. واختلفت مستويات الهوموسيستين في الأشخاص الذين لديهم فرط الهوموسيستين في الدم بحسب المنطقة الجغرافية. وكان لدى الأشخاص الذين لديهم فرط الهوموسيستين في الدم ارتفاع يعتد به إحصائياً في الكوليسترول الإجمالي، وكوليسترول البروتين الشحمي الخفيض الكثافة، وصميم البروتين الشحمي A وB، وانخفاض في مستويات الفيتامين B12 مقارنةً بأشخاص لديهم مستوى طبيعي من الهوموسيستين في الدم. وارتبطت مستويات الهوموسيستين مع الكوليسترول الإجمالي ($r = 0.09$) وصميم البروتين الشحمي A ($r = 0.012$) وB ($r = 0.013$) ونسبة الكوليسترول الإجمالي إلى الخفيض الكثافة ($r = 0.085$). وخُلصت الدراسة إلى أن ثمة حاجة لإجراء المزيد من الدراسات لتحديد الدور الدقيق للهوموسيستين في المرض القلبي الوعائي.

ABSTRACT Hyperhomocysteinaemia is considered as an important independent risk factor for atherosclerosis and thrombotic disease. This study determined the distribution of homocysteine (Hcy) levels in healthy Tunisian subjects and evaluated the relationship between Hcy levels and some cardiovascular risk factors. Randomly selected subjects (592 men and 114 women) were recruited from different regions of Tunisia. The overall mean Hcy level was 12.6 (SD 5.4) $\mu\text{mol/L}$. Hcy levels in subjects with hyperhomocysteinaemia varied according to geographical region. Subjects with hyperhomocysteinaemia had significantly elevated total cholesterol, LDL cholesterol, apolipoprotein A and apolipoprotein B and lower vitamin B₁₂ levels compared with subjects with normohomocysteinaemia. Hcy levels correlated with total cholesterol ($r = 0.09$), apolipoprotein A ($r = 0.012$), and B ($r = 0.013$) levels and total/HDL cholesterol ratio ($r = -0.085$). Further epidemiological studies are needed to determine the precise role of Hcy in cardiovascular disease.

Taux d'homocystéine totale et facteurs de risque cardio-vasculaires chez des Tunisiens en bonne santé

RÉSUMÉ L'hyperhomocystéinémie est considérée comme un important facteur de risque indépendant pour l'athérosclérose et la maladie thrombotique. La présente étude a déterminé la répartition des taux d'homocystéine chez des sujets tunisiens en bonne santé et a évalué la relation entre ce taux et certains facteurs de risque cardio-vasculaires. Des sujets ont été sélectionnés aléatoirement (592 hommes et 114 femmes) à partir de plusieurs régions de Tunisie. Le taux moyen d'homocystéine était de $12,6 \mu\text{mol/L}$ (E.T. 5,4). Le taux d'homocystéine chez les sujets atteints d'hyperhomocystéinémie variait en fonction de leur région géographique. Les sujets atteints d'hyperhomocystéinémie présentaient des taux de cholestérol total, de cholestérol des lipoprotéines de basse densité, d'apolipoprotéine A et d'apolipoprotéine B très élevés ainsi que des taux moindres de vitamine B₁₂ par rapport aux sujets ayant un taux normal. Les taux d'homocystéine étaient corrélés aux taux de cholestérol total ($r = 0,09$), d'apolipoprotéine A ($r = 0,012$) et d'apolipoprotéine B ($r = 0,013$) ainsi qu'au rapport entre le cholestérol total et le cholestérol des lipoprotéines de basse densité ($r = -0,085$). Des études épidémiologiques supplémentaires sont nécessaires pour déterminer le rôle précis de l'homocystéine dans les maladies cardio-vasculaires.

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Introduction

Elevated homocysteine (Hcy) concentration has been demonstrated to be a risk factor for cardiovascular disease (CVD) [1,2]. Evidence now indicates that hyperhomocysteinaemia (Hcy level > 15 µmol/L) is an important independent risk factor for atherosclerosis and thrombotic disease [3]. Although the distribution of plasma concentrations of Hcy has been well reported in some populations in America and Europe, there are no epidemiological studies of Hcy concentrations in healthy subjects from different regions in Tunisia and their impact on CVD risk factors.

In the present study, we aimed to determine the distribution of plasma Hcy levels in healthy Tunisian subjects and to evaluate the relationship between Hcy levels and CVD risk factors.

Methods

Sample

In the present study 706 healthy young adults (592 men and 114 women) were randomly recruited from different regions of Tunisia. Their mean age was 28.0 [standard deviation (SD) 9.1] years old, range 20–71 years. We subdivided subjects into groups according to their geographical origin of residence: north ($n = 361$), Tunis (the capital) ($n = 178$), centre ($n = 115$) and south ($n = 52$). Exclusion criteria for participants were diabetes mellitus, hypertension, cardiomyopathy, renal failure and current use

of vitamins. The study was approved by the local ethics committee and all subjects gave their consent to participate.

Data collection

A questionnaire was completed for each subject about demographic information (age, sex, weight, height, smoking, alcohol consumption). Cigarette smokers were categorized as current smokers (54.2%) or non-smokers (including never smokers and ex-smokers who had quit smoking for at least 6 months before the study). Alcohol consumption was defined as consumers (12.9%) or not of any alcoholic beverages. Body mass index (BMI) was calculated as weight (kg)/height (m²).

Blood samples were collected from subjects after 12 hours of fasting. Concentrations of Hcy in plasma were assessed using an automatic analyser (Immolute 2000, Diagnostic Products Corporation) based on a competitive immunoassay and were expressed in µmol/L. Serum vitamin B₁₂ and folate levels were measured by the autoanalyser based on a competitive immunoassay. Vitamin B₁₂ and folate levels were expressed in pg/mL and ng/mL respectively.

Total cholesterol, triglycerides (TG) and high-density lipoprotein (HDL) cholesterol were assessed by colorimetric enzymatic method (Technicom analyser, RA-1000, Dade Behring). Low-density lipoprotein (LDL) cholesterol was calculated by the Friedwald formula: LDL cholesterol = total cholesterol (HDL cholesterol + TG/2.18) for TG < 4.5 mmol/L. Apolipoprotein A, apolipoprotein B and

lipoprotein (a) were assessed by the nephelometric method and the results were expressed in g/L.

The definition of normohomocysteinaemia was Hcy ≤ 15 µmol/L and hyperhomocysteinaemia was Hcy > 15 µmol/L.

Statistical analysis

Statistical analyses were performed by SPSS, version 10.0 for Windows. Continuous variables are presented as mean and SD, and qualitative variables as relative frequencies. Kolmogorov–Smirnov test for the normality of different parameters showed a normal distribution only for BMI, HDL cholesterol and apolipoprotein A. Comparison of means were performed by 1-way analysis of variance based on Fisher statistics. Correlations between Hcy concentrations and the different parameters were evaluated using Spearman correlation coefficient. Significant differences between groups were performed by Tukey honestly significant differences method. *P* values < 0.05 were considered significant.

Results

The mean Hcy level of the study group was 19.1 (SD 5.6) µmol/L. There were 541 subjects with normal Hcy levels (≤ 15 µmol/L) and 162 with elevated Hcy levels (> 15 µmol/L), giving a prevalence of hyperhomocysteinaemia of 22.9%. Table 1 shows the mean Hcy and vitamin levels in healthy people with normal and raised Hcy by sex. The mean Hcy concentration was significantly

Table 1 Mean homocysteine (Hcy) and vitamin levels in healthy people with normal and raised Hcy by sex

Variable	Normohomocysteinaemia ^a ($n = 541$)			Hyperhomocysteinaemia ^b ($n = 162$)		
	Male Mean (SD)	Female Mean (SD)	<i>P</i> -value	Male Mean (SD)	Female Mean (SD)	<i>P</i> -value
Hcy (µmol/L)	12.7 (5.4)	11.9 (5.2)	0.028	19.5 (5.6)	19.7 (5.7)	NS
Vitamin B ₁₂ (pg/mL)	259.4 (106.3)	284.7 (121.1)	NS	236.7 (80.8)	278.9 (114.9)	0.035
Folates (ng/mL)	4.31 (2.40)	6.13 (3.06)	< 0.001	4.32 (3.61)	6.06 (2.69)	0.031

^aHcy ≤ 15 µmol/L; ^bHcy > 15 µmol/L. SD = standard deviation.

Variable	Normohomocysteinaemia ^a				Hyperhomocysteinaemia ^b					
	North (n = 278)	Tunis (n = 138)	Centre (n = 88)	South (n = 40)	P-value	North (n = 83)	Tunis (n = 40)	Centre (n = 27)	South (n = 12)	P-value
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
Hcy ($\mu\text{mol/L}$)	12.4 (4.9)	13.4 (5.4)	12.4 (6.9)	12.6 (4.9)	> 0.05	18.5 (3.9)	19.7 (6.5)	23.2 (8.5)	18.8 (2.6)	< 0.03 ^d ; 0.004 ^e
Vitamin B ₁₂ (pg/mL)	260.6 (97.5)	308.7 (133.1)	242.5 (105.2)	293.2 (170.6)	< 0.001 ^c	242.1 (90.2)	260.4 (87.1)	215.5 (77.5)	214.0 (72.2)	> 0.05
Folates (ng/mL)	4.53 (2.03)	4.92 (2.62)	4.45 (1.82)	5.19 (3.12)	> 0.05	4.22 (1.86)	5.40 (5.91)	4.39 (2.06)	4.05 (1.49)	> 0.05

^aHcy $\leq 15 \mu\text{mol/L}$; ^bHcy $> 15 \mu\text{mol/L}$.
^cTunis versus centre; ^dTunis versus south.
SD = standard deviation.

Variable	Hyperhomocysteinaemia ^a Hcy (μmol/L) (<i>n</i> = 162) Mean (SD)	<i>P</i> -value
<i>Alcohol user</i>		
No	19.6 (5.8)	
Yes	18.0 (3.4)	< 0.03
<i>Tobacco user</i>		
No	20.3 (6.8)	> 0.05
Yes	18.7 (4.1)	
<i>BMI</i>		> 0.05
Normal weight	18.9 (4.5)	
Overweight	20.3 (7.1)	

higher in men than women in the subgroup with normal homocysteine levels [12.7 (SD 5.4) versus 11.9 (SD 5.2) $\mu\text{mol/L}$] ($P = 0.028$) but not in the subgroup with elevated homocysteine levels [19.5 (SD 5.6) versus 19.7 (SD 5.7)].

In the normohomocysteinaemia group there were no difference in Hcy levels by region whereas in the hyperhomocysteinaemia group the mean Hcy level was significantly higher in the central region of the country compared with the capital, Tunis city and the southern region (Table 2).

Vitamin B₁₂ level was significantly higher in Tunis city than in the central region In the normohomocysteinaemia group but not in the hyperhomocysteinaemia group (Table 2). Folate levels did not vary by region in either subgroup.

In subjects with hyperhomocysteinaemia the mean Hcy level was significantly lower in those consuming alcohol compared with those not drinking alcohol [18.0 (3.4) $\mu\text{mol/l}$ versus 20.3 (6.8) $\mu\text{mol/L}$] ($P < 0.05$) (Table 3). There were no significant differences by smoking and BMI status.

Subjects with hyperhomocysteinemia had significantly elevated lipid parameters—total cholesterol,

LDL cholesterol, apolipoprotein A and apolipoprotein B—and lower vitamin B₁₂ levels compared with those with normohomocysteinaemia (Table 4).

In all studied population, Hcy levels correlated with total cholesterol ($r = 0.09, P < 0.05$), apolipoprotein A ($r = 0.012, P < 0.01$) and apolipoprotein B ($r = 0.013, P < 0.01$).

Discussion

In the present study the prevalence of hyperhomocysteinaemia was 22.9% in this sample of healthy people in Tunisia and the mean value was 12.6 (SD 5.4) $\mu\text{mol/L}$. The distribution of Hcy in different geographic regions of Tunisia was not homogenous; we found differences in Hcy distribution between residents of the capital city and the centre region of Tunisia but only among those with hyperhomocysteinaemia. Previous studies have reported Hcy concentrations ranging from 6 $\mu\text{mol/L}$ in Japan to 13 $\mu\text{mol/L}$ in South Africa in healthy subjects [4]. In the Iranian population, Hcy concentrations were lower [7.4 (SD 3.2) $\mu\text{mol/L}$] compared with our sample [12.6 (SD 5.4) $\mu\text{mol/L}$] [5] and compared with Syrian healthy subjects (11.3 $\mu\text{mol/L}$) [6] and Moroccan healthy subjects [11.3 (SD 3.1)

Table 4 Mean values of biological parameters in healthy people with normal and raised homocysteine

Variable	Normohomocysteinaemia ^a (<i>n</i> = 541)	Hyperhomocysteinaemia ^b (<i>n</i> = 162)	<i>P</i> -value
	Mean (SD)	Mean (SD)	
Vitamin B ₁₂ (pg/mL)	271.2 (115.2)	242.7 (87.2)	< 0.01
Folates (ng/mL)	4.63 (2.21)	4.55 (3.54)	> 0.05
Total cholesterol (mmol/L)	4.01 (1.08)	4.22 (1.10)	< 0.05
HDL cholesterol (mmol/L)	0.97 (0.22)	1.00 (0.21)	> 0.05
Total/HDL cholesterol ratio	4.33 (1.98)	4.24 (1.05)	> 0.05
LDL cholesterol (mmol/L)	2.32 (0.87)	2.49 (1.09)	< 0.01
Triglycerides (mmol/L)	1.50 (1.00)	1.53 (1.05)	> 0.05
Apo A (g/L)	1.19 (0.26)	1.25 (0.27)	< 0.05
Apo B (g/L)	0.73 (0.25)	0.78 (0.29)	< 0.05
Apo B/A ratio	0.61 (0.41)	0.62 (0.20)	> 0.05
Lp a (g/L)	0.12 (0.11)	0.11 (0.10)	> 0.05

^aHcy ≤ 15 µmol/L; ^bHcy > 15 µmol/L.

SD = standard deviation; HDL = high-density lipoprotein; LDL = low-density lipoprotein; Apo A = apolipoprotein A; Apo B = apolipoprotein B; Lp a = lipoprotein (a).

µmol/L] [7]. The similar levels of Hcy in Syria and Morocco compared with our findings may be due to similarities in food intake habits.

In the literature, the reasons for variations of plasma Hcy between different countries are not clear. Alftan et al. argued that intercountry differences in Hcy levels were real and were not due to different sampling or assay procedures [8]. We think that geographical variations in dietary fruit and vegetable intake might explain these intercountry differences between European and Mediterranean countries. In healthy populations, a correct nutritional regimen with sufficient daily intakes of the nutritional determinants of Hcy metabolism is crucial for maintaining Hcy plasma concentrations within the normal range [9]. It has been suggested that a high dietary intake of folate can make a substantial contribution to a reduction in plasma Hcy concentrations in the general population. In fact, each 3 µmol/L decrease in Hcy may be associated with a 16% reduction in the risk of ischaemic heart disease, 25% in the risk of deep vein thrombosis and 24% in the risk of stroke [1].

Differences in Hcy and folates levels between men and women may be due to differences in lifestyle, such as tobacco use [10] and coffee drinking

(which has been demonstrated to diminish vitamin B absorption [11]). In our study all the tobacco smokers were men, who in Tunisia generally consume coffee while smoking. Syrian smokers had lower folates levels compared with ex-smokers and never smokers, a fact which may have explained the higher Hcy levels found in men than women [6]. In the literature, differences in Hcy concentrations between men and women have been explained by the effect of oestrogen on Hcy metabolism [12], with remethylation being more effective in premenopausal women than in men. This hypothesis is supported by the decreased levels of Hcy after hormone treatment in menopausal women [13].

Tobacco smoking is considered to be a CVD risk factor. Jendricko T et al. found that war veterans who were non-smokers had higher Hcy levels than did smokers [14]. Other studies found a positive correlation between Hcy levels and tobacco use [15] and significantly lower plasma concentrations of pyridoxal phosphate in smokers compared with non-smokers [16]. Smokers with high plasma Hcy are at greatly increased risk of CVD. These subjects had reduced levels of B vitamins that modulate Hcy metabolism [10]. In our results, low Hcy concentrations in men

may have been due, in part, to the effect of alcohol consumption, as alcohol drinkers had significantly lower Hcy levels. In fact studies have reported the favourable action of alcohol on lowering Hcy, and that this depends on the type of alcoholic beverage [17,18].

Boushey et al. estimated that an elevation of 5 µmol/L in Hcy levels is equivalent to an increase of 20 mg/dL in cholesterol [19]. Hcy has been demonstrated to induce both atherogenic and thrombogenic mediators in cultured vascular cells [20] and cause endothelial dysfunction in humans [21,22]. In fact, increasing synthesis of Hcy may have an effect on the progression of atherogenesis [23,24]. Yadav et al., however, did not find a significant correlation between plasma Hcy and total cholesterol, HDL cholesterol or triglycerides [25]. Holven et al. suggested that hyperhomocysteinaemic individuals have dysfunctional HDL particles with attenuated antiatherogenic activity and that this may represent a novel explanation for the increased risk of cardiovascular events in these individuals [26]. In a recent study, Zinellu et al. demonstrated that intracellular reactive oxygen species production induced by Hcy-S-LDL might be responsible for the observed human

endothelial cells damage and indicated that Hcy-S-LDL may have some role in CVD [27]. Other lipid parameters are also demonstrated to have a role in CVD. Low apolipoprotein A, high apolipoprotein B and apolipoprotein B/A ratio were recently considered as new risk factors for CVD [28,29]. In the Atherosclerosis Risk in Communities study, apolipoprotein A was found to be strongly predictive when considered alone, but did not contribute to the risk prediction when considered with LDL cholesterol, HDL cholesterol and

TG [30]. A prospective study from the United Kingdom in men followed up for 6 years, showed that apolipoprotein B was a better predictor of risk than total cholesterol or LDL cholesterol and that the ratio of apolipoprotein B/A was associated with the strongest effect on risk [31]. In a recent research, Ravnskov et al. demonstrated that homocysteine thiolactone reacted with the free amino groups of apolipoprotein-B to form homocysteinylated LDL lipoprotein and caused obstruction of the circulation in the vasa vasorum [32].

Conclusion

The elevation of Hcy levels is considered as a risk factor for CVD. In this study of healthy young adults, hyperhomocysteinemia was associated with significantly elevated total cholesterol, LDL cholesterol, apolipoprotein A and apolipoprotein B and lower vitamin B₁₂ levels compared with subjects with normohomocysteinemia. Further epidemiological studies are needed to determine the precise role of Hcy.

References

- Wald DS et al. Homocysteine and cardiovascular disease: evidence on causality from a meta-analysis. *British Medical Journal*, 2002, 325:1202-1206.
- Van Oijen N et al. Prognostic value of free plasma homocysteine levels in patients hospitalized with acute coronary syndrome. *American Journal of Cardiology*, 2008, 102:135-139.
- Lawrence de Koning AB et al. Hyperhomocysteinemia and its role in the development of atherosclerosis. *Clinical Biochemistry*, 2003, 36:431-441.
- Ueland PM et al. Total homocysteine in plasma or serum: methods and clinical applications. *Clinical Chemistry*, 1993, 39:1764-1779.
- Golbahar J et al. Distribution of plasma total homocysteine concentrations in the healthy Iranians. *Clinical Biochemistry*, 2004, 37:149-151.
- Herrmann W et al. Hyperhomocysteinemia and vitamin B-12 deficiency are more striking in Syrians than in Germans—causes and implications. *Atherosclerosis*, 2003, 166:143-150.
- Bennouar N et al. Thermolabile methylenetetrahydrofolate reductase C677T polymorphism and homocysteine are risk factors for coronary artery disease in Moroccan population. *Journal of Biomedicine and Biotechnology*, 2007, 2007(1):80687.
- Alfthan G et al. Plasma homocysteine and cardiovascular disease mortality. *Lancet*, 1997, 48:349-397.
- Kudlackova KM et al. Nutritional determinants of plasma homocysteine. *Bratislavské Lekárske Listy*, 2007, 108:510-515.
- O'Callaghan P et al. European COMAC group. Smoking and plasma homocysteine. *European Heart Journal*, 2002, 23:1559-1560.
- Ulvik A et al. Coffee consumption and circulating B-vitamins in healthy middle-aged men and women. *Clinical Chemistry*, 2008, 54:1418-1420.
- Bogdan C et al. Hormones and homocysteine [Hormones et homocystéine]. *Sang Thrombose et Vaisseaux*, 2000, 12:564-568.
- Morris MS et al. Total homocysteine and estrogen status indicators in the third national health and nutrition examination survey. *American Journal of Epidemiology*, 2000, 152:140-148.
- Graham IM et al. Plasma homocysteine as a risk factor for vascular disease: The European Concerted Action Project. *Journal of the American Medical Association*, 1997, 277:1775-1787.
- Jendricko T et al. Homocysteine and serum lipids concentration in male war veterans with posttraumatic stress disorder. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 2009, 33:134-140.
- Robinson K et al. Hyperhomocysteinemia and low pyridoxal phosphate: common and independent reversible risk factors for coronary artery disease. *Circulation*, 1995, 92:2825-2830.
- Schlienger JL. Homocystéine et consommation d'alcool: une relation ambiguë et un nouveau paradoxe [Homocysteine and alcohol consumption: an ambiguous relationship and a new paradox]. *La Presse Médicale*, 2003, 32:262-267.
- Schlienger JL. Consommation modérée d'alcool et maladies cardiovasculaires. *Pathologie Biologie*, 2001, 49:769-774.
- Boushey CJ et al. A quantitative assessment of plasma homocysteine as a risk factor for vascular disease: probable benefits of increasing folic acid intakes. *Journal of the American Medical Association*, 1995, 274:1049-1057.
- Jamaluddin MS et al. DNA methylation and vascular disease. *Clinical Chemistry and Laboratory Medicine*, 2007, 45:1660-1666.
- Sipkens JA et al. Homocysteine affects cardiomyocyte viability: concentration-dependent effects on reversible flip-flop, apoptosis and necrosis. *Apoptosis*, 2007, 12:1407-1418.
- Levrant S et al. Homocysteine induces cell death in H9C2 cardiomyocytes through the generation of peroxynitrite. *Biochemistry and Biophysical Research*, 2007, 359:445-450.
- McCully KS et al. Homocysteine and lipid metabolism in atherogenesis: effect of the homocysteine thiolactonyl derivatives, thioretinaco and thioretinamide. *Atherosclerosis*, 1990, 83:197-206.
- Hirokyu M et al. Diet-induced hyperhomocysteinemia exacerbates neointima formation in rat carotid arteries after balloon injury. *Circulation*, 2001, 103:133-139.
- Yadav AS et al. Relationship of plasma homocysteine with lipid profile parameters in ischemic heart disease. *Indian Journal of Clinical Biochemistry*, 2006, 21:106-110.
- Holven KB et al. The antiatherogenic function of HDL is impaired in hyperhomocysteinemic subjects. *Journal of Nutrition*, 2008, 138:2070-2075.
- Zinellu A et al. S-homocysteinylated LDL apolipoprotein B adversely affects human endothelial cells *in vitro*. *Atherosclerosis*, 2009, 206(1):40-46.

28. Christa M et al. Prognostic value of apolipoprotein B and A-I in the prediction of myocardial infarction in middle-aged men and women: results from the MONICA/KORA Augsburg cohort study. *European Heart Journal*, 2005, 26:271–278.
29. Goswami B et al. Apo-B/apo-AI ratio: a better discriminator of coronary artery disease risk than other conventional lipid ratios in Indian patients with acute myocardial infarction. *Acta Cardiologica*, 2008, 63:749–755.
30. Sharrett AR et al. Coronary heart disease prediction from lipoprotein cholesterol levels, triglycerides, lipoprotein (a), apolipoprotein A-I and B, and HDL density subfractions. The Atherosclerosis Risk in Communities (ARIC) study. *Circulation*, 2001, 104:1108–1113.
31. Talmud PJ et al. Non fasting apolipoprotein B and triglycerides levels as a useful predictor of coronary heart disease risk in middle-aged UK men. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 2002, 22:1918–1923.
32. Ravnskov U et al. Review and hypothesis: Vulnerable plaque formation from obstruction of vasa vasorum by homocysteinylated and oxidized lipoprotein aggregates complexed with microbial remnants and LDL autoantibodies. *Annals of Clinical and Laboratory Science*, 2009, 39:3–16.

Global atlas on cardiovascular disease prevention and control

The *Global atlas on prevention and control of cardiovascular diseases* is the second Atlas on the worldwide epidemic of cardiovascular diseases published by the World Health Organization (WHO). Cardiovascular diseases lead the noncommunicable diseases epidemic contributing to nearly one third of global deaths; 17.3 million deaths a year.

The 2011 Atlas has been compiled mainly using publications and databases produced and maintained by WHO and contains chapters on death and disability, behavioural and metabolic risk factors and determinants, evidence-based interventions for prevention and control, primary health care, inequities, implementation gaps, policies, strategies, Best Buys, health in all policies and monitoring in relation to cardiovascular diseases.

The striking differences in death, disability and trends in cardiovascular diseases between high-income countries and low- and middle-income countries described in this publication, are largely related to differences in public policies within as well as outside the health sector, availability of financial resources for health, prevention and early detection practices, capacity of the health workforce, accessibility to diagnosis and treatment and primary care services. The Atlas also provides a baseline for monitoring trends and assessing progress made by countries in addressing the cardiovascular epidemic.

Further information about this and other WHO publications is available at: <http://www.who.int/publications/en/>

Metabolic syndrome in family practice in Jordan: a study of high-risk groups

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المتلازمة الاستقلابية في ممارسة طب الأسرة في الأردن: دراسة للمجموعات العالية الخطر

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الخلاصة: تقيم هذه الدراسة انتشار المتلازمة الاستقلابية، ومكوناتها، وفق تعريف معايير رعييل علاج البالغين، في المرضى الأردنيين الذين يراجعون عيادة طب الأسرة لعلاج عوامل الخطر القلبية الوعائية. وقد اختيرت عينة عشوائية مكونة من 730 مريضاً في عمر 25 عاماً أو يزيد. وقد بلغ معدل انتشار المتلازمة الاستقلابية 37.4% (31.7% في الرجال؛ 41.0% في النساء). وزاد معدل الانتشار مع تقدم العمر في مجمل العينة وفي الجنسين. وأظهر أن محيط أعلى الحَضر كان أعلى انتشاراً في مجمل العينة (61.6%). وكان ترتيبه بين النساء هو الأول (73.5%). وكان ارتفاع مستوى ثلاثي الغليسريد في المصل أعلى انتشاراً بين الذكور (50.2%). وكانت الفروق بين الجنسين فروقاً يُعتدُّ بها إحصائياً. وخَلَصَت الباحِثان إلى ضرورة أن ينتبه أطباء الأسرة لأهمية عوامل الخطر المتعددة في المتلازمة الاستقلابية.

ABSTRACT This study assessed the prevalence of the metabolic syndrome, and its components, as defined by Adult Treatment Panel III criteria in Jordanian patients attending a family practice clinic for management of cardiovascular risk factors. The sample was 730 randomly selected patients aged ≥ 25 years. The prevalence of metabolic syndrome was 37.4% (31.7% in men; 41.0% in women). The prevalence increased with age in the total sample and in both sexes. High waist circumference showed the highest prevalence in the total sample (61.6%). Among females it ranked as the first criterion (73.5%). High serum triglyceride level showed the highest prevalence in males (50.2%). Differences between the sexes were significant. Family practitioners should be alerted to the importance of multiple risk factors in the metabolic syndrome.

Syndr me m tabolique en m decine familiale en Jordanie :  tude des groupes   haut risque

R SUM  La pr sente  tude a  valu  la pr valence du syndr me m tabolique et ses composantes selon les crit res de l'Adult Treatment Panel III chez des patients jordaniens consultant dans un  tablissement de soins en m decine familiale pour la prise en charge des facteurs de risque cardio-vasculaires. L' chantillon comprenait 730 patients s lectionn s al atoirement et  g s d'au moins 25 ans. La pr valence du syndr me m tabolique  tait de 37,4 % (31,7 % chez les hommes ; 41,0 % chez les femmes). Elle augmentait avec l' ge dans l' chantillon total et pour les deux sexes. Une forte pr valence d'un tour de taille  lev  a  t  observ e dans l' chantillon total (61,6 %). Chez les femmes, cette mesure  tait le crit re principal (73,5 %). La plus forte pr valence d'une concentration s rique en triglyc rides  lev e a  t  observ e chez les hommes (50,2 %). Les diff rences entre les sexes  taient importantes. Les m decins de famille devraient  tre sensibilis s   l'importance des facteurs de risque multiples pour le syndr me m tabolique.

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Introduction

The metabolic syndrome is a clustering of metabolic abnormalities which includes hyperlipidaemia [elevated triglycerides (TG), low serum high-density lipoprotein (HDL) cholesterol], hypertension, central obesity and elevated blood glucose [1]. The syndrome has been found to be associated with a greater risk of coronary heart disease, stroke and cardiovascular mortality than the risk conferred by each one of its individual components [2].

The concept of metabolic syndrome started to gain recognition several decades ago, but the ability to compare its prevalence in various populations was hindered by lack of a uniform definition of the syndrome [1]. Three definitions of the metabolic syndrome are currently in use, those of the World Health Organization in 1999 [3], the European Group for the Study of Insulin Resistance also in 1999 [4] and the National Cholesterol Education Program Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults—Adult Treatment Panel III (ATP III) in 2001 [5].

The ATP III definition was shown to be more useful in clinical practice since the objectives of the definition are to facilitate the diagnosis and to stress the preventive interventions related to individual components [1,5]. According to the ATP III guidelines demonstration of any 3 or more of the following abnormalities identifies the syndrome: waist circumference > 102 cm in men and > 88 cm in women, serum TG level $\geq$ 150 mg/dL, HDL-cholesterol < 40 mg/dL in men and < 50 mg/dL in women, systolic blood pressure $\geq$ 135 mmHg and/or diastolic $\geq$ 85 mmHg and serum glucose level $\geq$ 110 mg/dL. Management of the metabolic syndrome has a 2-fold objective: first, to reduce underlying causes (i.e. obesity and physical inactivity) and secondly to treat associated non-lipid and lipid risk factors [5].

Our family medicine clinic is a hospital-affiliated clinic located in Jordan University Hospital (the main teaching hospital in the capital city of Jordan, Amman), and is the primary teaching clinic for the family medicine programme. This clinic provides primary care to a socially diversified group of patients representing various population strata. Patients of this clinic are often observed to have a multitude of major cardiovascular risk factors including obesity and physical inactivity. Furthermore any data generated through this clinic is accurate, well controlled and subject to peer evaluation.

In this study we assessed the prevalence of the metabolic syndrome and its individual components as defined by ATP III in a group of patients with cardiovascular risk factors attending the family practice clinic at Jordan University Hospital. Differences in the prevalence by age and sex were also evaluated.

Methods

Sample

The sampling frame for this study was all patients aged $\geq$ 25 years attending the family practice clinic at Jordan University Hospital for management and follow-up of selected cardiovascular risk factors during the study period June to December 2004.

A patient was eligible to be included in the study if he/she satisfied 1 or more of the following conditions: diagnosed as hypertensive or on medication for elevated blood pressure; diagnosed as diabetic or on treatment for diabetes mellitus; centrally obese; having family history of premature cardiovascular disease (men < 55 years or women $\leq$ 65 years); smoker; physically inactive.

Three times a week during the study period (Monday, Tuesday, Wednesday), the first 10 illegible patients attending the clinic were invited to take part in the study, an average of 30 patients per week. At the end of the 6-month

study period, the number of selected patients totalled 730 (281 males and 449 females).

Data collection

Patients were oriented to the objectives of the study and their consent was secured. A special form was used for recording data on: age and sex, history of diabetes or hypertension, waist circumference, fasting lipid profile, serum TG level and serum HDL-cholesterol level. Information on smoking status, physical activity and family history of premature cardiovascular disease were also collected. Family history was considered positive if the patient reported having a first degree relative (parent, sibling or child) that has history of myocardial infarction or ischaemic stroke at age < 55 years in men and < 65 years in women. For the analysis, age was grouped into 4 categories (< 30, 30–45, 46–60 and > 60 years).

The ATP III criteria were used to classify patients as with or without metabolic syndrome. Subjects were considered to have metabolic syndrome if they demonstrated any 3 or more of the following abnormalities:

- Abdominal obesity: waist circumference > 102 cm in men and > 88 cm in women.
- High blood pressure: systolic blood pressure $\geq$ 135 mmHg and/or diastolic $\geq$ 85 mmHg or on treatment for hypertension.
- Hypertriglyceridaemia: serum TG level $\geq$ 150 mg/dL.
- Low HDL-cholesterol: < 40 mg/dL in men and < 50 mg/dL in women.
- High fasting blood glucose: serum glucose level $\geq$ 110 mg/dL or on treatment for diabetes.

Blood pressure was measured in the sitting position, using a suitable cuff sphygmomanometer. Two measurements were made. Any reading above 135/85 mmHg was repeated 2–3 times over a 6-week interval. If consistent readings at this level were obtained the

patient was labelled as hypertensive according to the ATP III definition of hypertension.

Waist circumference was measured using a steel measuring tape, with measurement made halfway between the lower border of the ribs and the iliac crest. Two measurements to the nearest 0.5 cm were recorded. If the variation between the measurements was greater than 2 cm, a third measurement was taken. The mean of the 2 closest measurements was then calculated.

For the purpose of this study physical activity was defined as regular practice of any type of activity at least 3–4 times a week for duration of 20–30 minutes per session. Smoking was noted only if the subject was a current smoker.

Blood samples were taken from patient and all blood tests were done at Jordan University Hospital laboratories using an autoanalyser (Cobas Integra 400/700/800 version 1.0, Roche Laboratory Systems, Mannheim, Germany).

Data analysis

All data were entered into the computer and analysed using SPSS version 10.0. Descriptive statistics were used for the prevalence of metabolic syndrome and its components. The chi-squared test was used to examine associations between categorical variables and metabolic syndrome, its components, age, sex, smoking status and physical activity. The data were considered significant if $P \leq 0.05$.

Results

The study sample consisted of 730 subjects, 38.5% (281) males and 61.5% (449) females. The age ranged from 25–80 years, with a mean of 52 [standard deviation (SD 11.9)] years; males 54.9 (SD 11.9) years, females 50.0 (SD 11.7) years.

Table 1 shows the sociodemographic characteristics of the study sample: 15.9% were current smokers, 26.4% exercised regularly as defined and 11.0% had a family history of premature cardiovascular disease.

Only 9.9% ($n = 72$) of the study sample had none of the ATP III criteria for the diagnosis of metabolic syndrome, 24.5% ($n = 179$) had 1 abnormal criterion, 28.1% ($n = 205$) had 2 criteria, 22.1% ($n = 161$) had 3 criteria, 12.7% ($n = 93$) had 4 criteria and 2.7% ($n = 20$) had 5 criteria of the metabolic syndrome (Figure 1).

The overall prevalence of metabolic syndrome among the patients was found to be 37.4%. Table 2 shows the prevalence of metabolic syndrome by sex and age groups. Sex-specific prevalence was 31.7% in men and 41.0% in women ($P < 0.05$). The prevalence generally increased with age in the total sample and in both sexes, but the trend was statistically significant in women only ($P < 0.005$). The highest prevalence was observed above 60 years of age in the total sample (48.6%) and in both men and women (39.1% and 57.8% respectively).

Table 3 shows the prevalence of each of the 5 ATP III criteria for diagnosis of metabolic syndrome by sex and in the total sample. The parameter with the highest prevalence was abnormal waist circumference (61.6%), while the lowest was diabetes mellitus (21.5%).

Among females, increased waist circumference ranked as the highest criterion followed by low serum HDL-cholesterol while high serum TG showed the highest prevalence in males and low serum HDL-cholesterol ranked second. The differences between males and females for increased waist circumference, low serum HDL-cholesterol and raised serum HDL-cholesterol were statistically significant ($P \leq 0.05$). The differences between the sexes for the remaining criteria (hypertension and diabetes mellitus) although higher in males, did not reach statistical significance. Differences in smoking status, physical activity and family history of premature cardiovascular disease between patients with metabolic syndrome and those without were examined using the chi-squared test. Family history of premature cardiovascular disease showed a statistically significant difference ($P < 0.0001$) between the 2 groups, where patients with metabolic syndrome showed an almost double prevalence of family history of premature cardiovascular disease (16.4% versus 7.7%). Smoking status and physical activity did not show any statistically significant difference (Table 1).

Table 1 Metabolic syndrome status of the study patients according to selected characteristics

Characteristic	With metabolic syndrome ($n = 274$)		Without metabolic syndrome ($n = 456$)		Total ($n = 730$)	
	No.	%	No.	%	No.	%
Smoking	41	14.9	75	16.0	116	15.9
Physical activity	65	23.7	128	28.0	193	26.4
Family history of premature cardiovascular disease ^a	45	16.4	35	7.7	80	11.0

^a $P < 0.001$.

$n =$ total number of participants.

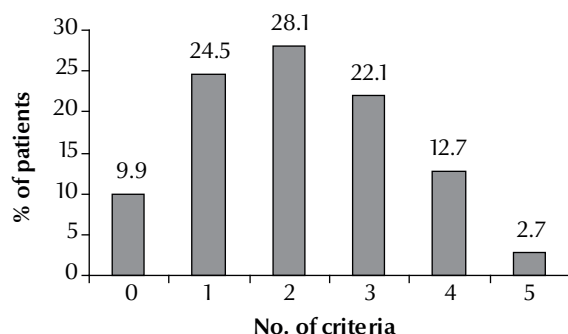


Figure 1 Distribution of the total sample of patients by number of Adult Treatment Panel III (ATP III) criteria for metabolic syndrome

Discussion

Studies estimating the prevalence of metabolic syndrome in different populations are usually not amenable to comparison [6–9]. These studies often have a variety of different study designs, sample selection, definitions of metabolic syndrome, and age and sex structure of the populations under study. Nevertheless useful inferences and comparisons can be made.

The results of our study showed a high prevalence of metabolic syndrome (37.4% of all subjects). These findings could be due to the characteristics of the sample where 90% had at least 1 or more of the 5 abnormal components of the metabolic syndrome as defined by the ATP III criteria.

A similar study done on 250 Kuwaiti hypertensive patients attending a family medicine clinic demonstrated also a high

prevalence of metabolic syndrome (34%) [10], which is comparable to our results. In the same study, women had a higher prevalence of the syndrome than men which was also seen in our study. Other studies although with a different design also showed this sex difference [11–13].

A consistent finding in various studies is the observation that the prevalence of metabolic syndrome is highly age dependent [1,10,14]. The results of our study confirm this observation, as the prevalence increased with a rising age to reach a maximum above the age of 60 years for the total sample and for both sexes. It is also noted that in females the prevalence of metabolic syndrome in the age group > 60 years was almost double that in the age group 30–45 years.

Based on clinical trials, proper and adequate management of individual components of the syndrome should prevent or delay the onset of diabetes,

hypertension and cardiovascular disease [14]. Our study showed that the waist circumference as a measure of abdominal obesity ranked as the first abnormality among females and in the total sample, while elevated serum TG level ranked first among males. Even though central obesity ranked as third among males, 42.3% of them had abnormal waist circumference.

The presence of abdominal obesity was found to be highly correlated with metabolic risk factors. Therefore the simple measure of waist circumference is recommended to identify the body weight component of this syndrome. The ATP III study recognized also that some men develop multiple metabolic risk factors when waist circumference is only marginally increased [14]. Furthermore central body fat (around the body organs and in deeper tissues) was found to be associated with metabolic syndrome in older men and women whether they are of normal weight or not [15].

More than half of our study sample had low serum HDL-cholesterol levels. Similar observations were reported by studies from Oman [16] and the West Bank of Palestinian [9]. Elevated serum TG and low serum HDL-cholesterol were shown to be independent risk factors for coronary heart disease [5]. In clinical practice these 2 abnormalities are usually observed with obesity, overweight, physical inactivity, cigarette smoking and diabetes among others.

Table 2 Age-specific prevalence of metabolic syndrome by sex (total sample)

Age (years)	Males			Females ^a			Both sexes		
	Total	With metabolic syndrome		Total	With metabolic syndrome		Total	With metabolic syndrome	
	No.	No.	%	No.	No.	%	No.	No.	%
< 30	8	2	25.0	20	1	5.0	28	3	10.7
30–45	56	13	23.2	124	38	30.6	180	51	28.3
46–60	130	40	30.8	214	93	43.5	344	133	38.7
> 60	87	34	39.1	90	52	57.8	177	86	48.6
Total	281	89	31.7	448	184	41.0	729	273	37.4
		$P = 0.234$			$P < 0.001$				

^aData missing for 1 female.

Difference in sex-specific prevalence significant ($P \leq 0.05$).

Table 3 Prevalence of Adult Treatment Panel III (ATP III) criteria for diagnosis of metabolic syndrome among the study sample

ATP III criteria	Males (n = 281)		Females (n = 449)		Both sexes (n = 730)		P-value
	No.	%	No.	%	No.	%	
Waist circumference	119	42.3	330	73.5	449	61.5	< 0.001
Hypertension	100	35.6	137	30.5	237	32.6	NS
Diabetes mellitus	69	24.6	88	19.6	157	21.5	NS
Serum HDL-cholesterol	130	46.3	252	56.1	382	52.3	< 0.01
Serum triglycerides	141	50.2	178	39.6	319	43.7	< 0.005

HDL = high-density lipoprotein; NS = not significant; n = total number of participants.

ATP III guidelines also stress that family history of premature cardiovascular disease is considered a major risk factor that modifies the management approach of metabolic syndrome [5].

The results of this study should alert all family practitioners to the importance of multiple risk factors, as observed in the metabolic syndrome. Among men the increased risk of diabetes and cardiovascular disease are 3.7-fold and 24.5-fold for men having 4 or 5 criteria respectively compared with men having no criteria of the metabolic syndrome [17]. In women significant associations

between the metabolic syndrome and subsequent 3-year risk of death or major adverse cardiovascular events has also been observed [18].

Even though the etiology of metabolic syndrome has not been established definitely, the ATP III cites obesity and physical inactivity as the 2 underlying causes of the syndrome. This suggests that lifestyle changes and the treatment of hyperlipidaemia, diabetes and hypertension are the cornerstones for the management of metabolic syndrome.

Our study looks at metabolic syndrome in high-risk groups, and in this

sense, it is the first of its kind in Jordan. However, further in-depth studies are needed to identify the syndrome not only in patients with similar conditions but also in the general Jordanian population.

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References

1. Cameron JA, Shaw EJ, Zimmet ZP. The metabolic syndrome: prevalence in worldwide populations. *Endocrinology and Metabolism Clinics of North America*, 2004, 33(2):351-375.
2. Isomaa B et al. Cardiovascular morbidity and mortality associated with the metabolic syndrome. *Diabetes Care*, 2001, 24:683-689.
3. *Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: diagnosis and classification of diabetes mellitus*. Geneva, World Health Organization, 1999.
4. Balkau B, Charles MA. Comment on the provisional report from the WHO consultation. European Group for the Study of Insulin Resistance (EGIR). *Diabetic Medicine*, 1999, 16:442-443.
5. Executive summary of the third report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). *Journal of the American Medical Association*, 2001, 285:2486-2497.
6. Ramachandran A et al. Metabolic syndrome in urban Asian Indian adults: a population study using modified ATP III criteria. *Diabetes Research and Clinical Practice*, 2003, 60:199-204.
7. Onat A et al. Metabolic syndrome: major impact on coronary risk in a population with low cholesterol levels: a prospective and cross sectional evaluation. *Atherosclerosis*, 2002, 165:285-292.
8. Balkau B et al. Frequency of the WHO metabolic syndrome in European cohorts, an alternative definition of an insulin resistance syndrome. *Diabetes and Metabolism*, 2002, 28:364-376.
9. Abdul-Rahim HF et al. The metabolic syndrome in the West Bank population: an urban-rural comparison. *Diabetes Care*, 2001, 24:275-279.
10. Sorkhou IE et al. Prevalence of metabolic syndrome among hypertensive patients attending a primary care clinic in Kuwait. *Medical Principles and Practice*, 2004, 13:39-42.
11. Azizi F et al. Prevalence of metabolic syndrome in an urban population: Tehran Lipid and Glucose Study. *Diabetes Research and Clinical Practice*, 2003, 61:29-37.
12. Gupta A et al. Prevalence of diabetes impaired fasting glucose and insulin resistance in an urban Indian population. *Diabetes Research and Clinical Practice*, 2003, 61:69-76.
13. Ford ES, Giles WH, Dietz WH. Prevalence of the metabolic syndrome among U.S adults: findings from the Third National Health and Nutrition Examination Survey. *Journal of the American Medical Association*, 2002, 287:356-359.
14. Meigs JB. The metabolic syndrome (insulin resistance syndrome or syndrome X). *UpToDate* [online article] (<http://www.uptodate.com/patients/content/topic.do?print=true&topicKey=diabetes/21989&view=print>, accessed 14 November 2011).
15. Goodpaster BH et al. Obesity, regional body fat distribution, and the metabolic syndrome in older men and women. *Archives of Internal Medicine*, 2005, 165:777-783.

16. Al-Lawati JA et al. Prevalence of the metabolic syndrome among Omani adults. *Diabetes Care*, 2003, 26:1781-1785.
17. Sattar N et al. Metabolic syndrome with and without C-reactive protein as a predictor of coronary heart disease and diabetes in the West of Scotland Coronary Prevention Study. *Circulation*, 2003, 108:414-419.
18. Kip KE et al. Clinical importance of obesity versus the metabolic syndrome in cardiovascular risk in women. A report from the Women's Ischemia Syndrome Evaluation (WISE) Study. *Circulation*, 2004, 109:706-713.

Corrections

M. Al Adham and B. Abu Hamad. Drug dispensing systems in Gaza hospitals: a comparative study. *Eastern Mediterranean Health Journal*, 2011, 17(10):722-729. The Arabic abstract should read:

الخلاصة: يُعد تطبيق نظام ملائم لتوزيع الدواء في المستشفيات ضرورياً لضمان مأمونية وترشيد استخدام الدواء. وتهدف هذه الدراسة إلى تقييم نظام الجرعة الواحدة لتوزيع الدواء ونظام توزيع الدواء بحسب المخزون الدوائي المطبقين في مستشفيات غزة للتحقق من أي النظامين أكثر نفعاً. وقد اعتمد في تصميم الدراسة المستعرضة الكمية المقارنة على مقابلة مبرمجة مع الصيادلة ورئيسات التمريض، وعلى استعراض استمارات التسجيل للأدوية المفقودة، وعلى القائمة التفقدية للإشراف على تناول الدواء. وقد كان متوسط عدد الوحدات المفقودة لكل صنف من الأدوية يجري توزيعه: 3.4 لنظام الجرعة الواحدة لتوزيع الدواء، و 1.8 لنظام توزيع الدواء بحسب المخزون الدوائي في الأجنحة وكان متوسط أخطاء تناول الدواء: 1.8 لنظام الجرعة الواحدة لتوزيع الدواء و 0.9 لنظام توزيع الدواء بحسب المخزون الدوائي في الأجنحة وهما أقل بدرجة يُعتدُّ بها إحصائياً في المستشفى الذي يتبع نظام توزيع الدواء بحسب وحدة الجرعة مقارنة بنظام توزيع الدواء بحسب المخزون الدوائي في الأجنحة. واتضح أن نظام الجرعة الواحدة لتوزيع الدواء أكثر أماناً، وأقل فقداناً للأدوية، وأكثر تقبلاً لدى العاملين، وأكثر دعماً للممارسات الصيدلانية السريرية الجيدة. ولذلك يوصى باستخدامه في سائر مستشفيات قطاع غزة.

J.A. Razzak, U.R. Khan, I. Azam, M. Nasrullah, O. Pasha, M. Malik and A. Ghaffar. Health disparities between Muslim and non-Muslim countries. *Eastern Mediterranean Health Journal*, 2011, 17(9):654-664. The affiliation of M. Nasrullah should read: Department of Emergency Medicine, Aga Khan University, Karachi, Pakistan.

Obesity-associated distress in Lebanese adolescents: an exploratory look at a large cohort of students

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الضائقة المصاحبة للسمنة لدى المراهقين اللبنانيين: نظرة استقصائية على أترابية ضخمة من التلاميذ

باسكال سلامة، برناديت بربور

الخلاصة: تخطى السمنة بين الأطفال باهتمام دولي، وقد هدفت الباحثتان من هذه الدراسة إلى إيجاد سلم قياسي لتقييم الضائقة المتعلقة بالسمنة بين الفتيان والفتيات في لبنان، مع دراسة العلاقة بين السلوكيات المصاحبة للسمنة وبين الضائقة. فقد أجريت دراسة مستعرضة عام 2009، على عينة مؤلفة من 1933 مراهقاً تراوح أعمارهم بين 12 و18 عاماً. وقامت الباحثتان بتوجيه عدد من الأسئلة إلى مجموعة الدراسة حول الخصائص العائلية والشخصية، والرّضى عن الوزن، وتكرار استهلاك مجموعات منتقاة من الطعام، وعادات الغذاء والنظام الغذائي، وسلوك ممارسة النشاط البدني (حالياً وأثناء مرحلة الطفولة) والمواقف تجاه السمنة، والضائقة المتعلقة بالسمنة. ولدى تحليل العوامل؛ وجدت الباحثتان أن جميع العناصر الثمانية لسلم قياس ضائقة السمنة تصب في عامل واحد. وقد كان احتمال إصابة الغتيان بضائقة السمنة أقل مما لدى الفتيات، كما أن الضائقة المتعلقة بالسمنة، ولا سيما ما يتعلق منها بضغوط الأسرة أو الضغط الإعلامي لإنقاص الوزن، تزيد من خطر اتباع نُظم غذائية لإنقاص الوزن وتناول الأدوية لذلك الغرض، ولكنها لم تتوافق مع العادات الغذائية الصحية أو الاشتراك بأنشطة رياضية.

ABSTRACT Childhood obesity has become an international concern. Our objective was to construct a scale for assessing obesity-related distress among Lebanese boys and girls and to study the relationship between obesity-associated behaviours and distress. A cross-sectional study was conducted in 2009 on a sample of 1933 adolescents aged 12–18 years. Questions were asked about personal and family characteristics, satisfaction with weight, frequency of consumption of selected food groups, eating and dieting habits, physical activity behaviour (current and during childhood), attitudes towards obesity, and obesity-related distress. In the factor analysis, all 8 items of the obesity distress scale loaded onto 1 factor. Boys were significantly less likely than girls to be distressed by their obesity. Obesity-related distress, particularly when related to family and media pressure to lose weight, increased the risk of using weight-loss diets and drugs but was not associated with healthy dietary habits or participation in physical activity.

Détresse associée à l'obésité chez des adolescents libanais : étude exploratoire d'un vaste échantillon d'élèves

RÉSUMÉ L'obésité de l'enfant est devenue une préoccupation mondiale. Notre objectif était d'élaborer une échelle de mesure de la détresse associée à l'obésité chez des filles et des garçons libanais et d'étudier la relation entre les comportements associés à l'obésité et la détresse. Une étude transversale a été menée en 2009 sur un échantillon de 1933 adolescents âgés de 12 à 18 ans. Les questions ont porté sur les caractéristiques personnelles et familiales, le niveau de satisfaction par rapport au poids, la fréquence de consommation de certains groupes d'aliments, les habitudes alimentaires et les régimes, le comportement en matière d'activité physique (au moment de l'étude et pendant l'enfance), l'attitude envers l'obésité et la détresse liée à l'obésité. Dans l'analyse factorielle, les huit items de l'échelle de détresse associée à l'obésité étaient regroupés en un seul facteur. Les garçons étaient moins susceptibles d'être en détresse en raison de leur obésité que les filles. Ce type de détresse augmentait le risque de recours à des régimes et médicaments amaigrissants, surtout lorsqu'il était lié à une pression familiale et médiatique pour perdre du poids. Mais il n'était pas associé à des habitudes alimentaires saines, ni à la pratique d'une activité physique.

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Introduction

Obesity has become the most common chronic disorder in childhood and adolescence in industrialized countries [1]. At the same time contemporary media culture emphasizes thinness and stigmatizes obese persons; this increases the probability of obese young people internalizing negative information about themselves and may cause them to feel psychologically distressed about their physical appearance and self-image [2–4]. Thus, low quality of life [5] and depression, low self-esteem and self-expectations have been identified among many obese teens, especially girls [6]. A disturbed body image may lead to further eating disorders, e.g. binge eating [3,7], even in the absence of overt mental pathology [8].

In a previous study performed on adolescents from Lebanese private schools, we showed that the prevalence of obesity was 2.5 times higher in boys (10.1%) than in girls (4.2%). Overweight boys without obesity (28.8%) were almost 1.5 times more common than girls (19.0%) [9,10]. Lebanon is a country where a transition in nutrition habits is taking place [11] and the causes of obesity in adolescence may lie in unhealthy dietary habits and low levels of physical activity [12–18].

To our knowledge, no scale has been validated to specifically assess obesity-related distress in Lebanon, particularly in adolescents. We therefore carried out an exploratory study of obesity-related factors and distress. We have presented the results relating to correlates of adolescent obesity in another paper [19]. In the present analysis, we aimed to construct a scale for assessing obesity-related distress among Lebanese boys and girls and to study the relationship between obesity-associated behaviours and distress.

Methods

Study design and sample

A cross-sectional study was conducted between May and July 2009 on a sample

of adolescents aged between 12 and 18 years attending Lebanese schools. We chose this age category because children 12 years old and over are generally able to respond adequately to questionnaires and as Lebanese schools comprise adolescents up to 18 years of age. A convenience sample of 20 schools was chosen from the 5 Lebanese districts: 2 in Beirut, 9 in Mount Lebanon, 3 in North Lebanon, 3 in South Lebanon and 3 in the Bekaa. One school in Beirut refused to participate, while all others agreed to enrol and to distribute a total of 2503 questionnaires. Of these, we obtained 1933 adequately filled questionnaires (77.2% response rate).

Data collection

Three researchers were trained to collect the data from students in the required age group from the schools' health registers, in collaboration with the director and/or the school health professional. After explanations about the general objectives of the study, the selected adolescents were asked to complete a questionnaire on the spot, enquiring about baseline characteristics (age, sex, region of residence, height and weight), personal and family characteristics (obesity history) and satisfaction with their weight. Questions were also asked about frequency of consumption of selected food groups, eating and dieting habits, in addition to questions regarding physical activity behaviour (current and during childhood) and attitudes towards obesity. Participants completed the obesity-related distress scale which was developed for this study. Although participation was not mandatory, no students refused to participate since participation was requested by the school directors.

Anthropometric measures

Body mass index (BMI), calculated as weight in kg over height in meters squared, was used to evaluate obesity (normal weight, at-risk of obesity and obese) [20,21]. Although the WHO

standard reference cut-offs can be used [22], we preferred to use the cut-off values taken from the International Obesity Taskforce for BMI of children aged 2–18 years to define obesity and at-risk of obesity (overweight but not yet obese) in order to compare the results with previous work performed in Lebanon [9,10,19]. The latter cut-offs for children correspond to the widely used cut-off points of 30 kg/m² and 25 kg/m² for adult obesity and overweight [23].

To validate the self-reported measures, height and weight were measured in a randomly selected subsample of 225 adolescents using calibrated balance (Soehnle, sensitivity 500g) and a stadiometer for height measurement (Stanley-Mabo). Measurements were made with the students wearing light indoor clothing and without their shoes. Simple regression equations were generated to validate the self-reported height and weight values; correlation coefficients along with their associated *t*-test were performed. The predicted values were then used as corrected height and weight.

Physical activity behaviour

To assess levels of physical activity we used a standard questionnaire to measure habitual leisure time sports or recreational activities other than those performed in physical education classes during school. We defined metabolic equivalents (MET) for the energy expenditure above that required for activities of daily living, for activities e.g. bicycling (MET = 8), basketball (MET = 8) and walking for exercise (MET = 4) and lessons e.g. swimming (MET = 6), dance (MET = 6.5) and stretching (MET = 2.5) [24–26]. The physical activity score was computed by multiplying an estimate of the MET for each recorded activity by the weekly frequency with which it was performed and an overall average weekly score was calculated as MET-times per week; a higher score indicated greater activity

[27]. The physical activity level was then standardized as: standard MET-times/week = (MET-times/week-sample mean)/standard deviation). For descriptive purposes, we classified the physical activity MET-times/week variable into 4 categories: no physical activity (< -1), low (-1 to -0.99), moderate (0 to 0.99) and vigorous (≥ 1).

Frequency of selected food groups

The food frequency questionnaire comprised questions about the frequency of consumption of 8 selected food groups. Foods were selected for the questionnaire if they were commonly consumed by the majority of the Lebanese population: at least once weekly for items and at least once monthly for dishes [28].

For the first 2 groups, dishes were selected if, according to the classification of the SAIN (score of nutritional adequacy of individual foods) and LIM (score of nutrients to be limited) nutrient profiling system [29,30], they were considered as "unhealthy", i.e. had a low SAIN and high LIM or "healthy", i.e. had a high SAIN and low LIM. The selected dishes were then classified into 2 classes:

- Lebanese traditional dishes ("healthy"), e.g. Lebanese *tabbouleh* (bulgur wheat, parsley and tomatoes mixed with lemon and olive oil sauce), *yakhnet* types (legumes stew), *mjaddra* (lentil purée), *loubieh bzeit* (green beans in oil), *fattouch* (fresh vegetables mixed with toasted bread).
- Fast food dishes ("unhealthy") e.g. *mna'ouche bzaatar* (Lebanese thyme pizza), *man'oucheh bjebneh* (Lebanese cheese pizza), hamburger, cheeseburger, Italian pizza and pastas, French fries.

We also added 6 other classes of food that were deemed to be important for adolescents:

- Dairy products, e.g. milk, cheese, yogurt, *labneh* (white cheese). These food items are frequently consumed with bread in Lebanon for breakfast or dinner [general observation].

- Snack foods: both sweet, e.g. sweets and candies, and salted, e.g. potato chips and popcorn.
- Liquids: e.g. fruit juices (natural or artificial) and carbonated, sweetened soft drinks.
- Vegetables, e.g. tomatoes, cucumber, lettuce, and fruits, e.g. apples, oranges, pears, bananas, grapes. These were the fruits and vegetables most commonly consumed by the Lebanese population and were grouped into one class

Eating habits

Questions were asked about regular eating habits: the rapidity and timing of eating, meal frequency, eating between meals, plate emptying, and eating during times of psychological distress. Questions were also asked about dieting: being on a weight-loss diet, counting calories, eating "light" food, taking drugs to lose weight, and being urged by the media or family to lose weight.

Obesity-related distress scale construction

The obesity-related distress scale was designed to cover the dimensions of obesity-related distress and to obtain a multifactorial measurement for the physical, social and psychological axes of obesity-related distress [24,25]. A set of items were generated by the authors who are experts in epidemiology and in sociology. The items fell into the categories of emotional functioning (low self-esteem, feeling depressed most of the time, feeling anxious most of the time, suicidal ideation, not loving oneself); physical functioning (difficulty in daily activities, dyspnoea on effort); body image disturbances (avoiding looking in mirrors, avoiding being photographed, difficulty in dressing); sexual problems (difficulty in dating, feeling undesired by persons of the opposite sex); social avoidance (public distress, impaired social life, poor communication with others) and marginalization (being criticized by others, being rejected during games, being teased by others, being

disliked by others). A total of 34 items were generated which were reviewed and compared with current internationally used scales [31,32]. All items had a 3-point Likert-type response format (1= never, 2 = sometimes, 3 = yes). The questionnaire was translated into Arabic language by 2 independent Lebanese translators who had expertise in French to Arabic translation. Translation discrepancies were resolved in collaboration with the investigators. The items were then tested on 8 individuals, who did not report any problems in understanding the scale.

This preliminary version of the scale, which included all 34 items, was administered to the sample of 1933 individuals. The scale construction required several steps. Reliability of the score was estimated by computing internal consistency (Cronbach alpha). In addition, the validity of the instrument was tested in 2 different ways. We first conducted a factor analysis by the principal component analysis technique, after checking the sample adequacy for this type of analysis. It would be expected that the item pool would be clustered into several factors referring to the above-mentioned dimensions of obesity-related distress. Factor loadings were retained if higher than 0.35. We thus eliminated 26 irrelevant items due to low factor loading (< 0.35), leaving an 8-item scale. The sum of these items (score range 8–24) constituted the global score for an individual.

We examined the group difference validity of the construct (i.e. the ability of the instrument to distinguish groups known to differ from one another) by comparing scores on the scale by sex, BMI category (normal weight, at-risk of obesity and obese) and satisfaction with weight (satisfied and not satisfied with weight).

Statistical analysis

Data entry and analysis were performed using SPSS statistical software, version 13.0.

The chi-squared test was used to compare percentages of nominal variables between groups (sex and BMI status categories), while Somers' D test was performed for ordinal variables, e.g. food consumption and physical activity frequencies and BMI status. Non-parametric tests were used to compare the distribution of discrete or non-normal variables across categories: Wilcoxon rank sum test to compare between 2 groups and Kruskal–Wallis test to compare between more than 2 groups.

A stepwise descendant multivariate logistic regression was carried out, with obesity-related distress as the dependent variable. Independent variables were all other variables evaluated in this study. Factors taken into account were age, sex, BMI status categories, eating when psychologically distressed, ever being on a weight-loss diet, ever taking drugs to lose weight, urged by the media to lose weight, urged by family to lose weight, and satisfaction with own weight.

In all statistical analyses, $P < 0.05$ was considered statistically significant.

Results

Obesity-related distress scale

A description of the 8 items in the final version of the obesity-related distress scale is given in Table 1. These were: impaired social life, low self-esteem, difficulty dressing, dyspnoea on effort, difficulty in daily activities, poor communication with others, being criticized by others, and avoiding looking in mirrors. In the factor analysis, all 8 items loaded onto 1 factor, giving 1-dimensional solution for the scale. This factor alone explained 53.1% of the total variance. The reliability analysis showed a high Cronbach alpha of 0.87.

Table 1 also shows the frequency of responses to scale items by sex and by BMI category. All items of the scale were significantly different comparing boys and girls, except for the item on

avoiding looking in mirrors. When comparing between BMI status categories, significant differences were found for all variables, except for poor communication with others (Table 1).

The total mean obesity distress score was significantly higher for girls than for boys [13.1 (SD 4.7) versus 12.6 (SD 4.7)] ($P = 0.002$). Obese individuals globally had higher mean scores [13.8 (SD 4.5)] than individuals at-risk of obesity [12.7 (SD 4.5)] ($P < 0.001$). Moreover, girls scored significantly higher on obesity-related distress than boys within both the obesity [mean score 16.4 (SD 4.5) versus 13.8 (SD 4.5)] and at-risk of obesity categories [14.1 (SD 4.3) versus 12.7 (SD 4.5)] ($P < 0.01$) (Table 2).

Factors associated with obesity-related distress

Baseline characteristics

Table 3 shows the mean total scores of respondents on the obesity-related distress scale and the frequency of responses in distressed and non-distressed individuals according to respondents' baseline characteristics. There was significantly more obesity distress in the Bekaa and Beirut regions, in individuals suffering from a disease that favours obesity, in the case of family obesity, in those with a history of childhood obesity and in individuals dissatisfied with their own weight (all $P < 0.001$).

Food consumption, eating and dieting behaviour

We found that individuals distressed due to obesity did not have different eating habits than those who are not distressed, except for eating potato chips and popcorn more frequently ($P < 0.01$). In addition, eating more fruits and vegetables and less carbonated soft drinks had a tendency to be related to greater distress, although the results were inconsistent. Consumption of other foods associated with obesity was similar in these 2 categories

of people (fast food, Lebanese dishes, fruit juices) ($P > 0.05$) (Table 4).

Obesity-distressed individuals more frequently sought to eat light food, tried to count calories, ate when psychologically distressed and were more encouraged by media publicity to eat food (all $P < 0.001$). Moreover, they had more frequently ever been on diet, ever taken drugs to lose weight and felt urged by the media and their family to lose weight (all $P < 0.001$) (Table 5).

Physical activity behaviour

In the measure of physical activities, obesity-distressed individuals performed significantly less sports ($P = 0.01$), had a significant trend towards lower number of hours of sport weekly ($P = 0.02$) and had a (borderline) lower level of physical activity ($P = 0.06$) (Table 6).

Multivariate analysis

In the multivariate analysis, obesity-related distress was significantly associated with the following variable: urged by family to lose weight, urged by media to lose weight, eating when psychologically distressed and dissatisfaction with own weight (Figure 1).

Discussion

This study reports the development of an obesity-related distress scale for Lebanese adolescents. Physical, psychological and social items all loaded on a 1-dimensional factor, indicating that obesity in Lebanese adolescents causes distress on all axes concomitantly. This is in contrast with the results of other researchers, who found a multifactorial pattern to obesity-related quality of life [33,34]. More research is needed to explore these results. Nevertheless, this scale was able to differentiate between individuals who were obese, at-risk of obesity and normal weight.

In addition, girls were more prone to report obesity-related distress than

Table 1 Loading factors and frequency of responses to items of the obesity-related distress scale by sex and by body mass index category

Item	Loading on factor	Communality	Males (n = 965)		Females (n = 968)		P-value	Normal weight (n = 1283)		At-risk of obesity (n = 518)		Obese (n = 103)		P-value
			No.	%	No.	%		No.	%	No.	%	No.	%	
Impaired social life														
Never	0.85	0.72	726	79.3	811	85.2	0.001 ^a	706	55.0	258	49.8	32	31.1	< 0.001 ^b
Sometimes			99	10.8	63	6.6		289	22.5	132	25.5	30	29.1	
Yes			91	9.9	78	8.2		288	22.4	128	24.7	41	39.8	
Low self-esteem														
Never	0.83	0.70	728	79.6	800	84.0	0.038 ^a	675	52.6	241	46.5	41	39.8	0.005 ^b
Sometimes			68	7.4	51	5.4		199	15.5	105	20.3	14	13.6	
Yes			119	13.0	101	10.6		409	31.9	172	33.2	48	46.6	
Difficulty in dressing														
Never	0.83	0.68	728	79.6	801	84.1	0.012 ^a	731	57.0	249	48.1	34	33.0	< 0.001 ^b
Sometimes			92	10.1	62	6.5		203	15.8	125	24.1	29	28.2	
Yes			95	10.4	89	9.3		349	27.2	144	27.8	40	38.8	
Dyspnoea on effort														
Never	0.83	0.61	749	81.9	845	88.8	< 0.001 ^a	804	62.7	294	56.8	54	52.4	0.05 ^b
Sometimes			66	7.2	55	5.8		191	14.9	106	20.5	15	14.6	
Yes			100	10.9	52	5.5		288	22.4	118	22.8	34	33.0	
Difficulty in daily activities														
Never	0.80	0.62	752	82.2	867	91.1	< 0.001 ^a	844	65.8	322	62.2	51	49.5	< 0.001 ^b
Sometimes			86	9.4	45	4.7		177	13.8	100	19.3	31	30.1	
Yes			77	8.4	40	4.2		262	20.4	96	18.5	21	20.4	
Poor communication with others														
Never	0.78	0.56	809	88.5	880	92.4	0.007 ^a	946	73.7	377	72.8	67	65.0	0.348 ^b
Sometimes			53	5.8	43	4.5		154	12.0	76	14.7	20	19.4	
Yes			52	5.7	29	3.0		183	14.3	65	12.5	16	15.5	
Being criticized by others														
Never	0.75	0.70	734	80.2	822	86.3	< 0.001 ^a	829	64.6	271	52.3	39	37.9	< 0.001 ^b
Sometimes			96	10.5	64	6.7		232	18.1	124	23.9	36	35.0	
Yes			85	9.3	66	6.9		222	17.3	123	23.7	28	27.2	
Avoiding looking in mirrors														
Never	0.73	0.54	809	88.4	865	90.9	0.14 ^a	954	74.4	365	70.5	63	61.2	0.01 ^b
Sometimes			51	5.6	48	5.0		155	12.1	74	14.3	25	24.3	
Yes			55	6.0	39	4.1		174	13.6	79	15.3	15	14.6	

^aChi-square test; ^bSomers D ordinal test.

Table 2 Mean scores on the obesity-related distress scale by sex and body mass index category

Variable	Obesity distress score						<i>P</i> -value
	Total		Males		Females		
	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)	
Total	1904	12.9 (4.7)	947	12.6 (4.7)	957	13.1 (4.7)	0.002 ^a
Normal weight	1283	12.6 (4.8)	547	12.4 (4.8)	736	12.8 (4.8)	0.068 ^a
At-risk of obesity	518	13.2 (4.5)	332	12.7 (4.5)	186	14.1 (4.3)	< 0.00 ^a
Obese	103	14.7 (4.7)	68	13.8 (4.5)	35	16.4 (4.5)	0.005 ^a
<i>P</i> -value		< 0.001 ^b					

^aWilcoxon test; ^bKruskal-Wallis test.

SD = standard deviation.

boys, both among the whole sample and within the same category of BMI status. Moreover, in the multivariate analysis, sex was retained in the model as

an independent factor of obesity-related distress. Besides obesity itself, weight dissatisfaction was another determinant of obesity-related distress.

This exploratory study showed that boys were more frequently overweight and obese than girls. Prevalence and gender differences in obesity and risk

Table 3 Baseline characteristics: mean scores of respondents on the obesity-related distress scale and frequency of responses by distress category

Characteristic	Obesity distress score	<i>P</i> -value ^a	Non-distressed (<i>n</i> = 920)		Distressed (<i>n</i> = 1013)		<i>P</i> -value
	Mean (SD)		No.	%	No.	%	
Region		< 0.001					< 0.001 ^b
Bekaa	14.0 (4.7)		95	34.8	178	65.2	
Mount Lebanon	12.5 (4.4)		408	50.7	396	49.3	
North Lebanon	12.9 (5.3)		186	51.4	176	48.6	
South Lebanon	12.9 (4.8)		116	48.3	124	51.7	
Beirut	13.0 (4.6)		115	45.3	139	54.7	
Age (years)		0.695					0.736 ^c
< 15	13.0 (4.7)		265	46.7	302	53.3	
15–16	12.9 (4.7)		358	47.1	402	52.9	
> 16	12.8 (4.7)		295	48.8	309	51.2	
Has disease favouring obesity		< 0.001					0.001 ^b
Yes	15.2 (5.0)		14	25.0	42	75.0	
No	12.8 (4.7)		904	48.2	971	51.8	
Obese persons in the family (no.)		< 0.001					< 0.001 ^c
0	12.4 (4.6)		612	52.5	554	47.5	
1–2	13.5 (4.8)		253	42.2	347	57.8	
> 2	14.0 (4.5)		55	32.9	112	67.1	
History of obesity during childhood		< 0.001					< 0.001 ^b
Yes	14.0 (4.8)		155	36.7	267	63.3	
No	12.6 (4.7)		763	50.6	746	49.4	
Satisfied with own weight		< 0.001					< 0.001 ^c
Not at all	14.3 (4.6)		154	31.0	343	69.0	
More or less	12.7 (4.6)		305	49.8	307	50.2	
Yes	12.1 (4.7)		461	56.0	362	44.0	

^aKruskal-Wallis or Wilcoxon tests; ^bchi-squared test; ^cSomers' D test.

SD = standard deviation.

Table 4 Food consumption behaviour: mean scores of respondents on the obesity-related distress scale and frequency of responses by distress category

Food consumption	Obesity distress score	<i>P</i> -value ^a	Non-distressed (<i>n</i> = 920)		Distressed (<i>n</i> = 1013)		<i>P</i> -value ^b
	Mean (SD)		No.	%	No.	%	
<i>Fast food (times/week)</i>		0.39					0.33
0	12.5 (4.5)		40	4.3	40	3.9	
1-3	12.8 (4.7)		651	70.8	703	69.4	
4-7	13.1 (4.9)		225	24.5	263	26.0	
> 7	14.8 (5.2)		4	0.4	7	0.7	
<i>Lebanese dishes (times/week)</i>		0.44					0.05
0	12.5 (4.9)		77	8.4	63	6.2	
1-3	12.8 (4.6)		470	51.1	501	49.5	
4-7	13.1 (4.8)		366	39.8	445	43.9	
> 7	11.6 (4.1)		7	0.8	4	0.4	
<i>Fruit juice (times/week)</i>		0.11					0.71
0	12.6 (4.7)		63	6.9	62	6.1	
1-3	12.8 (4.6)		439	47.8	500	49.4	
4-7	13.1 (4.8)		406	44.2	448	44.3	
> 7	10.0 (2.3)		11	1.2	2	0.2	
<i>Soft drinks (times/week)</i>		0.03					0.11
0	12.1 (4.8)		94	10.2	64	6.3	
1-3	12.8 (4.7)		381	41.5	435	42.9	
4-7	13.1 (4.8)		429	46.7	504	49.8	
> 7	11.9 (4.3)		15	1.6	10	1.0	
<i>Milk and dairy products (times/week)</i>		0.37					0.05
0	12.5 (5.1)		127	13.8	94	9.3	
1-3	13.0 (4.7)		308	33.5	359	35.5	
4-7	12.9 (4.7)		478	52.0	545	53.9	
> 7	13.9 (5.0)		7	0.8	14	1.4	
<i>Sweets and candies (times/week)</i>		0.28					0.57
0	12.5 (4.7)		38	4.1	36	3.6	
1-3	12.9 (4.7)		380	41.3	407	40.3	
4-7	13.0 (4.7)		487	53.0	562	55.6	
> 7	11.1 (4.0)		14	1.5	6	0.6	
<i>Potato chips and popcorn (times/week)</i>		< 0.001					0.006
0	12.6 (4.7)		57	6.2	51	5.0	
1-3	12.5 (4.6)		471	51.3	462	45.6	
4-7	13.4 (4.9)		378	41.1	497	49.1	
> 7	10.1 (2.6)		13	1.4	3	0.3	
<i>Vegetables and fruits (times/week)</i>		0.18					0.017
0	11.8 (4.5)		48	5.2	32	3.2	
1-3	12.9 (4.8)		251	27.3	254	25.1	
4-7	13.0 (4.7)		613	66.6	712	70.3	
> 7	13.1 (4.1)		8	0.9	15	1.5	

^aKruskal-Wallis test; ^bSomers' D test.
SD = standard deviation.

Table 5 Eating and dieting habits: mean scores of respondents on the obesity-related distress scale and frequency of responses by distress category

Eating and dieting habits	Obesity distress score	<i>P</i> -value ^a	Non-distressed (<i>n</i> = 920)		Distressed (<i>n</i> = 1013)		<i>P</i> -value ^b
	Mean (SD)		No.	%	No.	%	
<i>Speed of eating</i>							
Eats slowly	12.8 (4.7)	0.51	459	49.9	476	47.0	0.20
Eats rapidly	12.9 (4.7)		461	50.1	537	53.0	
<i>Seeks to eat light food</i>							
Never	12.2 (4.7)	< 0.001	568	61.9	460	45.4	< 0.001
Sometimes	13.4 (4.9)		232	25.3	343	33.9	
Always	14.2 (4.9)		118	12.9	210	20.7	
<i>Tries to empty his dish</i>							
No	12.8 (4.9)	0.33	194	21.1	201	19.9	0.51
Yes	12.9 (4.7)		725	78.9	809	80.1	
<i>Tries to count calories</i>							
		< 0.001					0.016
Yes	13.5 (4.9)		225	24.5	297	29.3	
No	12.7 (4.6)		695	75.5	715	70.7	
<i>Tries to empty his/her plate</i>							
		0.63					0.51
Yes	12.9 (4.7)		194	21.1	201	19.9	
No	12.8 (4.9)		725	78.9	809	80.1	
<i>Encouraged by the media to eat food</i>							
		< 0.001					< 0.001
Yes	13.4 (4.8)		433	47.2	592	58.4	
No	12.3 (4.5)		485	52.8	421	41.6	
<i>Likes to eat between meals</i>							
		0.136					0.285
Never	12.5 (4.9)		171	18.6	161	15.9	
Sometimes	12.9 (4.4)		332	36.1	381	37.6	
Always	13.1 (4.9)		416	45.3	471	46.5	
<i>Eats when psychologically distressed</i>							
No	12.3 (4.5)	< 0.001	650	70.7	562	55.5	< 0.001
Yes	13.9 (4.8)		270	29.3	450	44.5	
<i>Ever been on weight-loss diet</i>							
No	12.5 (4.6)	< 0.001	769	84.0	708	70.0	< 0.001
Yes	14.3 (4.7)		147	16.0	303	30.0	
<i>Ever taken drugs to lose weight</i>							
No	12.8 (4.7)	< 0.001	893	97.7	963	95.3	0.003
Yes	14.9 (5.1)		21	2.3	48	4.7	
<i>Urged by media to lose weight</i>							
No	12.0 (4.4)	< 0.001	649	70.7	511	50.5	< 0.001
Yes	14.2 (4.9)		269	29.3	501	49.5	
<i>Urged by family to lose weight</i>							
		< 0.001					< 0.001
No	12.2 (4.7)		734	80.0	588	58.3	
Yes	14.4 (4.4)		184	20.0	421	41.7	

^aKruskal-Wallis test; ^bchi-squared test.
SD = standard deviation.

of obesity are in accordance with the results from previous studies in Lebanese

adolescents [9,10,35] and among children and adolescents in the United

States [36] and Taiwan and Fu-Chien [37].

Table 6 Physical activity practices: mean scores of respondents on the obesity-related distress scale and frequency of responses by distress category

Physical activity	Obesity distress score	<i>P</i> -value ^a	Non-distressed (n = 920)		Distressed (n = 1013)		<i>P</i> -value ^b
	Mean (SD)		No.	%	No.	%	
Television watching (hours per day)		0.56					0.33
1-3	12.8 (4.7)		540	59.4	571	57.2	
> 3	13.9 (4.7)		369	40.6	427	42.8	
Sports frequency (times per week)		0.33					0.009
0	13.1 (4.8)		206	22.6	254	25.3	
1-3	12.8 (4.7)		498	54.4	545	54.3	
> 4	12.7 (4.5)		209	22.9	205	20.4	
Sports (hours per week)							
0	13.1 (4.8)	0.45	206	22.9	255	25.5	0.02
1-2	12.7 (4.6)		214	23.8	270	27.0	
3-6	13.6 (5.0)		281	31.2	287	28.7	
> 6	12.4 (4.2)		199	22.1	188	18.8	
Physical activity level	Median (IQR)		No.	%	No.	%	
None	13.1 (4.8)	0.28	206	22.9	255	25.5	0.06
Low	12.9 (4.7)		311	34.6	354	35.4	
Moderate	13.0 (4.8)		184	20.4	201	20.1	
Vigorous	12.4 (4.4)		199	22.1	190	19.0	

^aKruskal-Wallis test; ^bSomers' D test.

SD = standard deviation; IQR = interquartile range.

Despite these higher rates of obesity, boys were more satisfied than girls with their weight. This is similar to the results of other studies showing that even when not overweight, girls may be dissatisfied

with their own weight and may suffer from obesity-related distress [38,39]. It is thus probable that media-generated feminine images, family and peer pressure for thinness and the fear of obesity

are more marked in Lebanese girls than boys. Indeed it has been demonstrated that girls as young as 5 years of age care more than boys about their self-image and associate it with weight status [40].

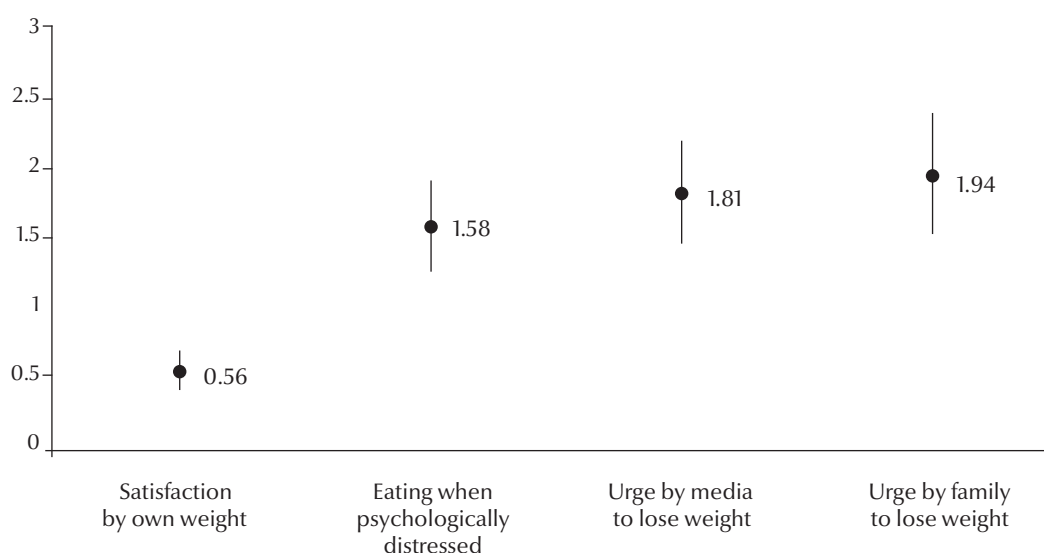


Figure 1 Multivariate analysis: significant determinants of obesity-related distress in Lebanese adolescents by stepwise backward logistic regression (adjusted odds ratios and 95% confidence intervals shown)

These findings reflect the dangers of psychological maladjustment and nutritional disorders [39]. Indeed, we found that obesity-related distress, particularly when related to family and media pressure to lose weight, increased the risk of using drastic weight-loss measures (e.g. dieting and taking drugs), but did not seem to be associated with healthy dietary habits or engagement in physical activity.

While prevention of obesity in adolescence is important, it should be performed according to international guidelines [41], through motivation to avoid obesity related-distress and its negative consequences [42]. While healthy eating and activity are together considered powerful tools against obesity [43], it has been shown that being forced to exercise during childhood has

potentially negative consequences on willingness to engage in physical activities in later life [44]. Moreover, dieting and unhealthy weight-control behaviours also predict outcomes related to obesity and eating disorders many years later [45,46], in addition to dietary inadequacy [47]. A shift away from dieting and drastic weight-control measures towards the long-term implementation of healthy eating and physical activity behaviour is needed to prevent obesity and eating disorders among adolescents.

Some points should be noted that might affect the validity of this study. Further studies are needed to confirm our results and to illuminate the complex behavioural patterns of adolescents from the sociological and psychological points of view.

The obesity distress scale that we constructed needs further validation, particularly test–retest reliability and convergent validity with other internationally used tests (e.g. the Individual Quality of Life (IQOL)-Lite [48] and the Impact of Weight on Quality of Life (IWQOL)-Kids [49]) scales. A confirmatory factor analysis also needs to be performed.

In conclusion, in this exploratory study, we reported the first scale that evaluated obesity-related distress in Lebanese adolescents. Family and media pressure to lose weight seemed particularly important in causing obesity-related distress. However, these factors did not seem to encourage individuals suffering from obesity-related distress into healthier eating patterns or engagement in physical activity.

References

- Hadigan C. Pediatric and adolescent obesity. *International Seminars in Pediatric Gastroenterology and Nutrition*, 2001, 10:1–7.
- Schwartz MB, Brownell KD. Obesity and body image. *Body Image*, 2004, 1:43–56.
- Makara-Studzinska M, Zaborska A. Obesity and body image. *Psychiatria Polska*, 2009, 43:109–114.
- Grilo CM et al. Teasing, body image, and self-esteem in a clinical sample of obese women. *Addictive Behaviors*, 1994, 19:443–450.
- Schwimmer JB et al. Health-related quality of life of severely obese children and adolescents. *Journal of the American Medical Association*, 2003, 289:1813–1819.
- Strauss RS. Childhood obesity and self-esteem. *Pediatrics*, 2000, 105:e15.
- Cargill BR et al. Binge eating, body image, depression, and self-efficacy in an obese clinical population. *Obesity Research*, 1999, 7:379–386.
- Bacchini D et al. Eating disorder variables and self image in Italian girls attending a weight control clinic. *Eating and Weight Disorders*, 2005, 10:125–132.
- Chakar H, Salameh P. Courbes de croissance et prévalence de l'obésité chez les adolescents des écoles privées au Liban. [Growth and obesity in Lebanese private schools children]. *Le Journal Medical Libanais*, 2007, 55:75–82.
- Chakar H, Salameh P. Obesity in Lebanese private schools adolescents. *European Journal of Public Health*, 2006, 60:2–7.
- Food balance sheets 2009. FAOSTAT. Food and Agriculture Organization [website] (<http://faostat.fao.org/site/368/default.aspx>, accessed 13 November 2011).
- Adair LS, Popkin BM. Are child eating patterns being transformed globally? *Obesity Research*, 2005, 13:1281–1299.
- Ekelund U et al. Physical activity but not energy expenditure is reduced in obese adolescents: a case–control study. *American Journal of Clinical Nutrition*, 2002, 76:935–941.
- Sallis JF. Age-related decline in physical activity: a synthesis of human and animal studies. *Medicine and Science in Sports and Exercise*, 2000, 32:1598–1600.
- Telama R, Yang X. Decline of physical activity from youth to young adulthood in Finland. *Medicine and Science in Sports and Exercise*, 2000, 32:1617–1622.
- Trost SG et al. Age and gender differences in objectively measured physical activity in youth. *Medicine and Science in Sports and Exercise*, 2002, 34:350–355.
- Sallis JF. Epidemiology of physical activity and fitness in children and adolescents. *Critical Reviews in Food Science and Nutrition*, 1993, 33:403–408.
- Tanasescu M et al. Biobehavioral factors are associated with obesity in Puerto Rican children. *Journal of Nutrition*, 2000, 130:1734–1742.
- Salameh P, Barbour B. Obesity associated behaviour in 1933 Lebanese adolescents. *Lebanese Medical Journal*, 2011, 59(4) [in press].
- Magarey AM et al. Predicting obesity in early adulthood from childhood and parental obesity. *International Journal of Obesity and Related Metabolic Disorders*, 2003, 27:505–513.
- Luciano A et al. Definition of obesity in childhood: criteria and limits. *Minerva Pediatrica*, 2003, 55:453–459.
- de Onis M et al. Development of a WHO growth reference for school-aged children and adolescents. *Bulletin of the World Health Organization*, 2007, 85:660–667.
- Cole T et al. Establishing a standard definition for children overweight and obesity worldwide: international survey. *British Medical Journal*, 2000, 320:1240–1246.
- Ainsworth BE et al. Compendium of physical activities: energy costs of human movement. *Medicine and Science in Sports and Exercise*, 1993, 25:71–80.

25. Ainsworth BE et al. Compendium of physical activities: an update of activity codes and MET intensities. *Medicine and Science in Sports and Exercise*, 2000, 32(Suppl. 9):S498-S516.
26. Kriska AM, Casperson CJ. Introduction to a collection of physical activity questionnaires. *Medicine and Science in Sports and Exercise*, 1997, 29(Suppl. 6):S5-S9.
27. Kimm SY et al. Longitudinal changes in physical activity in a biracial cohort during adolescence. *Medicine and Science in Sports and Exercise*, 2000, 32:1445-1454.
28. Batal M, Hunter E. Traditional Lebanese dishes based on wild plants: an answer to diet simplification? *Food and Nutrition Bulletin*, 2007, 28:S303-S311.
29. Darmon N et al. Nutrient profiles discriminate between foods according to their contribution to nutritionally adequate diets: A validation study using linear programming and the SAIN, LIM system. *American Journal of Clinical Nutrition*, 2009, 89:1227-1236.
30. Issa C et al. The nutrient profile of traditional Lebanese composite dishes: comparison with composite dishes consumed in France. *International Journal of Food Sciences and Nutrition*, 2009, 60(Suppl. 4):S1-S10.
31. Zeller MH, Modi AC. Development and initial validation of an obesity-specific quality-of-life measure for children: sizing me up. *Obesity*, 2009, 17:1171-1177.
32. Kolotkin RL, Crosby RD. Psychometric evaluation of the impact of weight on quality of life-lite questionnaire (IWQOL-lite) in a community sample. *Quality of Life Research*, 2002, 11:157-171.
33. Kolotkin R et al. Development of a brief measure to assess quality of life in obesity. *Obesity Research*, 2001, 9:102-112.
34. Patrick D, Bushnell D, Rothman M. Performance of two self-report measures for evaluating obesity and weight loss. *Obesity Research*, 2004, 12:48-58.
35. Sibai AM et al. Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study. *Obesity Research*, 2003, 11:1353-1361.
36. Styne D. Childhood and adolescent obesity. Prevalence and significance. *Pediatric Clinics of North America*, 2001, 48:1-4.
37. Huang YC, Wu JY, Yang MJ. Weight-for-height reference and the prevalence of obesity for school children and adolescents in Taiwan and Fuchien areas. *Journal of the Chinese Medical Association*, 2003, 66:599-606.
38. Vander Wal JS, Thelen MH. Eating and body image concerns among obese and average-weight children. *Addictive Behaviors*, 2000, 25:775-778.
39. De Sousa SM. Body-image and obesity in adolescence: a comparative study of social-demographic, psychological, and behavioral aspects. *Spanish Journal of Psychology*, 2008, 11:551-563.
40. Brown M et al. Obesity in children and adolescents. *Clinics in Family Practice*, 2002, 4:1-9.
41. Committee on Nutrition, American Academy of Pediatrics. Policy statement: prevention of pediatric overweight and obesity. *Pediatrics*, 2003, 112:424-430.
42. McWhorter JW, Wallmann H, Alpert P. The obese child: motivation as a tool for exercise. *Journal of Pediatric Health Care*, 2003, 17:11-17.
43. Gottesman MM. Healthy eating and activity together (heat): weapons against obesity. *Journal of Pediatric Health Care*, 2003, 17:210-215.
44. Taylor WC et al. Childhood and adolescent physical activity patterns and adult physical activity. *Medicine and Science in Sports and Exercise*, 1999, 31:118-123.
45. Neumark-Sztainer D et al. Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: how do dieters fare 5 years later? *Journal of the American Dietetic Association*, 2006, 106:559-568.
46. Field AE et al. Relation between dieting and weight change among preadolescents and adolescents. *Pediatrics*, 2003, 112:900-906.
47. Neumark-Sztainer D et al. Weight-control behaviors among adolescent girls and boys: implications for dietary intake. *Journal of the American Dietetic Association*, 2004, 104:913-920.
48. Forhan M, Vrkljan B, Macdermid J. A systematic review of the quality of psychometric evidence supporting the use of an obesity-specific quality of life measure for use with persons who have class III obesity. *Obesity Reviews*, 2010, 11:222-228.
49. Kolotkin RL et al. Assessing weight-related quality of life in adolescents. *Obesity*, 2006, 14:448-457.

Impact of an educational programme on knowledge, beliefs, practices and expectations about care among adolescent glaucoma patients in Cairo

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أثر البرنامج التثقيفي على معارف ومعتقدات وممارسات وتوقعات المراهقين المصابين بالزرق حول الرعاية العينية في القاهرة

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الخلاصة: الزرق (غلوكوما) من الأسباب الرئيسية للعمى في جميع أرجاء العالم. وتهدف هذه الدراسة إلى تقييم أثر برنامج تثقيفي على معارف ومعتقدات وممارسات وتوقعات المراهقين المصابين بالزرق حول الرعاية العينية. وشملت الدراسة عينة من 50 مصاباً بالزرق ممن تتراوح أعمارهم بين 12 و18 عاماً، يراجعون العيادات الخارجية لأمراض العيون في القاهرة، مصر، وقد تلقوا برنامجاً تثقيفياً يركز على المعلومات حول الزرق، ويصحح ما لدى مرضاه من معتقدات خاطئة، كما يقدم إيضاحات وإعادة تدريب حول الرعاية العينية. وقد استخدمت في هذه الدراسة طائفة من الأدوات لتقويم المرض قبل وبعد البرنامج؛ منها استبيان، وقائمة تفقدية بالملاحظات، وصحيفة للتقييم الجسدي، وسلم تقويم الاكتئاب لدى الأطفال، وسلم تقويم القلق الظاهر لدى الأطفال، وقائمة لتقدير احترام الذات، وسلم لتقويم توقعات المريض. واتضح للباحثين أن هذا البرنامج قد حسن من معارف ومعتقدات المرضى حول الزرق ومن ممارساتهم ومن توقعاتهم المتعلقة بالرعاية العينية. وتخلص الدراسة إلى أن الحاجة ماسة إلى برامج تثقيفية مبتكرة حول أمراض العين لتحسين المعارف والممارسات لدى المرضى.

ABSTRACT Glaucoma is a leading cause of blindness worldwide. The aim of the current study was to evaluate the impact of an educational programme on knowledge, beliefs, practices and expectations towards glaucoma and eye care among adolescent patients with glaucoma. A purposive sample of 50 patients with glaucoma aged 12–18 years, attending ophthalmology outpatient clinics in Cairo, Egypt, were given an educational programme focusing on information about glaucoma, correcting patients' incorrect beliefs and expectations, and demonstrations and retraining about eye care. A range of tools was used to assess patients before and after the programme: questionnaire, observation checklist, physical assessment sheet, childrens' depression scale, children manifest anxiety scale, self-esteem inventory and patients' expectations scale. The programme significantly improved patients' knowledge and beliefs about glaucoma and their practices and expectations concerning eye care. Innovative educational programmes about eye diseases are needed to improve patients' knowledge and practices.

Impact d'un programme éducatif sur les connaissances, les croyances, les pratiques et les attentes en termes de soins de patients adolescents atteints d'un glaucome au Caire

RÉSUMÉ Le glaucome est une cause majeure de cécité dans le monde. La présente étude avait pour objectif d'évaluer l'impact d'un programme éducatif sur les connaissances, les croyances, les pratiques et les attentes en termes de soins oculaires d'adolescents atteints d'un glaucome. Un échantillon choisi à dessein de 50 patients souffrant de glaucome, âgés de 12 à 18 ans, consultant un centre de soins externes en ophtalmologie au Caire (Égypte) a bénéficié d'un programme éducatif sur cette maladie, visant à corriger leurs idées fausses et leurs attentes, et comportant des démonstrations et des formations de perfectionnement sur les soins oculaires. Une série d'outils a été utilisée pour évaluer les connaissances des adolescents avant et après le programme : un questionnaire, une liste de contrôle des observations, une fiche d'évaluation physique, une échelle de mesure de la dépression chez les enfants, une échelle d'anxiété manifeste pour enfants, l'inventaire de l'estime de soi et une échelle de mesure des attentes des patients. Le programme a beaucoup amélioré les connaissances et les croyances de ces jeunes patients sur le glaucome ainsi que leurs pratiques et leurs attentes dans le domaine des soins oculaires. Des programmes éducatifs innovants sur les affections oculaires sont nécessaires pour accroître le savoir et les pratiques des patients.

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Introduction

Glaucoma is a group of eye diseases characterized by progressive loss of visual field due to damage to the optic nerve fibres [1]. Congenital and secondary glaucoma affects more than 3 million people in the Eastern Mediterranean region, 500 000 of them children and adolescents [2].

While glaucoma is not preventable, early detection and treatment can help to avoid serious damage to a person's vision [3]. Wilson et al. confirmed that the aim of glaucoma treatment is to slow the rate of field loss by reducing intraocular pressure [4]. Some simple methods of self-care are available to patients with glaucoma. For example, therapeutic nutrition such as foods rich in antioxidants (lutein and zeaxanthin), vitamins (C, E and A) and minerals (zinc and copper), and eye compresses and eye exercises are natural ways to lower intraocular pressure, improve blood flow to the retina and optic nerve, preserve patients' vision and limit glaucoma-related vision loss [5,6]. A nursing-based educational programme can address these issues by improving patients' awareness about their illness and hence compliance with therapy, as well as encouraging natural approaches to glaucoma care [7,8].

Patients' expectations have begun to play an increasingly important role in medical and nursing care and quality assessment. Patients with glaucoma were shown to have various expectations depending on their age, socioeconomic status and severity of their conditions [9]. Meeting patients' expectations has been shown to be associated with greater patient satisfaction and hence increased compliance with medical and nursing recommendations [10].

There is limited evidence in the literature about paediatric patients' knowledge, attitudes and expectations. Yet glaucoma care for young people presents difficult clinical challenges and, even when glaucoma is treated

appropriately, blindness can result. In Egypt, more than half a million children and adolescents are estimated to be affected by glaucoma [11,12]. The aim of the current study was to evaluate the impact of an educational programme on the knowledge, practices and expectations towards glaucoma and eye care among adolescent patients with glaucoma.

Methods

A quasi-experimental design was utilized.

Setting and sample

The study was conducted at the ophthalmology outpatient clinics in Ain Shams University hospital, New Children's hospital (Japanese hospital) and Research Institute of Ophthalmology affiliated to the University of Cairo, El-Mataria teaching hospital affiliated to the Egyptian general health organization for teaching hospitals.

A purposive sample consisting of 50 adolescents (age range 12–18 years old) were enrolled according to the following inclusion criteria: having congenital or secondary glaucoma, intraocular pressure ≤ 21 mmHg, characteristic pattern of glaucomatous visual field changes and previous diseases such as type 1 and 2 diabetes mellitus, epilepsy, juvenile arthritis, nephrotic syndrome and taking corticosteroid medications.

Data collection

Tools

The following data collection tools were used:

- Review of each patient's clinical records to document ocular symptoms and complications. The data collected included: corrected visual acuity of both eyes, visual field, dilated eye examination results, tonometry results and ultrasound wave results to detect signs of retina and optic nerve damage, thickening of the cornea and other eye diseases.

- Structured questionnaire to assess patients' knowledge about glaucoma. It was designed by the researchers after reviewing the relevant literature. First, the background sociodemographic and clinical characteristics of the respondents were recorded: age, sex, level of education, residence, previous diagnosis, present diagnosis and duration of illness. The knowledge questions assessed knowledge about glaucoma (definition, causes, clinical manifestations and management); incorrect beliefs about risk factors for glaucoma (diet, sleeping pattern, traumatic stress and play); and incorrect beliefs and attitudes towards glaucoma (the effect of nightmares on intraocular pressure, the effectiveness of management and follow up and their feelings about the future). There were 40 questions with open- and close-ended responses and the questionnaire took about 15 minutes to be filled by the researcher with each patient. According to patients' responses, their knowledge was classified as either satisfactory (score $\geq 50\%$ correct) or unsatisfactory (score $< 50\%$ correct). Responses to belief questions were scored as agree (score 0), uncertain (score 1) and disagree (score 2), with total scores converted into percentages and classified as either satisfactory ($< 50\%$) or unsatisfactory ($\geq 50\%$).
- Observation checklist to assess patients' practices regarding eye care. Adapted from Margret [13] and Watkinson and Seewoodhaky [14], the checklist included: eye-drop instillation (handling, storage and administration), eye ointment application, and eye exercises and eye compresses. Each patient was observed and evaluated and the observation checklist was filled by the researchers. There were 10 procedures, scored 1 point for each step done correctly with a total score of 10. Patients' practices were catego-

alized as either done correctly (score 7–10) or not done correctly (score < 7).

- Physical and social assessment [15] to assess difficulties with activities of daily life. The scale had 24 questions concerning: walking, going up or down stairs, talking, reading and writing, school attendance, and shopping. The total score was 24. Scoring was as follows: no problems (score 0); mild problems (score 1–8); moderate problems (score 9–16); severe problems (score 17–24).
- Psychometric assessment of the psychological problems of patients. This questionnaire used the following 3 scales:
 - Children manifest anxiety scale [16,17] assessed the degree of severity of anxiety symptoms in the following domains: somatic, emotional, physiological, mental, motor, and social. It consisted of 36 statements to which the patient answered no (score 0) or yes (score 1). The severity of anxiety symptoms was graded as: no anxiety (score 0); mild anxiety (score 1–12); moderate anxiety (score 13–24); severe anxiety (score 25–36).
 - Children depression inventory [18] assessed the degree of severity of depressive symptoms: grief, failure feelings, wrong behaviour, disturbance in emotion, sleep disorders, social problems and low school performance. It consisted of 27 questions, each with 3 statements scored from 0–2. The total severity of depressive symptoms was graded as: mild depression (score 0–18); moderate depression (score 19–36); severe depression (score 37–54).
 - Self-esteem inventory [19] measured patients' self-esteem and evaluated attitudes towards self in terms of social, academic, family, and personal areas of exper-

es. It consisted of 24 statements, each statement answered by the patient as like me (1 point) or unlike me (0 points). The total scores were graded as: low self-esteem (score 0–8); moderate self-esteem (score 8–16); high self-esteem (score 16–24).

- Patients' expectations scale [20], which was modified by the researchers to assess potential effects of disease on patients' expectations. The scale classified the 17 expectations areas articulated by patients into 6 groups: communication, interpersonal manner, ophthalmologists and nurses' skills, examination and testing, logistics of health services, and other. The patients' responses were classified as: satisfactory expectations score (score 11–17); unsatisfactory expectations (score < 11).

Testing and validity

A pilot study was done on 5 patients with glaucoma in order to test the study tools in terms of clarity, validity and reliability of content and to make any necessary modifications. The same results were achieved on 2 successive trials. On the other hand, the pilot study demonstrated a wide variation between patients in terms of knowledge and eye care practices and the need for a better nursing programme to tackle these problems. Patients involved in the pilot study were later excluded from the study sample.

Face and content validity were ascertained by a group of experts including medical and nursing personnel in ophthalmology clinics. Their opinions were elicited regarding the format, content consistency and scoring system of the tools.

Ethical considerations

Approval was obtained from medical and nursing administrators of the study settings and the glaucoma patients and their companions. A clear explanation of the nature of the study was offered

to patients and anonymity was assured. Patients were allowed to withdraw from the study whenever they wished.

Fieldwork

The fieldwork was carried out over 10 months from December 2008 to September 2009. To obtain the required number of patients, the researchers went to ophthalmology outpatient clinics twice a week from 09.00 to 12.30 by rotation in each previously sitting. Each patient was assessed individually and the researchers completed the above-mentioned tools during the interview, both before and after the patient had participated in the educational intervention (pre- and post-programme).

Intervention

An educational programme was given to groups of patients with glaucoma; each group included 2 patients. The programme was designed based on a needs' assessment of patients and included 5 sessions for theory and 10 sessions for practices performed by the researchers, with each patient trained individually in practices. The sessions were repeated according to each patient's medical condition and level of understanding. The programme sessions started with an explanation of the aims of the study and its expected outcomes and a description of the programme and its sessions. The content of the programme included information about glaucoma, with the emphasis on correcting patients' incorrect beliefs and expectations, and demonstrations and retraining of patients about eye care in terms of eyedrop handling, storage and installation, ointment application, eye compresses (hot and cold), and eye exercises. Different teaching strategies were used in simple, Arabic language.

Statistical analysis

The collected data were tabulated, analysed and subjected to statistical tests. The data were presented as frequencies, percentages and mean and standard

deviation (SD). The chi-squared and *t*-tests were used for analysis.

Results

The 50 patients enrolled in this study had a mean age of 15.9 (SD 2.4) years. As shown in Table 1, 20% had congenital glaucoma and 80% had secondary glaucoma, while 30% of them had a history of diabetes mellitus. The mean duration of illness was 6.6 (SD 2.0) years; 46% of patients had suffered glaucoma for 3 or more years.

Patients' knowledge, beliefs and attitudes

The proportion of patients with satisfactory knowledge scores ($\geq 50\%$ correct) was very low before implementation of the educational programme (12%). Post-programme, however, this percentage increased significantly to 96% ($\chi^2 = 70.9, P < 0.001$) (Table 2).

Pre-programme, patients had many misconceptions about glaucoma and poor attitudes towards their future health, all of which improved after the programme. Diet as a factor inducing glaucoma was reported by all patients (100%) pre-programme but only 6% post-programme ($\chi^2 = 88.7, P < 0.001$). While all the patients (100%) believed that management and follow up of their

Table 1 Demographic characteristics of the study sample of adolescents with glaucoma (n = 50)

Variables	No.	%
Age (years)^a		
12-14	23	46
15-17	11	22
18	16	32
Sex		
Male	30	60
Female	20	40
Educational level		
Illiterate	27	54
Preparatory school	11	22
Secondary school	12	24
Residence		
Rural	29	58
Urban	21	42
Previous diagnosis		
Juvenile diabetes	15	30
Nephrotic syndrome	13	26
Juvenile arthritis	12	24
Present diagnosis		
Congenital glaucoma	10	20
Secondary glaucoma	40	80
Duration of illness (years)^b		
3-	23	46
6-	11	22
9-	16	32

^aMean age (standard deviation) = 15.9 (2.4) years.

^bMean duration of illness (standard deviation) = 6.6 (2.0) years.

Table 2 Patients' knowledge, beliefs and attitudes towards glaucoma before and after the educational programme (n = 50)

Items	Pre-programme		Post-programme		χ^2 -value	P-value
	No.	%	No.	%		
Correct knowledge about disease	6	12	48	96	70.9	< 0.001
Incorrect beliefs about factors causing glaucoma						
Diet	50	100	3	6	88.7	< 0.001
Sleeping patterns	27	54	2	4	28.1	< 0.001
Traumatic stress	20	40	3	6	29.2	< 0.001
Play	29	58	4	8	28.3	< 0.001
Nightmares	30	60	5	10	72.7	< 0.001
Poor attitudes towards glaucoma care and future health						
Believe management and follow-up is ineffective	50	100	4	8	86.3	< 0.001
Have feelings of hopelessness about future life	50	100	3	6	88.7	< 0.001
Believe future occupational chances are impaired	30	60	5	10	27.9	< 0.001

Responses were not mutually exclusive.

Table 3 Patients' practices concerning their glaucoma eye care before and after the educational programme (n = 50)

Practices	Pre-programme		Post-programme		χ^2 -value	P-value
	No.	%	No.	%		
Eye drops instillation	3	6	47	94	34.1	< 0.001
Eye ointment application	4	8	46	92	31.7	< 0.001
Eye exercises	0	0	32	64	35.2	< 0.001
Eye compresses	3	6	50	100	86.2	< 0.001

care were ineffective and felt a loss of hope in their future, post-programme these percentages decreased significantly to 8% ($\chi^2 = 86.3$, $P < 0.001$) and 6% ($\chi^2 = 88.7$, $P < 0.001$) respectively.

Patients' eye care practices

Table 3 shows that none of the patients reported performing eye exercises pre-programme, while around two-thirds (64%) were performing this procedure post-programme ($\chi^2 = 35.2$, $P < 0.001$). Similarly, all patients (100%) were using eye compresses post-programme, a highly significant increase on the pre-programme rate (6%) ($\chi^2 = 86.2$, $P < 0.001$).

Patients' physical and social problems

Table 4 shows that most of the patients (94%) reported difficulties with attending school pre-programme, while 12% of the patients only had this problem post-programme ($\chi^2 = 31.9$, $P < 0.05$). Also, 66% of the patients had difficulties in walking pre-programme compared with only 20% post-programme ($\chi^2 = 21.6$, $P < 0.05$).

Patients' psychological problems

Regarding patients' psychological problems, the percentage suffering severe depression fell from 26% pre-programme to 8% post-programme ($\chi^2 = 2.4$, $P < 0.05$) (Table 5). Mean depression scores fell from 1.98 (SD 0.7) to 1.64 (SD 0.7). The rate of low self-esteem fell from 90% to 22% post-programme ($\chi^2 = 10.0$, $P < 0.001$), with mean self-esteem scores rising from 1.1 (SD 0.3) to 1.8 (SD 0.4).

Patients' expectations

The results of the assessment of patients' expectations of their care showed that a minority of patients (4%) reported listening and addressing concerns pre-programme, which rose to 72% post-programme ($\chi^2 = 59.7$, $P < 0.001$) (Table 6). In addition, few patients pre-programme (8%) stated that competence was important for ophthalmologists and nurses, whereas post-programme 100% of them believed that competence was important ($\chi^2 = 41.3$, $P < 0.001$). Pre-programme, only 6% of patients stated that examination and

testing were essential in their expectations, whereas all of them (100%) had these expectations post-programme ($\chi^2 = 88.6$, $P < 0.001$).

Discussion

Congenital and secondary glaucoma, although sometimes difficult to detect, has a traumatic impact on patients' behavioural and psychosocial development. In the present study we focused on adolescent patients (aged from 12 to 18 years, half aged < 15 years) and assessed their knowledge and practices towards glaucoma and eye care and determined their expectations of care before and after an educational nursing programme about glaucoma for these patients.

Our study found that, before the educational programme, only 12% of this group of young people had satisfactory knowledge about glaucoma. This could be attributed to a lack of educational materials about glaucoma in Arabic language, lack of time for ophthalmologists and nurses to

Table 4 Common physical and social problems reported by glaucoma patients before and after the educational programme (n = 50)

Items	Pre-programme		Post-programme		χ^2 -value	P-value
	No.	%	No.	%		
Difficulty walking	33	66	10	20	21.6	< 0.001
Difficulty going up or down stairs	35	70	6	12	23.5	< 0.001
Difficulty talking	13	26	6	12	7.6	< 0.001
Difficulty reading and writing	33	66	4	8	24.5	< 0.001
Difficulty attending school	47	94	6	12	31.3	< 0.001
Difficulty going shopping	33	66	3	6	25.1	< 0.001

Responses were not mutually exclusive.

Table 5 Psychometric assessment of glaucoma patients before and after the educational programme (n = 50)

Items	Pre-programme		Post-programme		χ^2 -value	P-value
	No.	%	No.	%		
<i>Anxiety</i>						
None	0	0	21	42	8.1	< 0.05
Mild	5	10	13	26		
Moderate	16	32	9	18		
Severe	29	58	7	14		
Total mean (SD) score	2.50 (0.7)		1.04 (1.1)			
<i>Depression</i>						
Mild	14	28	31	62	2.4	< 0.05
Moderate	23	46	15	30		
Severe	13	26	4	8		
Total mean (SD) score	1.98 (0.7)		1.64 (0.7)			
<i>Self-esteem</i>						
High	5	10	39	78	10.0	< 0.001
Low	45	90	11	22		
Total mean (SD) score	1.10 (0.3)		1.80 (0.4)			

SD = standard deviation.

provide patients with proper information, patients' low educational attainment (54% were illiterate) and the limited training of ophthalmologists and nurses who are the main source of information for patients. After the programme, considerable improvement was detected in patients' knowledge, which could be attributed to the face-to-face theory and practice sessions given by the researchers together with posters and leaflets about glaucoma and eye care. In a similar study, Ahmad argued that children with glaucoma need detailed knowledge about the disease and eye care for successful prevention of visual impairment in the future [21].

Before the programme were some incorrect beliefs among patients about the factors inducing glaucoma. Pre-programme, all patients believed diet was a factor causing glaucoma. This confusion may be because many ophthalmologists recommend patients eat more spinach and other green leafy vegetables or to take supplements rich in antioxidants and vitamins C, E and A and zinc to improve the blood supply to the optic nerve and slow the progression of visual impairment [22].

The current study found that all the patients pre-programme believed that management and follow up were ineffective and all had feelings of loss of hope in their future. This could be related to patients' awareness of the incurable nature of glaucoma. Post-programme, however, the proportion of patients with negative attitudes and feelings decreased significantly. This may be attributed to better knowledge about glaucoma and to the support offered by the research team acting as educators. Murtadha also found that feelings of hopelessness about the future were a problem among patients with glaucoma [23]. For this reason, better knowledge about prevention and psychological support for glaucoma patients are clearly important.

Our analysis of patients' eye care practices showed that a majority of them did not practise topical glaucoma therapy correctly pre-programme. Glaucoma patients may not see well enough to know if the drops are centred over their eyes, leading to suboptimal treatment and a costly waste of medication. Health care providers may neglect to help patients to practise techniques of topical eye medication. Other

authors have discussed the difficulties that glaucoma patients may have with administration of eyedrops [24,25]. In our study the educational programme significantly improved patients' eye care practices in terms of handling, storage and administration of topical therapy. Marsden and Shaw stated that proper use of glaucoma eyedrops can improve the medicine's effectiveness and reduce side-effects [25].

Another concern about eye care found in our study was that, pre-programme, none of the patients were performing eye exercises and very few were using eye compresses. Belal mentioned that eye exercises are a vital step for increasing eye relaxation, meditation and stress reduction and that compresses applied over the eyes (alternating 3 minutes with hot water and 1 minute with cold water) can be used to reduce intraocular pressure [5]. These eye practice issues were also documented by Danesh who argued that natural methods of eye care improve adequate blood supply to the optic nerve, improve the collagen structure of the eyes and drainage of aqueous humour thus leading to normalization of intraocular eye pressure [6]. Post-programme, our

Table 6 Patients' satisfactory expectations about their glaucoma care before and after the educational programme (n = 50)

Items	Pre-programme		Post- programme		χ^2 -value	P-value
	No.	%	No.	%		
Communication						
Discussion of family history	6	12	30	60	59.7	< 0.001
Information about diagnosis and prognosis	18	36	45	90		
Information about medication	19	38	43	86		
Listening and addressing concerns	2	4	36	72		
Interpersonal manner						
Personal connection	4	8	47	94	54.3	< 0.001
Professionalism	6	12	43	86		
Courtesy	6	12	42	84		
Encouragement	5	10	40	80		
Patience	9	18	45	90		
Ophthalmologist and nurses' skills						
Competence	4	8	50	100	41.3	< 0.001
Health outcomes	3	6	48	96		
Access to advances in eye care	2	4	47	94		
Examination and testing	3	6	50	100	88.6	< 0.001
Health service logistics						
Waiting time	4	8	37	74	46.6	< 0.001
Coordination of care	3	6	42	84		
Appointment access	2	4	30	60		
Other						
Time with physicians	5	10	40	80	4.9	< 0.001
Referral	0	0	42	84		

Responses were not mutually exclusive.

results showed that there were significant improvements in the proportion of patients' reporting good eye care practices. Clearly patients need health education to increase their awareness about the importance of eye care to reduce the risk of visual impairment.

Our study findings also highlighted adolescent glaucoma patients' physical and social problems. Pre-programme, most patients were having difficulty in attending school and in walking and almost two-thirds had difficulties reading and writing. Visual impairment that accompanies glaucoma may lead to social and psychological difficulties [26]. Post-programme, only 12% of patients reported difficulty in attendance of school. Glaucoma patients may require special schooling in order to maximize their educational achievements and in our case the researchers collaborated with schools about suitable arrangements.

In the initial stages of glaucoma patients may have difficulty recognizing stairs, reading fare charts and outdoor activities [27]. Eldar argued that parents should work closely with school staff and the educational system to ensure that the needs of children with glaucoma are met [28].

The present study found a high prevalence of psychological problems among adolescents with glaucoma; pre-programme, nearly half of patients had moderate depression, more than one-quarter had severe depression and 90% had low self-esteem. This could be attributed to emotional trauma in patients who were poorly adapted to their visual impairment. Thompson stated that children with glaucoma will show signs of anxiety and depression and feelings of low self-esteem [29]. Also they lose interest in activities that they used to enjoy before the development of

glaucoma and this leads to a feeling of dejection and failure. After the educational programme, the young peoples' scores on the psychometric assessments were significantly improved in all domains.

Communication between glaucoma patients and the health care team (ophthalmologists and nurses) is crucial for successful coping with multiple outpatient clinic visits. The current study found that in the area of communication very few of our patients had expectations of carers' listening and addressing their concerns. Post-programme there was a significant improvement in patients' expectations. This could be due to the researchers helping patients to cope by listening and providing support during discussions about diagnosis and treatment with the ophthalmologist. Marple et al. argued that ophthalmologists and nurses should use every opportunity

that arises for listening and talking to patients and helping them to cope with their disease both physically and psychologically [30].

Post-programme, the patients' highest expectations were in examination and testing and competence of ophthalmologist and nurses (100% of patients expected these). Dondona et al. demonstrated that ophthalmologists' behaviours (examination and testing) were significantly influenced by their assumptions about patients' expectations and that ophthalmologists often do not correctly assess patients' expectations [31]. Increasing patients' expectations is likely to offer opportunities to improve the quality of eye care in the outpatient clinics. Dawn et al. found

that eye care professionals vary in their training and experience [9]. Diagnosis, treatment and care require special attention and knowledge; glaucoma requires lifelong follow up of visual field changes with the goal of preservation of vision, the optic nerve needs to be regularly examined and documented and eye care providers need to keep up-to-date with new methods of glaucoma treatment.

Conclusions and recommendations

The educational nursing programme was effective in improving patients' knowledge and correcting their eye

care practices. Post-programme, patients expressed a wide variety of expectations regarding to their glaucoma and eye care which might have implications for patients' satisfaction and the delivery of eye care. Clearly the management of children and adolescents with glaucoma requires a collaborative effort between the health care team, patients' families and schoolteachers. Innovative educational programme are needed to improve the knowledge and attitudes of young glaucoma patients and their parents. Further study is needed to address the psychosocial problems associated with reduction in quality of life of patients affected with glaucoma.

References

1. Sommer A, Doyne L. Glaucoma facts and fancies. *Ophthalmology*, 2006, 16:295-301.
2. Green M, ed. *Pediatric diagnosis*, 18th ed. Philadelphia, WB Saunders, 2007:16-36.
3. Bohn L et al. Which patients are treated for glaucoma? An observational analysis. *Journal of Glaucoma*, 2007, 9(1):38-44.
4. Wilson M, Kosoko O, Cowan C. Progression of visual field loss in untreated glaucoma patients and glaucoma suspects in St. Lucia, West Indies. *American Journal of Ophthalmology*, 2002, 134:399-405.
5. Belal S. *Post operative self-care guide for patients with intraocular surgery* [MSc thesis]. Cairo, Department of Medical Surgical, Faculty of Nursing, Ain Shams University, 2006.
6. Danesh M. Food supplementation and eye exercises are decreasing IOP. *Journal of Glaucoma*, 2009, 18:563-566.
7. Neuberger J. The educated patient with glaucoma: new challenges for the medical profession. *Journal of Internal Medicine*, 2000, 74:6-10.
8. Tsai T, Robin AL, Smith JP. An evaluation of how glaucoma patients use topical medications: a pilot study. *Transactions of the American Ophthalmological Society*, 2007, 105:29-35.
9. Dawn A, Freedman, S, Enyedi L. Patients' expectations regarding their eye care; interview results. *American Journal of Ophthalmology*, 2007, 136:796-785.
10. Cheng TL, et al. Expectations, goals and perceived effectiveness of child health supervision: a study of adolescents in pediatric practice. *Clinical Pediatrics*, 2007, 35:1129-1137.
11. Marion M, Tumully R. Prevalence and incidence statistics for glaucoma in Northern Africa. *American Journal of Nursing*, 2007, 83:752-756.
12. Farid M. *Fundamentals of pediatrics*. Cairo, Department of Pediatrics, Faculty of Medicine, Ain Shams University, 2009:97-99.
13. Alexander MF, ed. *Nursing practice: hospital and home*, 2nd ed. London, Churchill Livingstone, 2003:500-507.
14. Watkinsin S, Seewoodhaky R. Administering eye medications, *Nursing Standard*, 2009, 22(18):42-48.
15. El-Hawashy R et al. *Textbook of basic nursing*, 9th ed. New York, JB Lippincott, 2005:187-200.
16. Abdel-Hamid S, El-Nail E. *Children manifest anxiety scale*. Cairo, Dar El Nahda El-Masryia, 1991.
17. Reynolds CR, Richmond BO. What I think and feel: a revised measure of children's manifest anxiety. *Journal of Abnormal Child Psychology*, 1978, 6(2):271-280.
18. Abdel-Fattah G. *Children depression inventory*. Cairo, Dar El Nahda El-Masryia, 1988.
19. El-Dosoki M. *Self esteem-inventory*. Cairo, Dar El Nahda El-Masryia, 1987.
20. Dawn AG, Santiago-Turla C, Lee PP. Patient expectations regarding eye care: development and results of the Eye Care Expectations Survey (ECES). *Archives of Ophthalmology*, 2003, 121(36):762-768.
21. Ahmad M. *Assessment of patients needs: Nurses role in caring children with ophthalmological diseases* [MSc thesis]. Cairo, Faculty of Nursing, Ain Shams University, 2007.
22. Kang J et al. Dietary fat consumption and primary open-angle glaucoma. *American Journal of Clinical Nutrition*, 2007, 79:755-764.
23. Murtadha A. *Neuroprotection in glaucoma* [MSc thesis]. Cairo, Department of Ophthalmology, Faculty of Medicine, University of Cairo, 2007.
24. Gail P. Eye drops installation: glaucoma. *Nursing Times*, 2009, 21:51-55.
25. Marsden J, Show M. Correct administration of topical eye treatment. *Nursing Standard*, 2009, 17(30):42-44.
26. Aumar R. *Review of primary congenital glaucoma* [MSc thesis]. Cairo, Department of Ophthalmology, Faculty of Medicine, Ain Shams University, 2007.

27. Uenishi Y et al. Quality of life of elderly Japanese patients with glaucoma. *International Journal of Nursing Practice*, 2007, 9:28–35.
28. Eldar R. Quality of care in ophthalmology. *Ophthalmology*, 2004, 45(3):350–353.
29. Thompson T. Causes and signs of anxiety and depression in children with glaucoma. *Ophthalmology*, 2007, 27:335–336.
30. Marple L et al. Concerns and expectations in patients presenting with physically complaints: frequency of physician perceptions and actions and 2 week outcome. *Archives of Internal Medicine*, 2007, 157:1482–1488.
31. Dondona R. et al. Awareness of eye diseases in an urban population in southern India. *Bulletin of the World Health Organization*, 2001, 79:96–102.

Control and prevention of blindness in the Region

Available data indicates that about 37 million people are visually impaired in the Region, of whom 5.3 million people are blind; 15 million suffer from low vision and 16 million from refractive errors. The burden of blindness lies mainly in countries with large populations and poor communities, causing a huge economic burden to families and communities; 80% of these cases are avoidable, treatable or curable with simple cost-effective interventions.

The Control and Prevention of Blindness programme was established in 2001 to assist Member States in the World Health Organization's Eastern Mediterranean Region to develop comprehensive eye care and prevention of blindness programme at the national and subnational level in collaboration with partners. Our mission is to eliminate the main causes of avoidable blindness by the year 2020 in the Region.

Further information about the work of the WHO Regional Office for the prevention of avoidable blindness can be found at: <http://www.emro.who.int/cpb/>

Sonographic fetal biometry charts for a Pakistani cohort

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المقاييس البيولوجية بالتخطيط بالأموح فوق الصوتية لأترابية من الباكستانيين

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الخلاصة: تهدف هذه الدراسة إلى إعداد الشرائح المئوية للنمو في مختلف أسابيع العمر الجنيني لكل من القطر بين الجدارين، والمحيط البطني، وطول عظم الفخذ، ومحيط الرأس في أترابية من الباكستانيين. وقد تمّ جمع المعطيات في مستشفى ثالثي للإحالة من نساء حوامل تتراوح أعمارهن الحملية بين 13 و40 أسبوعاً، وتمت إحالتهم لإجراء تخطيط بالأموح فوق الصوتية كجزء من الرعاية الروتينية السابقة للولادة. وتمّ جمع إجمالي المقاييس البيولوجية للأجنة بالتخطيط بالأموح الصوتية لـ 1599 جنيناً، وذلك بعد التحري عن معايير الإدراج في الدراسة. واشتُقّت لكل قياس، نماذج تحوُّفية منفصلة لتقدير المتوسط، والانحراف المعياري، والشرائح المئوية المرجعية لكل أسبوع من العمر الجنيني لهذه الأترابية. واختير أفضل نموذج مناسب لكل متغير. وسوف تساعد هذه المخططات اختصاصي الأشعة والأطباء في التنبؤ بتاريخ الولادة، وقياس نمو الجنين، وتحديد القصور الجنيني في السكان الباكستانيين.

ABSTRACT This study aimed to develop growth centiles at different gestational weeks for fetal biparietal diameter, abdominal circumference, femur length and head circumference in a Pakistani cohort. Data were collected at a tertiary referral hospital from pregnant women at gestational ages 13–40 weeks referred for obstetric ultrasound as a part of routine antenatal care. A total of 1599 fetal sonographic biometric measurements were collected after screening for the inclusion criteria. For each measurement, separate regression models were derived to estimate the mean, standard deviation and reference percentiles at each week of gestational age for this cohort. The best fitting model for each variable was selected. These charts will help radiologists and clinicians in predicting dates of delivery, assessing fetal growth and identifying intrauterine fetal insufficiency in the Pakistani population.

Tableaux de la biométrie fœtale à l'échographie d'une cohorte pakistanaise

RÉSUMÉ La présente étude visait à élaborer des tableaux de croissance de fœtus d'une cohorte pakistanaise aux différentes semaines de gestation et pour différentes mesures : le diamètre bipariétal, le périmètre abdominal, la longueur du fémur et le périmètre crânien. Les données ont été recueillies dans un hôpital de recours délivrant des soins tertiaires, auprès de femmes enceintes de 13 à 40 semaines et bénéficiant d'une échographie obstétricale dans le cadre des soins prénatals systématiques. Au total, 1599 mesures biométriques fœtales ont été recueillies après une sélection fondée sur des critères d'inclusion. Pour chaque mesure, des modèles de régression distincts ont été élaborés pour obtenir une estimation de la moyenne, de l'écart type et des mesures de référence par centile pour chaque semaine gestationnelle. Pour chaque variable, le modèle le plus adapté a été retenu. Ces tableaux permettront aux radiologues et aux cliniciens d'estimer les dates d'accouchement des femmes pakistanaïses, d'évaluer la croissance du fœtus ou de dépister un retard de croissance intra-utérin.

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Introduction

Fetal biometric measurements of different anatomical structures are valuable in radiological and obstetric practice for the estimation of gestational age, assessment of intrauterine growth and differentiation of normal from abnormal fetuses [1]. Birth weight estimation also depends on different fetal biometric measurements and has tremendous value for neonatal management in terms of appropriate time of delivery, specific obstetric interventions and delivery under intensive neonatal care support. Clinical approaches to fetal biometric measurements and weight estimations by fundal height measurement and abdominal palpation are helpful, but are subjective and are strongly influenced by factors such as maternal obesity, multiple gestation and operator experience [2,3]. Additionally these approaches are non-technical and cannot be used reliably in the early stages of pregnancy.

At present ultrasound is the most widely accepted method for determining fetal anthropometric measurements [4,5] and many studies have emphasized its usefulness [6–10]. While growth measurement centiles have been generated by various investigators using standard parameters [11–16], almost all fetal biometric growth centiles using sonographic anthropometric measurements have been derived from data from European and American populations [11–15,17]; only a few studies have used Asian women [16,18]. Fetal anthropometric data from the population in Pakistan are limited [18] and fetal centiles derived from other ethnic populations applied in our locality might lead to systematic errors in estimation. The primary objective of this study therefore was to use fetal anthropometric measurements obtained from ultrasound from a multiethnic cohort of Pakistani low-risk pregnant women to establish growth centile charts for our local population.

Methods

Setting and sample

Data were collected from 1 January 2007 to 31 July 2008 in the department of radiology of Aga Khan University hospital, Karachi. This is one of the largest tertiary care centres in the Pakistan, with patients coming from all ethnic strata within the country.

All pregnant women referred to the department of radiology for routine obstetric ultrasound examination as a part of antenatal care were included in the study. The inclusion criteria were singleton pregnancy, Pakistani ethnicity and gestational age confirmed by first trimester ultrasound or patients' last menstrual period (LMP). Exclusion criteria were the presence of any fetal congenital abnormalities on ultrasound, uncertain LMP, ultrasound and menstrual age differing more than 10 days, fetus with intrauterine growth retardation, mother with underlying chronic diseases or on medication that could affect fetal growth or mother unavailable for follow-up. All pregnancies were longitudinally followed from the medical records until the birth of the baby. Neonates born with low birth weight or having low Apgar scores were also excluded. Of 1200 pregnancies with radiological records available, 600 patients fulfilled the inclusion criteria. From these pregnancies, 1599 obstetric ultrasounds were obtained at different gestational ages of the fetus during the course of the pregnancies.

Data collection

All women included underwent at least 1 ultrasound examination in each second and third trimester to determine fetal biometric measurements. All ultrasounds were performed by qualified, experienced obstetric radiologists using the predefined, structured departmental protocol. All measurements were done with a realtime ultrasound scanner (Aloka SSD-650) using a 3.5 MHz

curvilinear probe. Soft copies as well as hard copy images of fetal biometric measurements were taken for documentation. A proforma was used for data collection.

Biparietal diameter (BPD), femur length (FL), head circumference (HC) and abdominal circumference (AC) of the fetus were measured in a standardized way using the electronic callipers of the ultrasound machine. BPD was measured (leading edge to leading edge) at the transthalamic plane with visualization of the cavum septum pellucidum. FL was measured from the greater trochanter to the lateral condyle. AC was measured at the level of the umbilical vein by tracing the outline of the trunk on the screen of the ultrasound machine (circular or elliptical outline includes the fetal spine, umbilical vein and stomach). HC was measured by outlining the head on the screen in transverse image. Three measurements were made for each variable.

Each woman contributed at least one set of measurements and each sonographic fetal biometric measurement was included in the analysis independently, regardless of the number of ultrasounds in a single pregnancy.

Data analysis

Data were entered and analysed using SPSS, version 16.0. Reference ranges (90% range between 5th and 95th centiles) were constructed for each biometric parameter and displayed in graph form. Linear, quadratic and cubic regression models were fitted to estimate the relationship between fetal BPD, FL, HC and AC (in millimetres) and gestational age (in weeks). Pearson correlation coefficients (R^2) were calculated for each parameter to assess the strength of association for the developed regression model. The best fitting model for each variable was selected. A value of $P < 0.05$ and $R^2 > 0.99$ was considered statistically significant.

Results

Table 1 shows the frequency distribution of fetal biometric measurements at each gestational age that were input to the analysis.

The significant regression models (P -value < 0.05, R^2 > 99%) developed in this study are summarized in Table 2. The cubic model showed a good fit for BPD and FL, while AC and HC were well correlated with the quadratic model.

Figures 1–4 show the estimated 5th, 50th and 95th centiles for BPD, HC, AC and FL respectively for each

gestational week between 13th and 40th weeks of gestation. All the studied fetal biometric parameters showed linear growth with gestational weeks until the end of pregnancy. BPD and HC showed more rapid growth in the first half of pregnancy, while FL and AC showed faster growth rates in the later half of pregnancy. There was a peak of the 95th percentile at around 15th and 28th weeks gestation in AC and FL.

Discussion

In this study measurement ranges for fetal BPD, HC, AC and FL were derived

from a multiethnic cohort of Pakistani low-risk pregnant women with singleton births. Each woman contributed at least one set of measurements. All studied fetal parameters showed linear growth with advancement in gestational weeks until the end of pregnancy; BPD and HC showed grew faster in the first half of pregnancy while FL and AC showed faater growth in later half of pregnancy.

The linear growth of BPD and HC until 34 weeks of pregnancy and the charts derived in this study for the 50th centiles of BPD and HC showed a close agreement with published charts from

Table 1 Frequency distribution of fetal biometric measurements at each gestational age input to the analysis

Week of gestation	No. of measurements			
	Head circumference	Abdominal circumference	Biparietal diameter	Femur length
13	–	–	41	3
14	–	10	39	11
15	4	20	27	22
16	4	26	28	27
17	14	30	30	30
18	22	46	44	46
19	27	78	78	78
20	48	145	146	146
21	52	127	127	127
22	34	71	70	71
23	20	48	48	48
24	17	44	44	44
25	5	14	14	14
26	11	18	18	18
27	17	32	31	32
28	18	30	30	30
29	27	59	60	60
30	47	92	93	93
31	74	121	122	121
32	57	107	107	108
33	44	84	85	85
34	52	94	94	92
35	30	66	66	66
36	33	68	69	69
37	20	42	42	42
38	16	32	33	33
39	3	9	9	9
40	2	2	2	2

Table 2 Regression equation with fetal parameters and strength of association

Fetal parameter	Regression equation for the mean	R ² (%)
Abdominal circumference (AC)	$-93.1+13.7(AC)-0.062(AC^2)$	99.9
Biparietal diameter (BPD)	$-33.6+4.913(BPD)-0.043(BPD^2)+0.000023(BPD^3)$	99.8
Femur length (FL)	$-1.841+0.064(FL)+0.122(FL^2)-0.002(FL^3)$	99.9
Head circumference (HC)	$-155.1+20.9(HC)-0.206(HC^2)$	99.7

other countries and another Pakistani cohort [14,17,18].

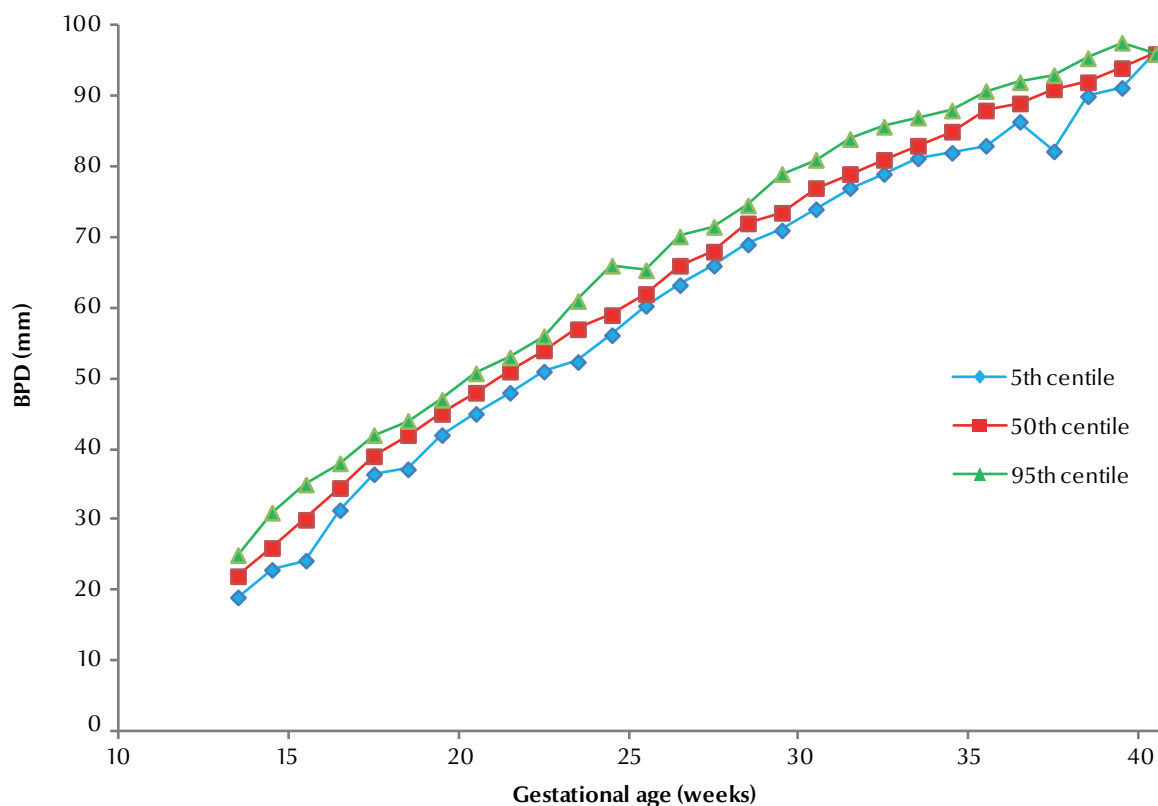
Continuous linear growth of AC was seen from 16 weeks to the end of pregnancy. This finding and the 50th centiles derived for AC in this study were consistent with the charts of Lessoway et al. in a North American Caucasian population [17]. Abdominal size appeared to be larger than the 50th centile in Shahida et al.'s study in another cohort from Karachi, Pakistan [18]. This finding could be due to socioeconomic or ethnic differences between these 2 studies, as our study

predominantly comprised patients of higher socioeconomic status, while Shahida et al.'s sample included a majority of patients from a particular ethnic group.

A linear growth of FL was seen until 36 weeks of pregnancy and then a plateau was identified; this was most likely due to transverse growth of the fetus at this stage rather than longitudinal growth. Charts derived in this study for the 50th centiles of FL showed close agreement with published charts from North Americans and Pakistanis [17,18].

The abrupt peak of the 95th percentile in AC and FL at around 15th and 28th weeks may be because of the wide standard deviation in measurements at these gestational weeks, probably because of the rapid growing period or perhaps due to random errors.

This study had some limitations, besides being carried out a single-centre, private institute site. The exact proportions of different ethnic groups within the sample could not be identified from the mother's charts. Stratification of charts according to

**Figure 1 Fitted 5th, 50th and 95th centiles for biparietal diameter (BPD) by gestational age**

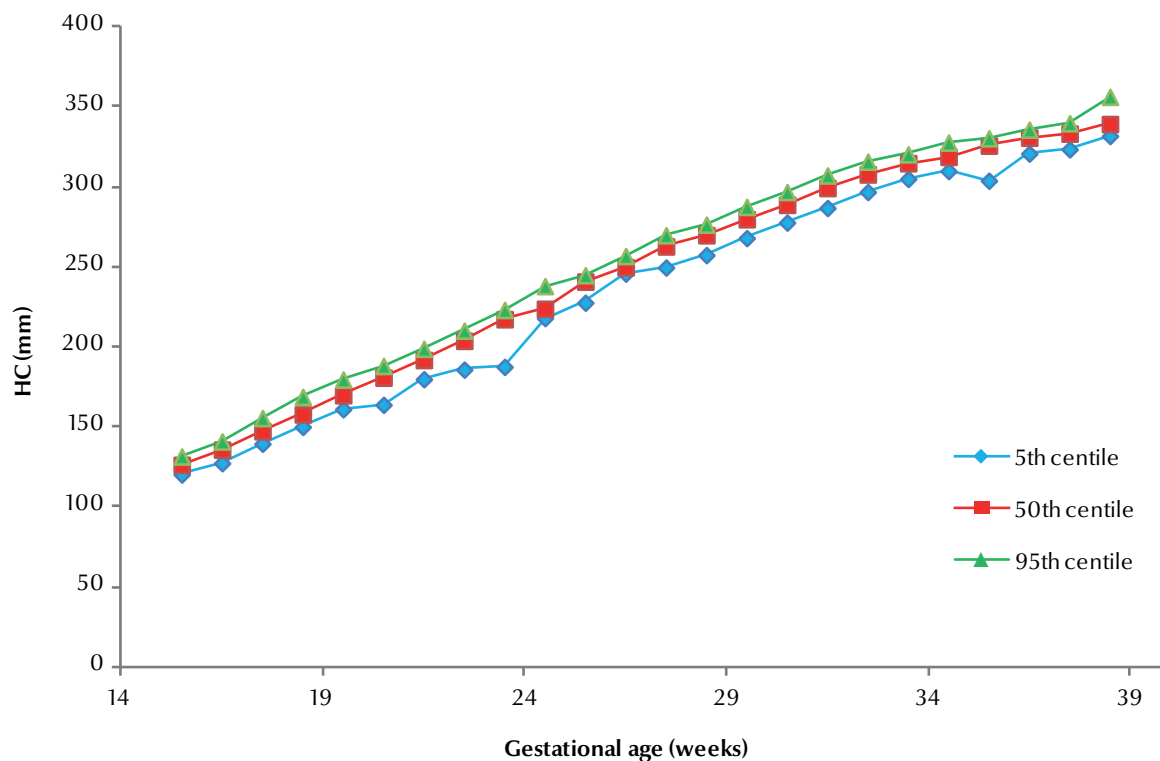


Figure 2 Fitted 5th, 50th and 95th centiles for head circumference (HC) by gestational age

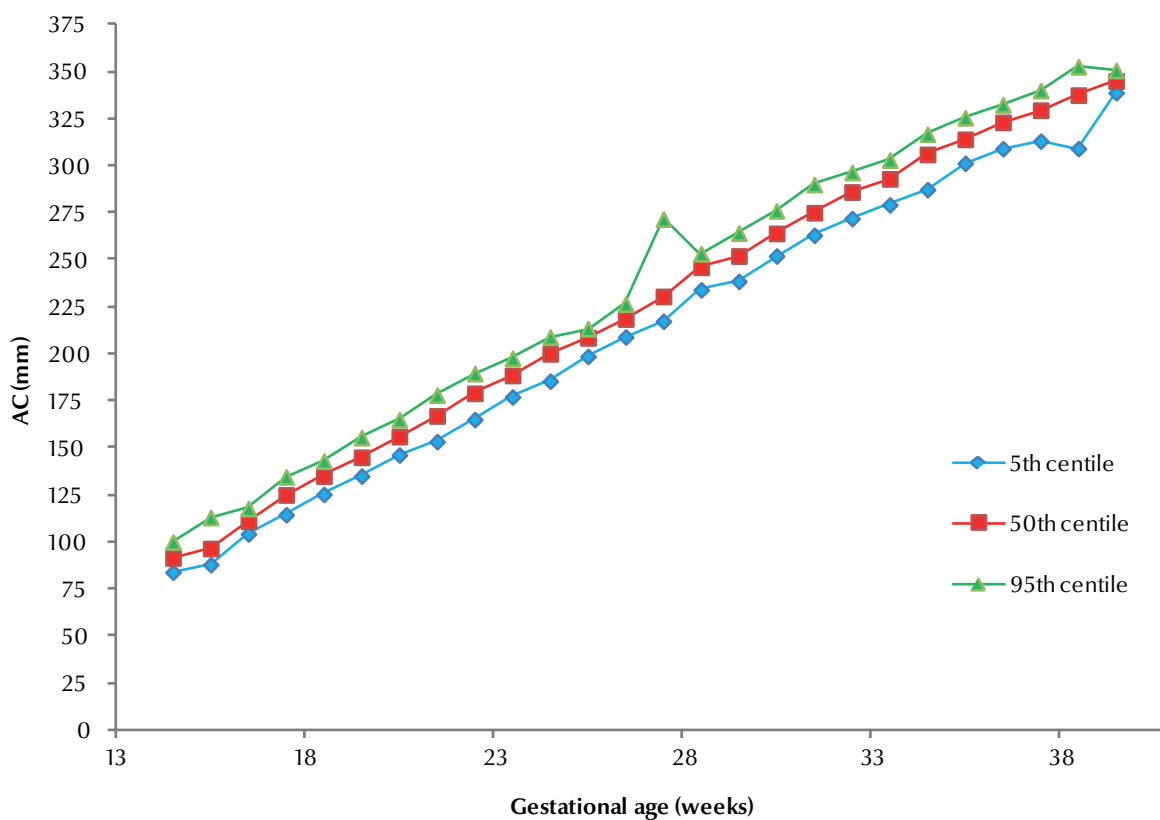


Figure 3 Fitted 5th, 50th and 95th centiles for abdominal circumference (AC) by gestational age

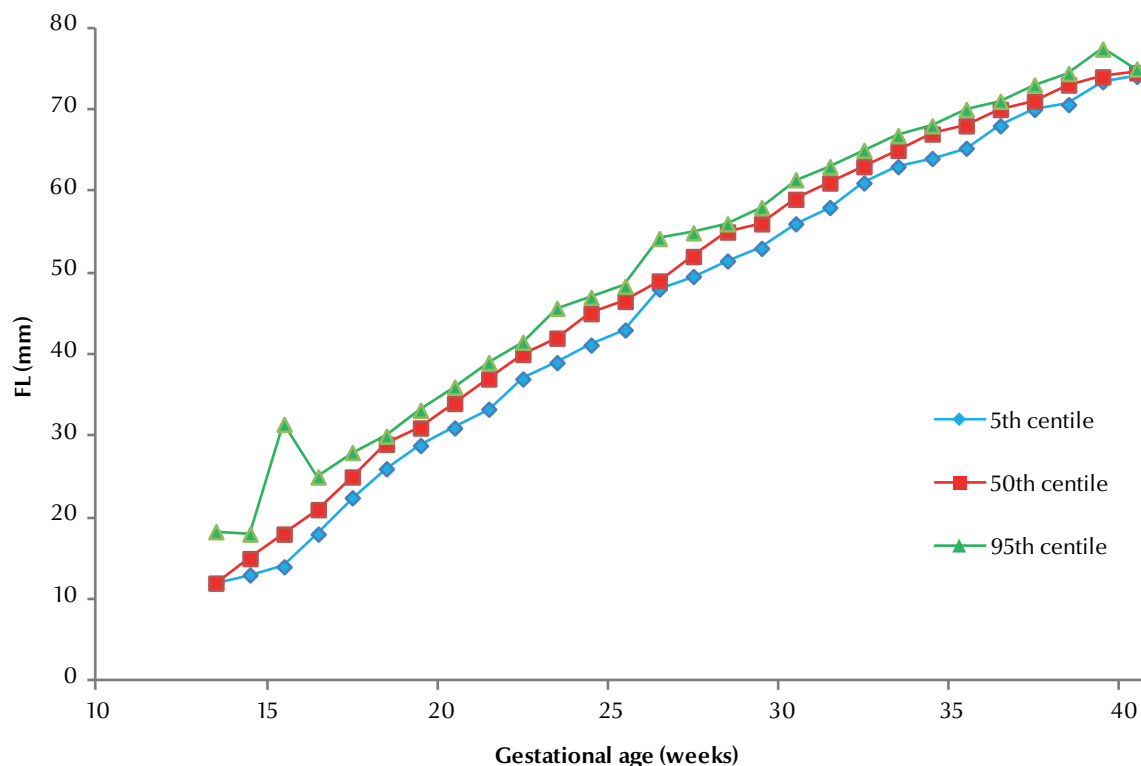


Figure 4 Fitted 5th, 50th and 95th centiles for femur length (FL) by gestational age

birth weight was not done and only normal birth weight babies were included. In addition, interobserver variability of fetal measurements was not assessed.

Nevertheless, we suggest that the fetal biometry charts derived in this

study can be reliably used for the assessment of fetal growth in the local population. A large multicentre study is required to investigate possible differences in fetal growth across different ethnic groups in the Pakistani population.

Conclusion

Fetal BPD, FL, AC and HC centiles graphs for gestational weeks developed in this study are unique for this population and can be used to assess fetal growth from ultrasound measurements.

References

- Hohler CW. Ultrasound estimation of gestational age. *Clinical Obstetrics and Gynecology*, 1984, 27:314–326.
- Shittu AS et al. Clinical versus sonographic estimation of fetal weight in southwest Nigeria. *Journal of Health, Population, and Nutrition*, 2007, 25:14–23.
- Balann DW, Prien SD. Estimation of fetal weight before and after amniotomy in laboring gravid woman. *American Journal of Obstetrics and Gynecology*, 2000, 55:229–239.
- Noumburg E et al. Prenatal ultrasound examination and risk of childhood leukemia: case control study. *British Medical Journal*, 2000, 320:280–283.
- Nyborg WL. Safety of medical diagnostic ultrasound. *Seminars in Ultrasound, CT, and MRI*, 2002, 23:377–386.
- Campbell S, Newman GB. Growth of fetal biparietal diameter during normal pregnancy. *Journal of Obstetrics and Gynaecology of the British Commonwealth*, 1971, 78:513–519.
- Shehzad K, Ali M, Zaidi S. Fetal biometry. *Pakistan Journal of Medical Sciences*, 2006, 22:503–508.
- Khalil H, Rana T, Goraya AR. Fetal weight prediction in 3rd trimester by ultrasonography. *Annals of King Edward Medical College*, 2002, 8:37–38.
- Parveen Z. Birth weight percentiles by gestational age: A hospital based study. *Journal of Ayub Medical College, Abbottabad*, 2001, 13:22–27.
- Campbell S. An improved method of fetal cephalometry by ultrasound. *Journal of Obstetrics and Gynaecology of the British Commonwealth*, 1968, 75:568–576.
- Altman GA, Chitty LS. Charts of fetal size. Methodology. *British Journal of Obstetrics and Gynaecology*, 1994, 101:29–34.
- Browne PC, Hamner LH, Scott Clark D. Sonographic fetal growth curves from an indigent population in Atlanta Georgia. Singleton pregnancies. *American Journal of Perinatology*, 1992, 9:469–476.
- Chitty LS et al. Charts of fetal size. Femur length. *British Journal of Obstetrics and Gynaecology*, 1994, 101:132–135.
- Chitty LS et al. Charts of fetal size. Head measurements. *British Journal of Obstetrics and Gynaecology*, 1994, 101:35–43.

15. Snijders RJM, Nicolaids KH. Fetal biometry at 14–40 weeks gestation. *Ultrasound in Obstetrics and Gynecology*, 1994, 4:34–38.
16. Ashrafunnessa et al. Construction of fetal charts for biparietal diameter, fetal abdominal circumference and femur length in Bangladeshi population. *Bangladesh Medical Research Council Bulletin*, 2003, 29(2):67–77.
17. Lessoway VA et al. Ultrasound fetal biometry charts for a North American Caucasian population. *Journal of Clinical Ultrasound*, 1998, 26:433–453.
18. Zaidi S, Shahzad K, Omair A. Sonographic foetal measurements in a cohort of population of Karachi, Pakistan. *Journal of the Pakistan Medical Association*, 2009, 59:246–249.

Manual of diagnostic ultrasound, second edition, volume 1

When the first edition of *Manual of diagnostic ultrasound* was published in 1995, it quickly established itself as a reference work. In the intervening period, the rapid developments that have occurred in both ultrasound equipment and investigative techniques, including use of ultrasonography in the therapeutic domain, have necessitated publication of a totally new edition of this manual.

The present manual, a basic reference text that covers ultrasound techniques, recognition of normal anatomical features and differential diagnosis, is the first of two volumes of the second edition. Volume 2, which will cover paediatric examinations, gynaecology and musculoskeletal examinations, as well as therapy, will appear at a later date.

These new publications, which extensively cover modern diagnostic and therapeutic ultrasonography, will be of great use to medical professionals in both developed and developing countries.

Volume 1 begins with a chapter on the basic physics of ultrasound, including one dimensional A-, B-, and M-mode, B-mode two-dimensional, three-, four-dimensional and Doppler ultrasound. This is followed by a chapter on examination techniques. The subsequent fourteen chapters deal in turn with the diagnostic ultrasonography of each of the main organs of the body. The authors of the individual chapters are internationally recognized experts in their fields, while the book's editors are Professor Harald T. Lutz and Professor Elisabetta Buscarini.

The book is co-published by the World Health Organization (WHO) and the World Federation for Ultrasound in Medicine and Biology. Further information about this and other WHO publications is available at: <http://www.who.int/publications/en/>

Evaluation of the usefulness of maternal mortality ratio for monitoring long-term effects of a disaster: case study on the Bam earthquake

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تقييم أهمية نسبة وفيات الأمهات في رصد التأثيرات الطويلة الأمد للكوارث: دراسة حالة لزلزال "بام" فرزانه ذو العلى

الخلاصة: تعتبر نسبة وفيات الأمهات مؤشراً هاماً للأوضاع الاجتماعية والاقتصادية في بلد أو منطقة ما. وتهدف هذه الدراسة التي أجريت في مقاطعة كرمان إلى مقارنة نسب وفيات الأمهات من مختلف مصادر المعطيات، وفحص الفوارق في جميع المعطيات الحياتية في جمهورية إيران الإسلامية، في سياق كارثة زلزال "بام" (كانون الأول/ ديسمبر 2003). وقد جُمعت المعطيات السنوية من الوثائق المتوافرة قبل الزلزال وبعده، وأجريت مقابلات مع المستجيبين الرئيسيين. وكان هناك فرق كبير في نسب وفيات الأمهات بين سنة الزلزال والسنة التالية لها بمقارنة مصدرَي المعطيات الرئيسيين (وحدة الأسرة تحت إشراف وزارة الصحة والتعليم الطبي، والسجلات المدنية تحت إشراف وزارة الداخلية). وقد نوقشت أسباب هذا الاختلاف. كما أُلقت هذه الدراسة الضوء على مشاكل التنسيق بين الوكالات الدولية للمساعدات وهي المشاكل التي عرقلت الجمع الروتيني للمُعْطَيَات.

ABSTRACT The maternal mortality ratio is an important indicator of socioeconomic conditions in a country or area. This study in Kerman province aimed to compare maternal mortality ratios from different data sources and examine deficiencies in vital data collection in the Islamic Republic of Iran in the context of the Bam earthquake disaster (December 2003). Annual data were collected from documents before and after the earthquake and interviews were conducted with key informants. There was a large difference in maternal mortality ratios in the year of the earthquake and the year after the earthquake comparing the 2 main data sources (the family unit under the supervision of the Ministry of Health and Medical Education and the civil registry under the supervision of the Ministry of Interior). The reasons for this are discussed. This study also highlighted problems in collaboration between international aid agencies that hindered routine data collection.

Évaluation de l'utilité du taux de mortalité maternelle pour le suivi des effets à long terme d'une catastrophe naturelle : étude de cas du tremblement de terre de Bam

RÉSUMÉ Le taux de mortalité maternelle est un indicateur important de la situation socioéconomique d'un pays ou d'une zone géographique. Cette étude, effectuée dans la province de Kerman (République islamique d'Iran), visait à comparer les taux de mortalité maternelle de différentes sources et à examiner les faiblesses du recueil des données vitales iraniennes, dans le contexte de la catastrophe du tremblement de terre de Bam en décembre 2003. Les données annuelles ont été collectées à partir de documents antérieurs et postérieurs au tremblement de terre et des entretiens ont été réalisés avec d'importants fournisseurs d'information. Des différences significatives ont été observées dans le taux de mortalité maternelle de l'année du tremblement de terre et celui de l'année suivante, si l'on compare les deux principales sources de données : le Centre familial, supervisé par le ministère de la Santé et de l'Enseignement médical, et les registres d'état civil, placés sous la tutelle du ministère de l'Intérieur. Les raisons expliquant ces différences sont présentées dans l'article. La présente étude a également souligné les problèmes de collaboration entre les organismes d'aide internationaux qui entravent le recueil des données de routine.

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Introduction

According to the World Health Organization (WHO) about 2 billion people were affected by disasters and 600 000 lost their lives in the 1990s alone [1]. On average 60 000 people die and 250 000 000 are affected by disasters annually [2,3]. Disasters are not only a challenge to society in the immediate aftermath [4] they also have many long-term adverse effects. However, with the exception of mental health, the long-term effects of disasters on health have not received sufficient attention [5]. It has been argued that the health effects of a disaster are more severe for women than for men, as many of the disadvantages that women face in non-disaster conditions [6] are exacerbated in disaster situations, due to many women's lack of access to resources and control over decision-making [7]. Apart from the short-term effect of a disaster on safe motherhood—for example, the rate of preterm delivery has been shown to increase in the 48 hours after an earthquake [8]—there are concerns about the quantity and quality of reproductive health facilities and staff for women living in rescue camps [9,10].

Health indicators are a useful tool to inform policy-making [11]. The maternal mortality ratio (MMR) is an important indicator of socioeconomic conditions in a country or area and could be useful for monitoring the long-term effects of a disaster on the health system and society. This is because maternal mortality is likely to be affected by changes in women's living conditions and access to health facilities after a disaster. In addition, it reflects socioeconomic factors that could be affected by a disaster and need considerable time to rehabilitate [12,13].

The Islamic Republic of Iran is one of the most disaster-prone countries in the world. In December 2003, a very severe earthquake destroyed Bam, an ancient city on an old trade route. The

earthquake itself left huge numbers of people dead or injured, and the collapse of the physical and economic infrastructure disrupted the health care system and left many people living in temporary accommodation for extended periods of time after the quake [14,15]. This study aimed to compare MMRs from different data sources from before and after the Bam earthquake and to examine deficiencies in vital data collection in the Islamic Republic of Iran both routinely and in disaster situations.

Methods

This study was a part of a larger study carried out in Bam, a town located in Kerman province, and in Kerman city, the centre of Kerman province. The original study was a mix of qualitative and quantitative methods, with data collected from documents and via interviews with key informants. Permission to conduct the study was obtained from the deputy for health and the civil registry.

Data collection

This paper reports data on annual maternal mortality collected from 2 years prior to the Bam earthquake (March 2001 to March 2003), the year of the earthquake (March 2003 to March 2004) and the following 3 years (March 2004 to March 2007).

Data sources

The registration of vital data in the Islamic Republic of Iran has been discussed in more details in an earlier paper by the same author [16].

There are 2 official sources of mortality data, including maternal deaths, in the Islamic Republic of Iran: the provincial statistics unit under the supervision of the Ministry of Health and Medical Education (MOHE) (established at the medical science university in each province) and the civil registry under the supervision of the Ministry of Interior. In addition, maternal deaths are

collected through the family unit of the MOHE (also established at the medical science university in each province).

The only official source for live births in the Islamic Republic of Iran is the civil registry. However, due to the low accuracy of data at the civil registry [16] and the almost nationwide coverage of vaccination, health staff in the Islamic Republic of Iran prefer to use the number of children who received the first dose of polio vaccine as the surrogate for the number of live births [17].

Maternal mortality ratios

In the present study maternal mortality data from these 3 different sources (the family unit at Kerman Medical University, the statistics unit at Kerman Medical University and the civil registry) were extracted. The civil registry and the family unit held the data for the whole period of the study (2001–07), while at the statistics unit data were available only for a 3-year period (2004–07). The statistics unit data therefore could not be used to study maternal mortality before and after the earthquake but because more detailed data was recorded there it provided an opportunity to carry out case-matching with the family unit data.

The MMR is expressed as the number of maternal deaths per 100 000 live births. MMRs based on data from the family unit were calculated using the maternal deaths records for Bam as the nominator and the number of children who received the first polio vaccination in Bam as the denominator. MMRs for the civil registration were estimated by the number of maternal deaths and live births recorded at the civil registry.

The data obtained from different sources were not in the same format. The data from the family unit were extracted from the maternal death files. The files provided a variety of data including medical history and demographic and personal information. The author extracted only the personal and demographic characteristics of cases.

Case comparisons

It was interesting to know if the data recorded varied across different organizations. Because the data at the civil registry are not recorded for individuals, a crossmatch comparison to check if these 2 organizations had captured the same deaths was not possible. However, the data from the family unit and the statistics unit, which are both under the same organization (the MOHE) were matched. Data at the statistics unit were available for only 3 years and so the data from the family unit and the statistics unit from 2004–07 were matched case-by-case based on the common items recorded.

Organizational strategies

The strategy of each organization after the earthquake for data collection was examined through interviews with key informants who were involved in data collection and processing, both directly as data collectors and data processors and indirectly as policy-makers.

Data analysis

The data from the civil registry and the family unit were entered into a Microsoft *Excel* database in a format similar to that of the civil registry. The data from the statistics unit, which were originally input into Microsoft *Access*, were exported into Microsoft *Excel*. Then the data in Farsi were coded into English. Afterwards they were exported into *SPSS*, version 13 before recoding. The final data were grouped similarly to the output of the vital registry cross-tabulations.

Results

Maternal mortality ratios

The estimated MMRs from data recorded at the civil register and the family unit over the study period are presented in Figure 1. There was a remarkable difference between the 2 data sources in MMRs in the year of the earthquake (March 2003–March 2004) and the

year after the earthquake (March 2004–March 05). While the civil registry showed the highest MMR in the year of the earthquake, the family unit showed the second lowest MMR that year. However, the MMR rose at the family unit the year after the earthquake. Surprisingly, the civil registry presented one of the lowest MMRs in the year after the earthquake.

These contradictions can be attributed to inconsistencies in the denominators or the nominators or both. Therefore the data used for calculation of MMRs were explored and compared in Table 1. The data indicate that the number of live births recorded at the family unit (ranging from 3258 to 5537) were considerably higher than those for the vital registry over the same period (ranging from 2479 to 3948). The number of maternal deaths recorded was also higher in the family unit in comparison with the vital registry, for every year except the year of the earthquake (2003–04), which was 2 for the former and 10 for the latter.

Case matching

The maternal deaths were matched case-by-case at the family unit and the statistics unit for the years when data were available at both sources (2004–07). The total number of deaths recorded in the family unit was 11 while in the statistics unit it was 8. Data on age, place of residence and date of death were compared for the 8 deaths reported by both sources. In 3 cases the mother's age did not match, in 4 cases the date of death was not consistent and in 2 cases the mother's place of residence was different.

Organizational strategies

Following the Bam earthquake, the civil registry reacted quickly to register the deaths by establishing temporary branches of the civil registry in different areas of Bam. The government encouraged registration by offering a remuneration. However, the interviews with key informants revealed that if all family members had died, any relatives or neighbours could report the deaths.

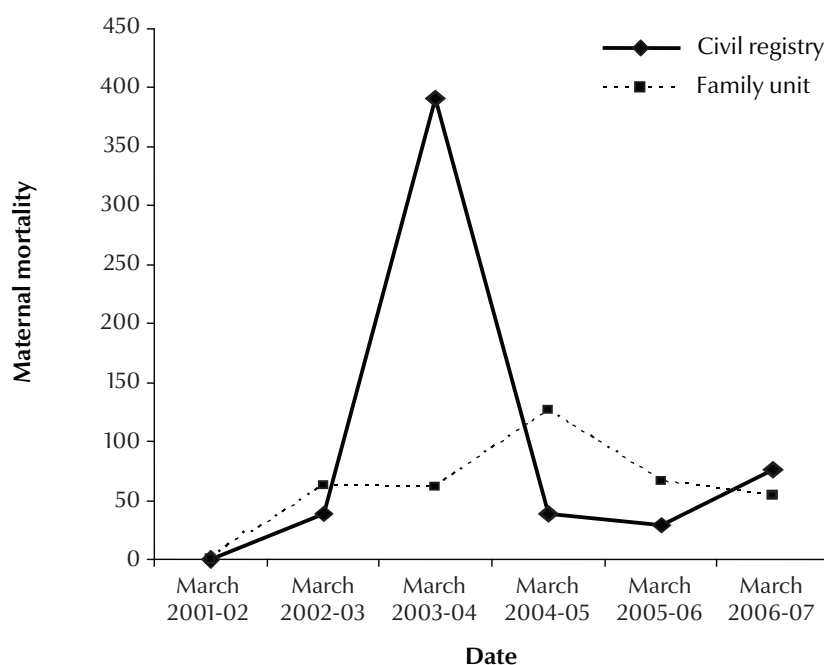


Figure 1 Pattern of maternal mortality ratios (per 100 000 deaths) in Bam according to different data sources (the civil registry and the family unit) from March 2001 to 2007

Table 1 Maternal deaths, live births and maternal mortality ratios (MMRs) in Bam according to different data sources (the civil registry and the family unit) from March 2001 to March 2007

Year	Civil registry			Family unit		
	Maternal deaths	Live births	MMR	Maternal deaths	Live births	MMR
	No.	No.	/100 000 live births	No.	No.	/100 000 live births
2001-02	0	2479	0	0	5075	0
2002-03	1	2616	38	3	4771	63
2003-04	10	2562	390	2	3258	61
2004-05	1	2575	39	5	3590	127
2005-06	1	3466	29	3	4543	66
2006-07	3	3948	76	3	5537	54

Therefore double registration and misregistration of living people were mentioned as problems with this system of registration. The problems with death records immediately after the earthquake have been discussed elsewhere [18].

The interviews at the medical sciences university illustrated another facet of the effects of the earthquake on the data collection system. It was reported that the university had not recorded those deaths which happened immediately after the earthquake. This was explained as being due to the devastating effects of the earthquake on the health care system. Entire workplaces and their equipment were destroyed. Respondents stated that there was long time delay before places of work and equipment became re-established.

The interviews at the medical university also found that following the earthquake the local health staff worked with the International Red Cross/Red Crescent organization for a considerable length of time. During this period they did not send data on births and deaths to Kerman Medical Sciences University, as the data were collected by the Red Cross/Red Crescent emergency teams. Data were initially recorded in English and later in Farsi, the official language of the Islamic Republic of Iran. Reporting data in a different language than the language of a country may limit the ability of the host country to use the

data, due to lack of familiarity of regular staff with English language and the need for translation to make the data understandable. Respondents also pointed out that due to the extraordinary nature of the earthquake, the health system was overstretched trying to deal with contagious diseases. Concerns about contagious diseases diverted resources and attention away from routine data collection towards detecting and reporting of diseases.

Immediately after the Bam earthquake, due to the extraordinary scale of the disaster, Kerman Medical University, which used to have a supervisory role, was unable to continue with this role. It therefore provided different support for wide range of aid groups, national and international, and the situation was managed directly at the national level. Changing the role of the medical sciences university from a supervisory to a supportive role was perceived by one respondent as another obstacle to accurate recording of data.

Discussion

In the Islamic Republic of Iran the main policy decisions about health are made in the MOHE. Therefore, the ministry is one of the main data users. However, this study flags up some serious problems that could limit the validity of data collected by the MOHE. One problem is that of deficiencies in the routine

collection of data and another is when these problems are exacerbated by a disaster. The data collection problems observed routinely in non-disaster situations have been discussed elsewhere [16].

There are a number of long-term effects of a disaster on the routine collection of data. Several factors hindered the resumption of data collection shortly after this earthquake. First, recovering the routine data collection system to its pre-disaster state took a considerable time. This long recovery time could reflect either limitations in the ability to rehabilitate the system to its pre-disaster state or the university's priority-setting after the earthquake. The latter can be illustrated by 2 issues: in the period immediately after a disaster, there is a tendency for policy-makers to solve daily, short-term problems rather than longer-term problems [19]. Furthermore, there may be little enthusiasm to use data when policy-makers lack the skills and knowledge to use the data and this can hinder the usefulness of the data [20].

Secondly, the effect of the earthquake on living conditions diverted the policy-makers' attention from routine activities to emergency and surveillance actions. Although these tasks are very important in the critical period after a disaster, they should not prevent routine tasks from being undertaken, particularly when the collected data are

used not only to monitor the longer-term effects of a disaster but also to make governments accountable to the people [21].

Finally, another problem after the earthquake was poor coordination between the national and international aid agencies in sending routine data to the province. Although the role of national and international aid agencies is very important in disaster relief, poor coordination and lack of task definition regarding routine data collection resulted in no data being sent for several months after the Bam earthquake. Needless to say, these data have a vital role in highlighting problems that develop after a disaster and that could have a critical effect on the population's future health. Such data can be used as indicators of

the need for health care services and ultimately for planning future responses to similar situations in a developing country.

Conclusion

This study used epidemiological data to flag up problems found in the collection of health data and the necessity of paying attention to data collection after a natural disaster. It is very important to have the collaboration of international organizations to collate data in the host country. Therefore appropriate strategies are needed to increase awareness of this issue at the national and global level. This can be achieved through international organizations such as the

WHO or Red Cross/Red Crescent organizations.

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This project was financially supported by Kerman Medical University. The author recognizes the important collaboration of Kerman Medical University and Bam health network by facilitating access for fieldwork. I would like to acknowledge and thank my supervisor Dr John Forbes for his professional guidance and encouragement. I also acknowledge the contribution from Kerman Medical University staff and Bam health network for donating their time to be interviewed.

References

1. *Gender and health in disasters*. Geneva, World Health Organization, 2002 [factsheet] (http://www.who.int/gender/other_health/en/genderdisasters.pdf, accessed 2 October 2011).
2. White P et al. *Disaster risk reduction: a development concern. A scoping study on links between disaster risk reduction, poverty and development*. London, Department for International Development, 2005.
3. Guha DS, Hargitt D, Hoyois P. *Thirty years of natural disasters 1974–2003: the numbers*. Brussels, Centre for Research on the Epidemiology of Disasters, 2004.
4. Charvériat C. *Natural disasters in Latin America and the Caribbean: an overview of risk*. Washington DC, Inter-American Development Bank, 2007.
5. Searman J. The effects of disaster on health: a summary. *Disasters*, 1980, 4(1):14–18.
6. Beneria L. Reproduction, production and the sexual division of labour. *Cambridge Journal of Economics*, 1979, 3:203–225.
7. *Gender and natural disasters: why are women more vulnerable?* Washington DC, Pan-American Health Organization, 2000 [factsheet] (<http://www.paho.org/English/DPM/GPP/GH/genderdisasters.pdf>, accessed 2 October 2011).
8. Weissman A et al. The influence of increased seismic activity on pregnancy outcome. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*, 1989, 31:233–236.
9. Krause S. *Assessment of reproductive health for refugees in Zambia*. Zambia, Women's Commission for Refugee Women and Children, 2001.
10. Luka T. *Reproductive health services for Somali refugees in eastern Ethiopia*. Addis Ababa, United Nations Population Fund, 1999.
11. AbouZahr C, Adjei S, Kanchanachitra C. From data to policy: good practices and cautionary tales. *Lancet*, 2007, 369:1039–1046.
12. Graham WJ et al. The familial technique for linking maternal death with poverty. *Lancet*, 2004, 363:23–27.
13. Onwudiegwu U. The effect of a depressed economy on the utilisation of maternal health services: the Nigerian experience II. *Journal of Obstetrics and Gynaecology*, 1997, 17:143–148.
14. Tierney K et al. Social and public policy issues following the 2003 Bam, Iran earthquake. *Earthquake Spectra*, 2005, 21:S513–534.
15. Ashtiany MG, Mousavi R. History, geography, and economy of Bam. *Earthquake Spectra*, 2005, 21:S3–11.
16. Zolala F. Health information systems in the Islamic Republic of Iran: a case study in Kerman province. *Eastern Mediterranean Health Journal*, 2011, 17(9):679–683.
17. Ghassemi H, Harrison G, Mohammad K. An accelerated nutrition transition in Iran. *Public Health Nutrition*, 2002, 5(1A):149–155.
18. Zolala F. Data collection after massive natural disasters (focusing on Bam earthquake, Iran). *Disaster Prevention and Management*, 2010, 19(5):541–547.
19. Sauerborn R. Using information to make decision. In: Lippeveld T, Sauerborn R, Bodart C, eds. *Design and implementation of health information systems*. Geneva, World Health Organization, 2000.
20. Sæbø J, Titlestad O. Evaluation of a bottom-up action research approach in a centralised setting: HISP in Cuba. In: *Proceedings of the 37th Hawaii International Conference on System Sciences*, 2004 (<http://ieeexplore.ieee.org/iel5/8934/28293/01265384.pdf?arnumber=1265384>, accessed 2 October 2011).
21. Cibulskis RE, Hiawalyer G. Information systems for health sector monitoring in Papua New Guinea. *Bulletin of the World Health Organization*, 2002, 80:752–758.

Report

Protecting the right to health of internally displaced mothers and children: the imperative of inter-cluster coordination for translating best practices into effective participatory action

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حماية الحق في الصحة للأمهات والأطفال النازحين داخلياً: حتمية التنسيق بين المجموعات لترجمة أفضل الممارسات إلى أعمال تشاركية فعالة

خليفة بله محمود، سداً حفيظ، غلام نبي قاضي، ديفيد ساوث هول

الخلاصة: لقد أُحرز تقدم ملموس في تطوير تدخلات الاستجابة الطارئة أثناء الكوارث بما في ذلك مساعدة النازحين داخلياً. وقد طبقت بنجاح دلائل إرشادية واستراتيجيات إدارية تقنية ميدانية واضحة من خلال "أسلوب التلّة". في 2008-2009، أدى الصراع المسلح الذي اندلع في عدة مناطق في ولاية خيبر باختونخوا والمناطق الإدارية الحدودية الاتحادية لباكستان إلى نزوح أكثر من 2.7 مليون نازح داخلي. ويصف هذا التقرير استجابة الحكومة الباكستانية، بمساعدة الشركاء المعنيين بتسكين النازحين والأعمال الإنسانية، وتعامل الحكومة مع الأزمة باستخدام أسلوب التلّة لضمان الحماية الصحية للنازحين الداخليين، ولا سيما الأمهات والأطفال.

ABSTRACT Substantive progress has been achieved in advancing emergency response interventions during disasters including assistance of internally displaced persons (IDPs). Explicit operational technical guidelines and management strategies have been successfully applied through the "cluster approach". In 2008-09 armed conflict in several districts of the Khyber Pakhtunkhwa (KP) province and the Federally Administered Tribal Areas (FATA) of Pakistan resulted in over 2.7 million IDPs. This report describes the response by the Pakistan government, assisted by the hosting populations and humanitarian partners, to deal with the crisis using the cluster approach to ensure the health protection of the IDPs, particularly mothers and children.

Protéger le droit à la santé des mères et des enfants déplacés à l'intérieur de leur propre pays : une coordination intergroupes est impérative pour traduire les meilleures pratiques en action participative efficace

RÉSUMÉ Des progrès conséquents ont été accomplis en matière d'interventions d'urgence au cours de catastrophes, y compris pour assister les personnes déplacées à l'intérieur de leur propre pays. Des directives techniques opérationnelles claires et des stratégies de gestion ont été appliquées efficacement au moyen de l'approche modulaire. En 2008 et 2009, plusieurs districts de la province de Khyber Pakhtunkhwa et des zones tribales sous administration fédérale du Pakistan ont été le lieu d'un conflit armé qui a entraîné le déplacement de plus de 2,7 millions de personnes. Ce rapport décrit la riposte du gouvernement pakistanais, aidé par les populations hôtes et par des partenaires de l'aide humanitaire pour faire face à la crise en ayant recours à l'approche modulaire pour protéger la santé des personnes déplacées à l'intérieur de leur propre pays, en particulier les mères et les enfants.

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Introduction

Natural and man-made disasters have become frequent in recent times, with global estimates of the internally displaced persons (IDPs) caused by conflicts from 1990 to 2009 exceeding 23 million. Around 46% have occurred in the Eastern Mediterranean Region (EMR) of the World Health Organization (WHO) [1,2]. The tragic scenarios to which IDPs were exposed has necessitated the protection of their human rights, including the rights to health of mothers and children, violations of which have become a feature of most of these crises [2–4].

Furthermore, the protection of health-care systems in times of conflict has remained a critical factor influencing health care available to the affected population [5–7]. The First Geneva Convention was signed in 1863, which addressed the care for sick and wounded soldiers during wartime and recognized the neutrality of medical personnel, hospitals and ambulances identified by the emblem of the Red Cross [4]. The Second and Third Geneva Conventions were adopted in 1906 and 1929, and addressed care for the wounded, sick and shipwrecked armed forces and the rights of prisoners of war respectively. The protection of civilians and medical services in time of war was endorsed in 1949 by the Fourth Geneva Convention that forbids the use of hospitals for non-humanitarian duties, while mandating the provision of necessary relief to affected civilian populations [8]. The 1949 Convention was reinforced in 1977 by 2 additional protocols relating to the protection of victims of international and non-international armed conflicts respectively, providing a legal avenue for the internationally recognized protection of the rights of IDPs [9,10].

The limited disaster response capacity of most affected nations has necessitated the engagement of the international humanitarian community [5,11,12]. To effectively address

these global challenges, an Inter-Agency Standing Committee (IASC) was established in 2005 that soon conceived the launching of the cluster approach for 9 priority sectors that included health, nutrition, water and sanitation, protection and emergency shelter. The IASC identified cluster lead organizations for each, while the food security cluster was deliberated in 2010 [12,13]. These deliberations led to a Preliminary Guidance Note put into effect in 2006 by the IASC whereby the cluster approach has since been globally recognized as the best mechanism for coordinating and implementing effective and cohesive relief and rehabilitation during humanitarian response operations [8].

Pakistan adopted the cluster approach during the massive 2005 earthquake, and learned many lessons concerning the participatory management of humanitarian relief operations, the legitimate demand for results and accountability, and the protection of the human rights of IDPs [14]. Subsequently, Pakistan was affected by the cyclone and floods of 2006 in Sindh and Balochistan provinces and by the 2007 earthquake that hit Balochistan. These 3 disasters cumulatively affected over 8 million people, of which close to 50% became IDPs at some point in time. Almost all returned voluntarily to their places of residence through a well-managed government-led humanitarian response, rehabilitation and reconstruction effort. During these adversities a cadre of emergency response managers and professionals was groomed and institutional capacities created by establishing the National Disaster Management Authority to coordinate emergency preparedness and response interventions in the country. In 2008–09 armed conflict in several districts of the Khyber Pakhtunkhwa (KP) province and the Federally Administered Tribal Areas (FATA) of Pakistan resulted in over 2.7 million IDPs [15] and the capacities and assets of the National Disaster Management Authority were skilfully utilized to assist them.

The health-related human rights of Pakistan's IDPs of 2008–09 were closely reviewed. Relevant deliberations on health care in conflict were raised in a conference organized in London in November 2010 by the International Child Health Group, Royal College of Paediatrics and Child Health and Maternal and Child Health Advocacy International, with extended experience in Pakistan. The conference resulted in a resolution on the need to ensure the protection of health care during armed conflict [16]. The pervasive lack of protection for health care during armed conflicts outlined by the conference has consolidated the focus of this report.

This report shares the lessons learned from the Pakistan IDPs crisis of 2008–09 and describes how the vulnerable groups, especially mothers and children, were ensured the required essential health services as an inalienable human right. It substantiates the criticality of health protection among displaced mothers and children and the obligation to enhance their resilience and survival through a safeguarded and strengthened health system network.

Overview of the interventions successfully used to assist IDPs in Pakistan

The Health Cluster (HC) led by the government health authorities and WHO mobilized the participation of 46 humanitarian partners to assist the IDPs, of which over 60% were mothers and children. A package of vital primary health care (PHC) activities and life-saving emergency referral support interventions was provided. These interventions included the protection of maternal, neonatal and child health care rights implemented by a network of first-level care facilities, mobile and camp-based health services and 11 district hospitals. The

following outline illustrates the key interventions executed that had a positive impact on the protection of these vulnerable IDPs.

Organizing the humanitarian response

HC partners conducted regular meetings at national, provincial and district levels to promptly address the planning, implementation and monitoring of essential health response interventions. There was a coordinated resource mobilization, and the provision and management of essential medicines, supplies, equipment and operational logistics. Universal health coverage was facilitated by the official registration of all IDPs at multiple hubs created by the National Disaster Management Authority, and technically supported by both the National Database and Registration Authority and the United Nations Refugee Agency (UNHCR). All households, including those headed by women, were provided with identity cards to access the humanitarian relief assistance. Figure 1 shows the required multisectoral approach for protecting the health rights of IDPs and mothers and children in particular.

Box 1 illustrates the scope of critical services provided together with the protection required for the health system

to perform adequately and provide essential and life-saving health services to IDPs. These relief interventions were planned and implemented in all IDP hosting districts, coordinated by the National Disaster Management Authority, the provincial government relief commission and the Provincial Disaster Management Authority supported by several federal departments, including health. These efforts were extensively complemented by HC humanitarian relief organizations co-led by the government and WHO. Protection was also provided by hosting communities who sheltered and assisted 88% of the IDPs, each family accommodating on an average 1.2 displaced families. To mobilize this response effectively, HC partners developed a joint health response strategy, complemented by a set of standard operational guidelines that were collectively pursued (Box 2). The guidelines predominantly addressed the health needs of mothers and children and contributed significantly to the care of these vulnerable groups.

Emerging disparities in access to care

Humanitarian response partners in Pakistan discerned a difference in accessing essential health-care services by IDPs living in camps relative to those hosted by local communities; the former having better access to health

services. Conversely, IDPs hosted by families were perceived to live in more socially conducive and protective settings. Table 1 illustrates a qualitatively assessed range of determinants and their potential influence on this observed difference. To bridge these disparities, HC partners strengthened the service delivery capacity of the PHC facilities and hospitals with focus on maternal, neonatal and child health care (MNCH), including reproductive health, and raised the scope of service utilization for the out-of-camp IDPs and hosting populations. Likewise, the in-camp safety and protection measures were enhanced.

Health system strengthening

The rapid health needs assessment carried out at the outset of the crisis identified performance gaps in the health response strategy led by a scarcity of female health workers, and a paucity of medicines, relevant supplies and equipment. Over a third of the PHC facilities could not provide basic emergency obstetric and neonatal care and a similar proportion of the 11 district hospitals operating in the IDPs' catchment areas was unable to deliver comprehensive emergency obstetric and neonatal care services thus, necessitating urgent health system strengthening.

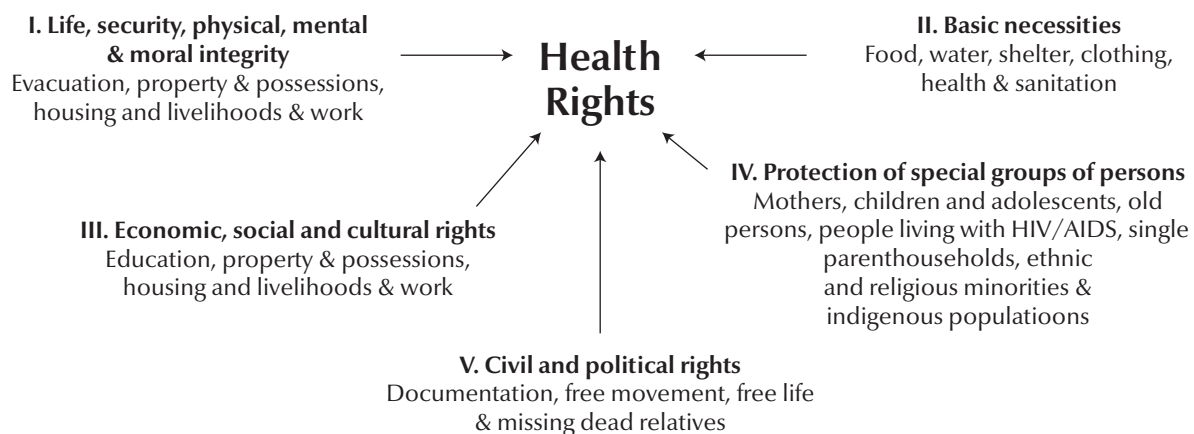


Figure 1 Protection of specific human right during disasters and their connection with health rights

Box 1 Scope of critical service operations and the action required to maintain health systems in disaster and conflict zones**Critical service operations**

1. Organizing the Health Cluster to coordinate all health relief operations
2. Assessing health protection needs of IDPs and their hosting population
3. Ensuring the access of IDPs to health relief operations and to all necessary health care facilities
4. Ensuring the availability of skilled health workers and sustained access to the female health workforce
5. Organizing essential care services with focus on MNCH including reproductive health and family planning
6. Promoting breast feeding & nutrition supplementation
7. Treating STIs
8. Preventing disease outbreaks
9. Providing immunization services
10. Offering specialized referral care
11. Facilitating access to psychosocial support & mental health services
12. Protecting single parents with children
13. Sustaining stocks of medical supplies and drugs, including oxygen
14. Caring for persons with disability and provision of supportive aid
15. Ensuring outreach health services to those unable to reach facilities
16. Organizing reconstruction and upgrading of health facilities
17. Setting minimum operating standards for health response
18. Recording and reporting all violations with a negative impact on the functioning of health services
19. Organizing community-based care and encouraging IDPs' active participation
20. Undertaking health education and promotion interventions

Protection required for the health systems

1. Protecting PHC and health facilities, hospitals and clinics operating in the disaster zone, including military health facilities, including physical protection and security measures for hospitals and checkpoints as necessary
2. Ensuring fast track transfer of essential drugs and medical supplies
3. Protecting health workers and health volunteers from attack and intimidation during their work, in their homes and to and from their places of work.
4. Ensuring safe transport of sick and injured patients to and from health facilities and preventing attacks on the sick and wounded.
5. Ensuring the safety of UN relief teams and other humanitarian organizations including registered national and international NGOs active in emergency health response operations
6. Banning the storage of weapons in hospitals, launching attacks from health-care facilities or carrying of members of armed forces in ambulances or any other health logistics except when transporting the seriously injured
7. Protecting and supporting national and international parties assisting the health system with provision of supplies, equipment and vital consumables that are essential to execute life-saving surgical, anaesthetic and other vital services
8. Ensuring the provision of safe corridors to care seekers to access health facilities
9. Documenting violations to the functioning of health services in conflict zones
10. Establishing formal and informal contact focal points with relevant authorities for enhancing protection and for acting on reported violations
11. Upholding the neutrality and impartiality of the health care system and the legitimacy of health workers assisting the sick and injured irrespective of the conflict zone they serve in and promoting preventive policies, while not coercing health workers to make statements that could compromise their neutral stance
12. Preserving all essential amenities of the health system with special attention to electricity and water supply
13. Training the health workforce in undertaking essential preventive security measures and in handling situations related to intimidation, kidnapping and violence

IDPs = internally displaced persons; MNCH = maternal, neonatal and child health; STIs = sexually transmitted infections; UN = United Nations; NGOs = nongovernmental organizations

The provincial health department mobilized female physicians from teaching hospitals in the provincial capital Peshawar, who commuted daily to the camps and health facilities of the IDP hosting districts. The support offered by professionals proficient in Pashto, the IDPs' spoken language, led to a substantial enhancement of health services use with visible improvement in MNCH outcomes. Implementation of the operational standards and

guidelines established by HC, which specified the quantity and quality of services to be provided at each level of care, were made mandatory for all national and international health partners assisting the IDPs. Moreover, the procurement and operational management of essential medicines were coordinated by WHO in liaison with the government and HC partners. Other essential supplies and equipment were also provided to ensure the effective

functioning of these facilities. The availability of running water and electricity was ensured at all times by providing generators to hospitals and facilitating water supply connections to secure the provision of emergency services.

Health education and promotion

During the course of this crisis, Lady Health Workers, a national cadre of trained female community health workers providing PHC services to

Box 2 The Health Cluster (HC) strategy for the internally displaced persons (IDPs) focusing on the protection of the right to health of mothers and children and the services for which standard operating guidelines were set for implementation

Pakistan HC strategy for the IDPs

- Coordination of health action
- Initial rapid assessment
- Disease surveillance
- Control of disease outbreaks
- Standard essential service package
- Mass vaccination
- MNCH focused action with IMNCI implementation
- Nutrition care and surveillance
- Health promotion and education
- Essential medical supplies
- Safe drinking-water
- Mental health & psychosocial support
- Assistance of persons with disabilities

Services for which standard operating guidelines were set

- Treatment of common ailments
- Integrated MNCH, reproductive health including family planning
- Expanded Programme on Immunization
- Nutrition
- Malaria case management
- Tuberculosis treatment through DOTS
- Minor surgical procedures and emergency health
- Mental health and psychosocial support
- Care for persons with disability
- Community-based health promotion and education
- Laboratory and X-ray facilities
- Essential drugs management and their rational use
- Disease Early Warning System (DEWS) for epidemic control
- Inpatient facility: only in RHCs and hospitals
- Ambulance services

MNCH = maternal, neonatal and child health; IMNCI = integrated management of neonatal and childhood illnesses; RHCs = rural health centres.

rural and peri-urban communities, were mobilized. Those operating in the IDPs' hosting districts paid daily visits to the camps and first-level care facilities and promoted health education activities. They organized focus group sessions for in-camp mothers and encouraged them to attend these sessions using an incentive-based approach called the "Bangle Project". Colourful traditional bangles were provided to mothers successfully completing these health education and promotion sessions. The programme was conceived by WHO and implemented jointly with the national health authority and several nongovernmental organizations (NGOs). To enhance health knowledge, attitude and practice, the training contained a package of health education and promotion messages covering: the prevention, control and management of acute diarrhoea; the feeding of infants, especially breastfeeding, weaning foods and supplementary feeding; reproductive health services; immunization; and

promotion of personal hygiene, including hand-washing, a clean environment, food safety and water and sanitation protection measures. Prior to its commencement, a baseline assessment revealed that less than 5% of the internally displaced mothers had adequate knowledge about these vital health issues. The training material designed was first pre-tested to ensure that the messages were technically sound, culturally relevant and easily understood in relation to the desired outcomes.

Averting excess morbidity and mortality

To mitigate the risk of infectious disease outbreaks, the Disease Early Warning System (DEWS) surveillance network was established, ensuring the active participation of at least 85% of the facilities in the catchment area of IDPs. DEWS covered the daily case reporting of 16 prioritized diseases and conditions that included acute lower and upper respiratory infections, acute diarrheal diseases/

bloody diarrhoea, haemorrhagic fever, acute jaundice syndrome, malaria, measles, meningococcal meningitis, acute flaccid paralysis, neonatal tetanus, scabies and unexplained fever. Notified cases were investigated and a response mobilized when the occurrence of an outbreak was imminent or verified. Mass vaccination for measles was carried out at the outset of the crisis and covered children between 6 months and 13 years of age, both from displaced and hosting populations; it was complemented by routine immunization.

The number of outbreaks reported during the first year of the IDP crisis was compared with the numbers reported from the 2005 earthquake during the same interval. The 2 disasters' recorded diarrhoeal outbreaks accounted for 53.5% (54/101) of reported outbreaks, predominantly characterized as cholera, while vaccine preventable disease (VPD) outbreaks, predominantly of measles, contributed to 22.8% (23/101)

Table 1 Qualitatively assessed differences in access to health services and facilities between in-camp internally displaced persons (IDPs) and those hosted by local communities

Access to health care services and other facilities	In-camp IDPs	IDPs hosted by families
Access to health care services		
Vaccinations	++++	++
Management of common illnesses	++++	++
Management of malnutrition	++++	+++
Vector control	++++	+
Reproductive health plus family planning services	+++	++
Care for severely malnourished children	++++	+++
Support to persons with disability	++++	++
Psychosocial support	++++	++
Prescribed medication	++++	+++
Ambulance services	++++	++
Emergency hospital services	++++	+++
Referral services	++++	++
Access to other facilities		
Safe drinking-water in comfort	++++	++
Sanitary facilities of hygienic standard and comfort	+++	++
Food and feeding centres	++++	+++
Nutrition education through growth monitoring	++++	++
Affording more privacy when breastfeeding	++	++++

+ = poor, ++ = satisfactory, +++ = good, ++++ = excellent.

of the outbreaks, cumulatively accounting for 76.2% of the total number of all reported outbreaks indicating the need for active surveillance. The proportion of diarrhoea outbreaks recorded among IDPs during the conflict [73.8% (31/42)] was significantly higher than that reported during the earthquake [39% (23/59)] (OR = 4.4, 95% CI: 1.7–11.5). However, the proportion of VPD outbreaks among IDPs during the conflict [2% (1/42)] was significantly lower than VPD outbreaks during the earthquake [45% (22/59)] (OR = 24.4, 95% CI: 3.2–509.3). Similarly, no hepatitis A and E outbreaks were reported among IDPs during the conflict crisis, while during the earthquake disaster, 18.6% (11/59) of outbreaks were due to hepatitis A and E.

Safeguarding mothers' and children's rights to adequate nutrition

A nutrition assessment carried out in May 2009 among the IDPs in camps

and in host communities revealed that the prevalence of acute malnutrition among the children under 5 years was less than 4%. The assessment was followed by an extensive health promotion and education intervention. Nutrition surveillance was also introduced by WHO to ensure that nutritional problems were promptly detected and necessary responses applied, including nutrition rehabilitation therapy for the severely malnourished. To maximize the impact of this initiative, interventions of community-based management of acute malnutrition were advanced by the nutrition cluster in partnership with the health, water and sanitation and the hygiene clusters.

Water and sanitation

To provide safe water to the IDPs, deep bore wells were the most used sources. All accessible hand pumps were tested and those found polluted were immediately closed. Water transported by tankers to the camps was chlorinated,

whether assigned for drinking or for other uses, and compliance closely monitored by a team of qualified professionals assigned to this task. Similarly, separate male and female sanitary facilities with screened fences were constructed in the camp to preserve privacy and encourage use. The sanitary latrines had hand-washing sinks attached with soap. Sanitary workers were assigned to maintain the hygiene of the latrines.

Role of emergency shelter and protection clusters

The government assisted by the humanitarian partners ensured the safe evacuation and registration of all IDPs and their immediate and free access to emergency response interventions. The emergency shelter cluster selected campsites for the IDPs and ensured that those originating from the same geographical areas were helped to reside in adjacent camp spaces as an effort to promote social and ethnic cohesion. Key social services were ensured with the

provision of cooking utensils and other essential non-food items, including the open access of women and children to food distribution centres. The protection cluster ensured the registration of about 1100 separated and unaccompanied children as well as about 3500 families headed by children or women. A team was established to register and refer all observed violations, particularly against children, to the established child protection committees. The work of these committees facilitated the protection of these vulnerable groups against any potential abuse, violence or exploitation.

Discussion

Protecting the rights to health of internally displaced mothers and children has been placed at the centre of major humanitarian disasters and recognized as a key determinant of the success of relief and recovery operations [10–12]. In Pakistan, a partnership was forged between the civilian government, the Pakistan Army and the humanitarian community led by the United Nations, collectively pursuing the cluster approach and its operational principles as the core strategy for emergency preparedness and response [16–18]. To harmonize emergency response operations, the HC has formulated a common health response strategy for IDPs along with a set of standard technical guidelines focusing on the protection of maternal, neonatal and child health rights [10]. The “Delivering as One” initiative launched a few years earlier in Pakistan has contributed to this harmonized accomplishment [19]. Although the HC took on the flagship role in protecting the health rights of displaced mothers and children, the effectiveness of this endeavour was inextricably linked with the broader protection framework generated through the fundamental pillars of the globally recognized human rights,

the safeguarding of which has been mandated during disasters [11]. This framework includes the protection of life, security, physical, mental and moral integrity, and mitigation of the negative impact of natural hazards, landmines and violence, particularly in relation to gender; the protection of basic necessities such as food, water, shelter, clothing, health and sanitation and livelihood; and the protection of specific groups of persons including mothers, neonates and children, adolescents, aged persons, people living with HIV/AIDS and single-parent households [11,14]. This wider imperative of a rights approach to mothers and children has enhanced the understanding of HC partners concerning the necessity of inter-cluster collaboration and alliance building.

Damage resulting from armed conflict often disrupts infrastructure and impedes the operational viability of primary and secondary health-care services, many being destroyed or rendered unsafe by frequent assault, in violation of internationally agreed conventions [9,10]. In Pakistan, these actions inflicted severe damage and disruption to a health system already under-funded and functioning at sub-optimal level, thus posing serious challenges to the health care needs of the IDPs. This prompted a health system strengthening approach operating surge capacity in all facilities, especially hospitals with core health response interventions being guided by the rapid assessment findings [5,7,20–23]. The National Health Emergency and Response Network established in the federal Ministry of Health has contributed to this endeavour. An immediate undertaking was the redistribution of existing human resources for greater efficiency and the deputation of additional health workers to address the shortage of skilled professionals, especially nurses, midwives and female medical doctors. Efforts were also made to ensure the provision of emergency medicines and essential supplies and equipment for the regular

implementation of MNCH and other critical health services. The health system strengthening focused on a package of essential health services, support to laboratories, blood banks, operating theatres, anaesthesia and life-support equipment, MNCH emergency care units, and the provision of ambulances and rectified the issue of accessing emergency response interventions by both in-camp and out-of-camp IDPs.

Unfortunately, health system strengthening efforts are often constrained by the inadequate share from the humanitarian appeal allocated to HC and the overall delayed government and donor response. The successful implementation of the emergency health response was found to be more attainable when the HC share of appeal funds was $\geq 10\%$, of which 30% was assigned to health system strengthening for scaling up MNCH and other life-saving interventions, 25%–30% used for the procurement of essential pharmaceutical and medical supplies and $< 30\%$ allotted for the recruitment of international health expertise. These operational findings should encourage systems research in order to generate evidence for future emergency health response interventions aimed at mitigating the impact of natural and man-made disasters.

Building health knowledge, attitude and practice capacities among displaced mothers was another major contributor to the protection of the right to health of mothers and children. Mothers were successfully encouraged to realize their role in disease prevention by inculcating healthier attitudes and behaviours related to hand-washing, environmental hygiene, antenatal care, child feeding, the use of oral rehydration therapy and immunization. The bangle initiative emerged as a socially valued incentive, as colourful bangles in Pakistan’s cultural context signify happiness and hope. The implementation of this health promotion initiative by culturally sensitive female health workers generated wider

acceptance among displaced mothers and approval from their male family members. The initiative created a visible interest among mothers and imparted maternal and child home health care skills, corroborating the relevance and cost-effectiveness of this participatory scheme. The skills attained were relevant both during displacement and upon the IDPs' return to their original homes during the recovery phase.

The DEWS initiative acted as a barrier against epidemics by offering the capacity to interrupt or mitigate the spread of disease [24,25]. During the course of this crisis, the significant reduction in measles outbreaks observed, relative to previous disasters, was attributed to the timely mass vaccination of children covering both IDPs and their hosting communities that were backed up by sustained routine immunization. The significantly higher number of diarrhoeal outbreaks among IDPs during the conflict relative to those recorded during the earthquake could be partly explained by the overwhelming floods that swept this region during the monsoons of 2008 and 2009. However, most of these outbreaks were limited in scope because of universal water chlorination, improved sanitation and the timely application of disease control measures. Conversely,

the outbreaks due to hepatitis A and E viral infections during the earthquake, relative to the IDPs' hosting districts, may be attributed to the contamination of the surface water used after the earthquake, their lower access to sanitation and possible higher susceptibility to these viral infections, being displaced from isolated mountainous areas.

The interface between the nutrition and health clusters was operationally complementary, whereby the nutrition assessment survey and surveillance guided the provision of fortified complementary foods, vitamin A supplements, care for the severely malnourished and promotion of breastfeeding. The impact of these interventions was further strengthened by MNCH-related emergency response interventions, highlighting the value of close inter-cluster coordination.

Universal water chlorination and regular monitoring was mandated and jointly supported by the water, sanitation and hygiene (WASH) and health clusters. This helped avert the problem faced during the 2005 earthquake response where a major cholera outbreak occurred because of the preferential consumption of unchlorinated water, designated for other uses, instead of the chlorinated water supplied for drinking because of

the perceived unpleasant smell and taste. Likewise, the low use of sanitary facilities during the 2005 earthquake was avoided by the construction of culturally and hygienically acceptable latrines.

The effective response to the protection of the rights to health of mothers and children during emergencies depends on many factors: the hazards that IDPs face, their inherent vulnerabilities, the magnitude of the response, the protection and support offered to health facilities and their workforce, and the effectiveness of the HC and inter-cluster operations management co-led by host governments and their humanitarian partners [6,8]. In Pakistan, the proactive and successful support provided to IDPs during their early evacuation and extended displacement period, the safe and assisted voluntary repatriation, and the comprehensive recovery plan had a major positive influence on providing this protection. These interventions were made possible through an endorsed human rights framework, timely mobilized health systems strengthening and life-saving technical interventions, adequate deployment of health workforce and the pursuit of upstream policy and strategic operational plans implemented in unison by the government and humanitarian partners.

References

1. International Displacement Monitoring Center. Global Statistics. IDP estimates (2001–2009) (<http://www.idmc.org/global-statistics>: IDP country figures.mht, accessed, accessed 23 October 2011).
2. Leus X, Wallace J, Loretto A. Internally displaced persons. *Pre-hospital and Disaster Medicine*, 2001, 6:116–123.
3. Mkoji GM. Civil turmoil in Africa: a potential setback in the fight against diseases. *African Journal of Health Sciences*, 1996, 3:109.
4. Sapir DG. Natural and man-made disasters: the vulnerability of women-headed households and children without families. *World Health Statistics Quarterly*, 1993, 46:227–233.
5. Paturas JL et al. Collective response to public health emergencies and large-scale disasters: putting hospitals at the core of community resilience. *Journal of Business Continuity & Emergency Planning*, 2010, 4:286–295.
6. Leonard SR, Bittle DM. Responsibility for protection of medical workers and facilities in armed conflict. *Lancet*, 2010, 375:329–340.
7. Gausche-Hill M. Pediatric disaster preparedness: are we really prepared? *Journal of Trauma*, 2009, 67(S2):73–76.
8. IRC. International Humanitarian Law – Treaties & Documents. *Convention (IV) relative to the Protection of Civilian Persons in Time of War. Geneva, 12 August 1949* (<http://www.icrc.org/ihl.nsf/385ec082b509e76c41256739003e636d/6756482d86146898c125641e004aa3c5>, accessed 23 October 2011).
9. IRC. International Humanitarian Law – Treaties & Documents. *Protocol additional to the Geneva conventions of 12 August 1949, and relating to the protection of victims of international armed conflicts (Protocol I), 8 June 1977* (<http://www.icrc.org/ihl.nsf/FULL/470?>, accessed 23 October 2011).
10. IRC. International Humanitarian Law – Treaties & Documents. *Protocol additional to the Geneva conventions of 12 August 1949, and relating to the protection of victims of non-*

- international armed conflicts (Protocol II), 8 June 1977* (<http://www.icrc.org/ihl.nsf/7c4d08d9b287a42141256739003e636b/d67c3971bcffc10c125641e0052b545>, accessed, 23 October 2011).
11. *Human rights and natural disasters: Operational guidelines and field manual on human rights protection in situations of natural disaster*. Washington DC, Brookings-Bern Project on Internal Displacement, 2008. (http://www.brookings.edu/~media/Files/rc/reports/2008/spring_natural_disasters/spring_natural_disasters.pdf, accessed, 23 October 2011).
12. Interagency Standing Committee (IASC). *Guidance note on using the cluster approach to strengthen humanitarian response*, 24 November 2006 (<http://www.humanitarianreform.org/humanitarianreform/Portals/1/Resources%20&%20tools/IASCGUIDANCENOTECLUSTERAPPROACH.pdf>, accessed, 23 October 2011).
13. Partnership to Cut Hunger and Poverty in Africa. *November 2010 update on the proposed food security Cluster*, 2010 (<http://www.partnership-africa.org/content/november-2010-update-proposed-food-security-cluster>, accessed, 23 October 2011).
14. Inter-Agency Standing Committee. *Protecting persons affected by natural disasters: IASC Operational guidelines on human rights and natural disasters*. Washington DC, Brookings-Bern Project on Internal Displacement, 2006.
15. Bile KM et al. Learning through crisis: development and implementation of a health cluster strategy for internally displaced persons. *Eastern Mediterranean Health Journal*, 2010, 16(Suppl.):82-90.
16. International Health Protection Initiative. Resolution (<http://ihpi.org/the-resolution>, accessed, 19 October 2011).
17. Rahim M et al. The impact of the disease early warning system in responding to natural disasters and conflict crises in Pakistan. *Eastern Mediterranean Health Journal*, 2010, 16(Suppl.):114-121.
18. Bukhari SKS et al. Essential medicines management during emergencies in Pakistan. *Eastern Mediterranean Health Journal*, 2010, 16(Suppl.):106-113.
19. Bile KM, Lashari KA, Shadoul FA. "Delivering as One" UN Reform process improving health partnerships and coordination: Old challenges and encouraging lessons from Pakistan. *Eastern Mediterranean Health Journal*, 2010, 16(Suppl.):122-131.
20. Fjaer RB. Primary health care in war and disaster and the NorAid system. *Prehospital and Disaster Medicine*, 1997, 12:183-188.
21. Bradt DA, Drummond CM. Rapid epidemiological assessment of health status in displaced populations—an evolution toward standardized minimum, essential data sets. *Prehospital and Disaster Medicine*, 2002, 17:178-185.
22. Hafeez A et al. Emergency maternal and child health training courses and advocacy to achieve millennium development goals in a poorly resourced country; challenges and opportunities. *Journal of the Pakistan Medical Association*, 2009, 59:243-246.
23. Hafeez A et al. Achieving health Millennium Development Goals through capacity building of health workers—ESSEMCH Strategy. *Pakistan Pediatric Journal*, 2006, 30(1):3-9.
24. Peterson EA et al. The effect of soap distribution on diarrhea: Nyamithuthu refugee camp. *International Journal of Epidemiology*, 1998, 27:520-524.
25. Centers for Disease Control and Prevention (CDC). Rapid establishment of an internally displaced persons disease surveillance system after an earthquake - Haiti, 2010. *MMWR. Morbidity and Mortality Weekly Report*, 2010, 59:939-945.

The Humanitarian Emergency Settings Perceived Needs Scale (HESPER)

The Humanitarian Emergency Settings Perceived Needs Scale (HESPER) aims to provide a quick, scientifically robust way of assessing the perceived serious needs of people affected by large-scale humanitarian emergencies, such as war, conflict or major natural disaster. Perceived needs are needs which are felt or expressed by people themselves and are problem areas with which they would like help.

The HESPER Scale assesses a wide range of social, psychological and physical problem areas. However, it does not provide an answer as to whether, or how to, offer help. It simply aims to identify those serious problems that are common in a population. These problems should then be assessed and addressed in more detail.

The HESPER Scale was developed by the World Health Organization and King's College London in order to fill several gaps in the humanitarian field. It enables needs assessments to be based directly on the views of people affected by humanitarian emergencies, and provides a more accurate picture of the serious problems with which the overall emergency-affected population wants help.

This manual includes the HESPER Scale, as well as a detailed explanation of how to use the HESPER Scale, and how to organise, analyze and report on a HESPER survey.

Further information about this and other WHO publications is available at: <http://www.who.int/publications/en/>

Short communication

Networking for applied field epidemiology – Eastern Mediterranean Public Health Network (EMPHNET) Conference 2011

M. Al Nsour¹ and R. Kaiser²

مُشَابَكَةُ الْوَبَائِيَّاتِ الْمِيدَانِيَّةِ التَّطْبِيقِيَّةِ – مُؤْتَمَرُ شَبَكَةِ إِقْلِيمِ شَرْقِ الْمُتَوَسِّطِ لِلصَّحَّةِ الْعُمُومِيَّةِ لِعَامِ 2011

محمد النصور، ريتشارد كيزر

الخلاصة: بمناسبة المؤتمر الثاني لشبكة إقليم شرق المتوسط للصحة العمومية (9-6 كانون الأول / ديسمبر 2011 في شرم الشيخ، في مصر)، تعرّف هذه المقالة شبكة إقليم شرق المتوسط للصحة العمومية، ودورها في الربط بين برامج تدريب الوبائيات الميدانية في الإقليم. كما تصف هذه الورقة بإيجاز، التغيّر الحاصل في الوضع الراهن للوبائيات في الإقليم، وذلك لتوضيح الحاجة الملحة لتعزيز نظم الصحة العمومية وبناء القوة العاملة من اختصاصيي الوبائيات.

ABSTRACT On the occasion of the second Eastern Mediterranean Public Health Network (EMPHNET) conference that was held from 6–9 December 2011 in Sharm Al Sheikh, Egypt, this article introduces EMPHNET and its role to link Field Epidemiology Training Programs (FETP) in the region. The paper briefly describes the changing epidemiology situation in the region to illustrate the urgent need to strengthen public health systems and to build up the epidemiologist workforce.

Nouer des liens en faveur de l'épidémiologie de terrain appliquée : le rôle de la conférence 2011 du Réseau de la Méditerranée orientale pour la santé publique

RÉSUMÉ À l'occasion de la deuxième conférence du Réseau de la Méditerranée orientale pour la santé publique qui s'est tenue du 6 au 9 décembre 2011 à Charm El Cheikh (Égypte), l'article présente ce réseau et son rôle dans l'établissement de liens entre les programmes de formation en épidémiologie de terrain au niveau régional. Il décrit brièvement l'évolution de la situation de l'épidémiologie dans la région pour illustrer la nécessité urgente de renforcer les systèmes de santé publique et de développer les ressources humaines en épidémiologie.

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Introduction

The Eastern Mediterranean Public Health Network (EMPHNET) is a regional network that is linking Field Epidemiology Training Programs (FETPs) in the Middle East and North Africa Region (MENA) [1]. FETPs are applied epidemiology programmes that help countries to improve and strengthen their public health system and infrastructure by building up a cadre of well-trained epidemiologists. The second EMPHNET conference was held from 6–9 December 2011, in Sharm Al Sheikh, Egypt [2] and allowed FETP residents to present their work and stimulated debate about major public health issues in the region. In this communication, we discuss the importance of FETPs against the background of a changing population and health situation in the MENA region.

The concept of Field Epidemiology Training Programs

The FETP is a 2-year, full-time training and service programme, which involves classroom instruction in a variety of epidemiology- and public health-related subjects, and field assignments including disease outbreak investigations and use of disease surveillance systems for decision-making. The programme is based on the U.S. Centers for Disease Control and Prevention's (CDC) epidemic intelligence service, which started in 1951. In 1975 the Canadians started their programme in consultation with CDC [3], and since then the number of programmes has increased dramatically. As of August 2010, there were 52 FETPs worldwide covering 66 countries (some are regional programmes) [4]. The concept of FETPs has further evolved in recent years with the development of a standard

curriculum including defined core competencies and proficiency levels [5]. In the MENA region, the first FETP was started in 1989 in Saudi Arabia, followed by Egypt (1993), Jordan (1998) and Pakistan (2006). New FETPs have recently been established in Iraq (2010), Morocco (2010) and Yemen (2011). A new FETP is also in preparation in Afghanistan (Pakistan and Afghanistan are included here because they are part of EMPHNET).

The EMPHNET conference – facing a changing epidemiology in the region

To date, over 250 epidemiologists have graduated from the MENA FETP. However, much remains to be done if the number of trained epidemiologists is to be increased to a ratio of 1 per 200 000 population [6].

The epidemiology in the region is characterized by increasing and ageing populations, half of them now living in urban areas (Table 1). The total fertility rate per woman has decreased from 5.5 in 1990 to 3.4 in 2009 but this is not enough to limit population growth. Given that there is a strong positive correlation between birth rates and child mortality [7], the successful reduction in under-5 mortality in the region from 100 deaths per 1000 live births in 1990 to 68 per 1000 live births in 2010 will help to stabilize population growth (Table 1); however, this is less than half of the Millennium Development Goal target for 2015 of 33 per 1000 live births [8]. Noncommunicable disease mortality is more than 3 times higher now than mortality from infectious and parasitic diseases (Table 1); however, emerging or re-emerging infectious diseases such as brucellosis [9] or dengue fever [10,11] are of concern for the region. An epidemiological profile of Egyptian human H5N1 influenza virus

cases was found that differs from other countries and raised the urgent need for prospective studies [12]. In face of the increasing relative importance of chronic diseases, behavioural changes demand our attention. In adults aged ≥ 20 years, the prevalence of obesity (body mass index ≥ 30 kg/m²) in 2008 was highest in the region for men in Kuwait [37.2%, 95% confidence interval (CI): 32.4%–42.3%] and Qatar (30.8%, 95% CI: 26.6%–35.6%), and in women in Kuwait (52.4%, 95% CI: 46.7%–58.0%) and Egypt (46.3%, 95% CI: 42.7%–49.9%) [13], indicating rapid changes in diets and lifestyles in the region [14]. One-third of men smoke and mortality from traffic accidents has not declined over time (Table 1). The proportion of the population with access to improved drinking-water sources and sanitation remains low in rural areas (Table 1). Environmental changes, including declining per capita water resources, loss of arable land, pollution-related problems, deteriorating coastal zones and vulnerable marine resources [15], will have an impact on health in the region. For example, annual renewable water resources per capita are expected to fall from 1997 levels of 1045 m³ per year to 740 m³ per year by 2015 [15]. Finally, recent political changes in the region have been accompanied by health impacts such as attacks against civilians and health facilities [16].

Conclusion

FETPs play an important role for health systems strengthening and workforce development and are more than ever needed to respond effectively to today's public health challenges. The recent EMPHNET conference of 2011 brought together epidemiologists and public health experts for scientific exchange and to improve networking and collaboration across the MENA region [17]. Workshops were held

Table 1 Selected population and health indicators in the World Health Organization's (WHO) Eastern Mediterranean Region

Indicator	Year	2006	2008	2009	2010
Population					
Total population ^a (no.)		519 687 692	580 208 120		
Population ≥ 60 years ^a (no.)		30 040 580 ^e	34 880 980 ^e		
Life expectancy at birth (years) ^b				67	
Population living in urban areas (%) ^b				49	
Total fertility rate (no. of children per woman) ^b				3.4	
Mortality					
All cause mortality (no. of deaths per 100 000 population) ^a		838	724		
Noncommunicable disease mortality (no. of deaths per 100 000 population) ^a		413	384		
Infectious and parasitic disease mortality (no. of deaths per 100 000 population) ^a		191	114		
Road traffic accident mortality (no. of deaths per 100 000 population) ^a		19	21		
Under-5 mortality (no. of deaths per 1000 live births) ^c	100				68
Other					
Prevalence of smoking any tobacco product among adults ≥ 15 years (%)^b					
Men		32.0			
Women		4.4			
Population using improved drinking-water sources (%)^d					
Urban	95		93		
Rural	76		76		
Population using improved sanitation (%)^d					
Urban	85		83		
Rural	32		45		

^aSource: WHO Disease and Injury Country Estimates: http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/index.html^bSource: WHO Global Health Observatory Data Repository: <http://apps.who.int/ghodata/>^cSource: Levels and Trends in Child Mortality Report 2011: http://www.childinfo.org/files/Child_Mortality_Report_2011.pdf^dSource: World Health Statistics Report 2010: http://www.who.int/whosis/whostat/EN_WHS10_Full.pdf^e5.5% (2000), 5.8% (2004) and 6.0% (2008) of the total population.

about noncommunicable diseases, epidemiological methods in emergencies, and ethics issues for the planning of and response to pandemics and other emergencies. Presentations included a variety of topics such as hepatitis B in pregnant women in Egypt, a

Chikungunya outbreak in Yemen, breast cancer in Jordan, and a Crimean Congo haemorrhagic fever outbreak in Afghanistan. The *Eastern Mediterranean Health Journal* will report on highlights and conclusions of the conference in an early issue of 2012.

Author disclaimer

The findings and conclusions in this manuscript are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

References

1. EMPHNET. The Eastern Mediterranean Health Network [website] (<http://emphnet.net/WelcometoEMPHNET/tabid/87/Default.aspx>, accessed 29 September 2011).
2. EMPHNET. Regional Conference 2011, December 6–9, Egypt (<http://conferences.tephinet.org/emphnet-2011>, accessed 29 September 2011).
3. White ME et al. Partnerships in international applied epidemiology training and service, 1975–2001. *American Journal of Epidemiology*, 2001, 154:993–999.
4. Centers for Disease Control and Prevention (CDC). Global Health. Field Epidemiology Training Program (FETP) (<http://www.cdc.gov/globalhealth/fetp/>, accessed 29 September 2011).
5. Traicoff DA et al. Replicating success: developing a standard FETP curriculum. *Public Health Reports*, 2008, 123(Suppl. 1):28–34.
6. Centers for Disease Control and Prevention (CDC). Minutes from the April 12, 2010 CDC Advisory Committee to the Director (http://www.cdc.gov/about/advisory/pdf/ACD_Minutes_04_12_10_Final.pdf, accessed 29 September 2011).
7. Rosenzweig MR, Schultz TP. Consumer demand and household production: the relationship between fertility and child mortality. *American Economic Review*, 1983, 73(2):38–42.
8. United Nations Children's Fund (UNICEF). *Levels and trends in child mortality. Report 2011. UN Interagency group for child mortality estimation*. New York, UNICEF, 2011 (http://www.child-info.org/files/Child_Mortality_Report_2011.pdf, accessed 29 September 2011).
9. *Brucellosis*. Geneva, World Health Organization, 1999 (WHO Fact sheet N173) (<https://apps.who.int/inf-fs/en/fact173.html>, accessed 29 September 2011).
10. Yemen: Dengue fever spreading in south. *IRIN news*, 14 July 2010 (<http://www.irinnews.org/report.aspx?reportid=89826>, accessed 29 Sept 2011).
11. Jelinek T. Trends in the epidemiology of dengue fever and their relevance for importation to Europe. *Euro Surveillance*, 2009, 14(25):19250 (<http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19250>, accessed 29 September 2011).
12. Kayali G et al. The epidemiological and molecular aspects of influenza H5N1 viruses at the human-animal interface in Egypt. *PLoS ONE*, 2011, 6:e17730 (<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0017730>, accessed 11 December 2011).
13. World Health Organization. Global Health Observatory Data Repository (<http://apps.who.int/ghodata/>, accessed 29 September 2011).
14. World Health Organization, Regional Office for the Eastern Mediterranean. Nutritional transition [website] (http://www.emro.who.int/nutrition/nutrition_transition.htm, accessed 29 September 2011).
15. World Bank. Environment Sector Brief Middle East and North Africa. <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/MENAEXT/0,,contentMDK:20525954~pagePK:146736~piPK:226340~theSitePK:256299,00.html>, accessed 3 November 2011).
16. World Health Organization, Regional Office for the Eastern Mediterranean. [WHO condemns attacks against civilians and health facilities in Yemen] [Press release] (http://www.emro.who.int/pressreleases/2011/8-September-2011_ar.htm, accessed 29 September 2011) [In Arabic].
17. Leventhal A et al. Regional collaboration in the Middle East to deal with H5N1 avian flu. *British Medical Journal*, 2006, 333:856–858.

Case report

Forearm hydatid cyst: an unusual presentation

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Introduction

Primary musculoskeletal hydatidosis is very rare and represents 1%–5% of all cases of echinococcosis [1]. Patients are typically asymptomatic and the cyst presents as a slow growing soft tissue tumour [2].

The diagnosis is usually easy in imaging by ultrasonography (US), computed tomography (CT) and magnetic resonance imaging (MRI). Sometimes, unusual imaging appearance because of complicated cysts can make diagnosis difficult [3].

We report here a case of forearm hydatid cyst with an unusual presentation.

Case report

A 23-year-old woman presented to Sahloul Hospital, Sousse in February 2009 with a history of a slow-growing mass on her forearm over the past 65 days. The patient resided rurally and had not consulted a doctor previously. She had been putting olive oil on and massaging her forearm many times.

On physical examination, the mass was 14 × 7 × 6 cm, painful, warm and erythematous. Her fingers were retracted and Volkmann syndrome was suspected (Figure 1).

US showed an echogenic solid and lobulated mass and a diagnosis of a tumour or abscess was made. MRI showed an impotent and heterogeneous soft tissue lesion with intermediate T1 and hyperintense T2 signals. T1 weighted images with fat suppressed

and gadolinium injection demonstrated diffuse and considerable enhancement of the lesion suggestive of a tumour. T2 weighted images showed a low-density area in the lesion compatible with an abscess and fat suppressed T2 images showed 3 small cysts suggestive of hydatid disease (Figure 2). There were no bone abnormalities.

Laboratory tests and CT of the thorax and abdomen were all normal.

Surgery was performed to remove the mass because the cyst was infected and there was a risk of spread of the disease. At surgery, hydatidosis was confirmed. Many daughter vesicles were identified and flexor muscle necrosis and fibrosis were noted (Figure 3).

At 3-year follow-up there was no evidence of local or distant recurrence but the patient still had obvious unsatisfactory finger stretching.

Discussion

In our case, while US showed a pseudo-tumoural lesion and MRI showed an

impotent lesion enhancement and abscesses, the presence of some small daughter cysts led to a diagnosis of hydatid cyst.

Musculoskeletal echinococcosis is very rare because few embryos can escape the capillary filtering systems of the liver and lung [1,2]. It has been suggested that muscle is inhospitable for hydatid infestation and provides a poor environment for the parasite because of the presence of lactic acid [4,5].

A combination of epidemiological, clinical, laboratory and radiographical findings is necessary to make the diagnosis. Echinococcosis should be considered when slowly growing soft tissue is developing in patients from rural areas, especially in endemic countries [5]. In case of complication (fissuring or infection) the cyst mimics an abscess or a soft-tissue tumour [3].

The preoperative radiological diagnosis is important to avoid biopsy and prevent serious complications, such as local recurrence and risks of anaphylaxis. Radiographs eliminate bone involvement and may show calcifications in 38% of the cases [1]. US is the most useful mean of diagnosis, showing the pathognomonic signs of the hydatid cysts: echogenic hydatid sand ("snowflake sign"), unilocular cysts with daughter cysts ("honeycomb sign") and cysts with a detached floating laminated membrane ("waterlily sign") [1,5].

In CT, complicated cases represent a real diagnostic problem, as in US a soft tissue tumour cannot be excluded [3].

MRI is the imaging method of choice for the differential diagnosis.



Figure 1 Left forearm mass and retracted fingers

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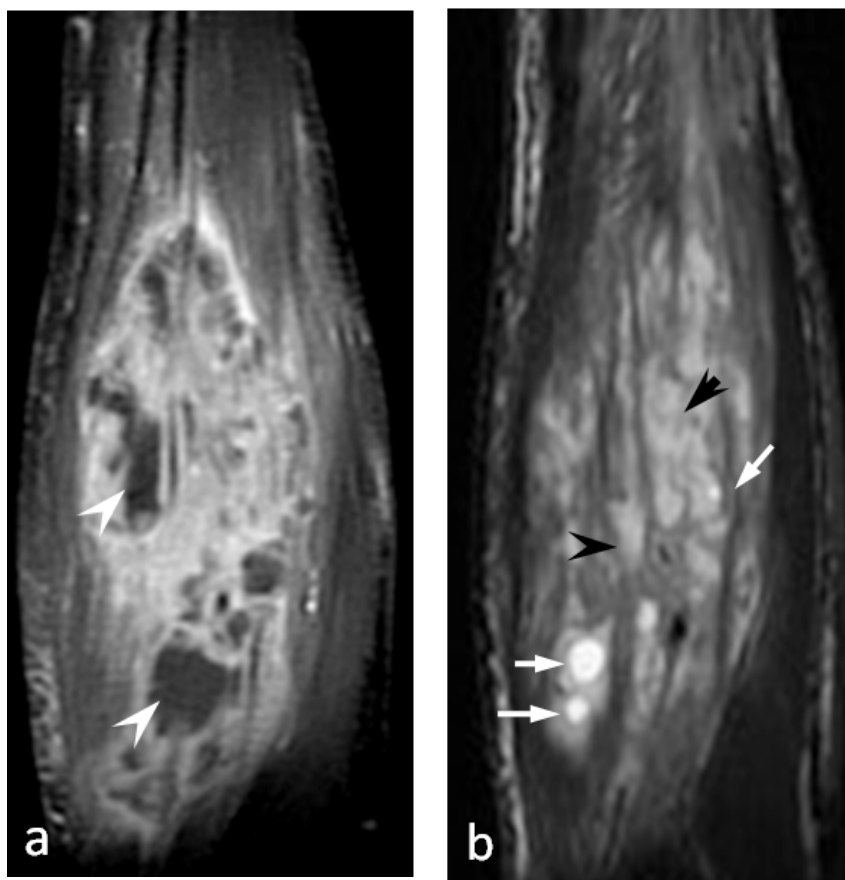


Figure 2 Magnetic resonance imaging. Sagittal T1 post gadolinium (a), and fat suppressed T2 (b) weighted images showing pseudotumoral lesion with daughter cysts (arrows). Note many collections into lesion (head arrows).

Rim sign and multicystic appearance are typical features of hydatid cyst [3,6]. The lesion usually has a high signal intensity on T2 and low intensity on T1 typically with daughter cysts. The rim sign, a low intensity rim on both T1 and T2, is not specific to hydatidosis and

can also be seen in tumours with fibrous capsule. Pericystic enhancement can be seen and is often moderate [5] but in our case the enhancement was weak and diffuse because of the infection of the cyst. If the cyst is complicated, it is very important to search for daughter

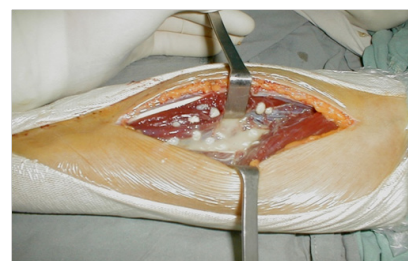


Figure 3 Mass incision showing many daughter vesicles, pus and flexor muscle necrosis

cysts, especially in fat suppressed T2 weighted images [4].

Pretherapeutic serology can be negative. Seronegativity does not exclude the diagnosis hydatidosis, but seropositivity may be helpful if diagnosis is difficult, especially when the cyst mimics a tumour or abscess and imaging appearance is not specific [1,7].

Surgical excision of the cyst has long been considered the only effective treatment and is still the treatment of choice [5]. However, the removal of the main cyst mass may not be effective, and drainage together with hypertonic saline irrigation is necessary. Currently complementary chemotherapy (alben-dazole) and percutaneous treatments have become widely recommended [5,7].

Human hydatidosis should be considered in the differential diagnosis of every soft tissue mass, especially in countries endemic for *Echinococcus*.

References

1. Basarir K et al. Primary muscular hydatidosis mimicking soft tissue tumour: a report of five cases. *Journal of Orthopaedic Surgery*, 2008, 16:368-372.
2. Ozkoc G et al. Primary hydatid disease of the quadriceps muscle: a rare localization. *Archives of Orthopaedic and Trauma Surgery*, 2003, 123:314-316.
3. Alouini Mekki R et al. Kyste hydatique des tissus mous : apport de l'IRM (à propos de trois observations) [Hydatid cyst of soft tissues: MR imaging findings (Report of three cases)]. *Journal de Radiologie*, 2005, 86:421-425.
4. Garcia-Diez AI et al. MRI evaluation of soft tissue hydatid disease. *European Radiology*, 2000, 10:462-466.
5. Mseddi M et al. Kyste hydatique musculaire: a propos de 11 cas [Hydatid cysts in muscles: eleven cases]. *Revue de chirurgie orthopédique*, 2005, 91:267-271.
6. Alexiadis G et al. Primary muscular hydatidosis. US, CT and MR findings. *Acta Radiologica*, 2002, 43:428-430.
7. Buyukbebeci O et al. Combined treatment of primary hydatid disease of the vastus lateralis muscle. *Orthopedics*, 2004, 27:621-622.

Rapport de cas

Apport de l'imagerie par résonance magnétique (IRM) dans le diagnostic du kyste hydatique cardiaque

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Introduction

Le kyste hydatique est une parasitose qui sévit à l'état endémique au Maroc. Une incidence de 4,55 cas opérés pour 100 000 habitants a été évoquée dans le dernier rapport du Ministère de la Santé (2006), plaçant le Maroc en troisième position au Maghreb après la Tunisie et l'Algérie [1].

Bien qu'il n'existe pas de chiffres nationaux précis, l'atteinte cardio-péricardique reste une affection rare. Par contre, elle est caractérisée par la gravité de son évolution spontanée et la fréquence de ses complications qui sont le plus souvent révélatrices. Le diagnostic repose essentiellement sur les techniques d'imagerie (échocardiographie, tomodensitométrie, imagerie par résonance magnétique).

Nous rapportons dans ce travail les observations cliniques de deux jeunes patients atteints d'hydatidose cardio-péricardique en exposant la démarche diagnostique suivie. Nous espérons ainsi mettre la lumière sur les moyens diagnostiques d'imagerie dont disposent non seulement le clinicien pour confirmer l'affection, mais également le chirurgien pour mener à bien son geste curatif. Une attention particulière est donnée à l'imagerie par résonance magnétique (IRM), qui s'affirme comme moyen d'imagerie de première intention dans cette pathologie.

Observation n° 1

Il s'agit d'un jeune patient de 16 ans, admis aux urgences du Centre hospitalier universitaire (CHU) Ibn Sina de Rabat (Maroc) en mars 2008 pour précordialgies à type de brûlures et crachats hémoptoïques remontant à 15 jours, avec une notion de contact avec les chiens à l'anamnèse.

L'examen clinique à l'admission retrouve un état hémodynamique stable ; un frémissement systolique au bord gauche du sternum est perçu, avec à l'auscultation cardiaque un souffle systolique rude et râpeux irradiant au bord gauche du sternum et dans le dos. L'électrocardiogramme objective un axe QRS en DIII, un hémibloc postérieur gauche et une hypertrophie ventriculaire droite. Le cliché thoracique de face montre un syndrome interstitiel basal bilatéral avec un cœur de volume normal. Biologiquement, on note une hyperéosinophilie.

Le patient a bénéficié d'une échographie abdominale qui a mis en évidence quatre kystes hydatiques hépatiques et un kyste hydatique rénal droit de siège. Les anomalies de l'examen cardio-vasculaire ont motivé la pratique d'une échocardiographie transthoracique objectivant une masse de 30 mm de diamètre au niveau de l'infundibulum pulmonaire responsable d'une obstruction de la voie d'éjection du ventricule droit (VD).

L'IRM permet de mettre en évidence une image kystique au niveau du septum infundibulaire avec un aspect bivésiculaire prolabant au niveau de la chambre de chasse du ventricule droit et mesurant 30 × 20 mm (Figures 1-3).

Ainsi le diagnostic a été retenu sur les arguments anamnestique (contexte épidémiologique), biologique (hyperéosinophilie) et radiologique (kyste hydatique hépatique et rénal associé).

Sur le plan thérapeutique, le patient a été mis sous albendazole (400 mg par jour), puis a été confié aux chirurgiens pour geste curatif. L'ablation de la tumeur a été faite avec succès et les suites opératoires ont été simples. Le patient est toujours suivi en consultation.

Observation n° 2

Le deuxième cas est celui d'une patiente de 36 ans, admise initialement au service de pneumologie du CHU Ibn Sina de Rabat (Maroc) en juin 2008. La patiente accusait des hémoptyses de moyenne abondance et une dyspnée. Une ponction pleurale a été décidée sur image kystique à la radiographie pulmonaire, compliquée d'une dissémination de l'hydatidose. Elle est réadmise aux urgences avec une dyspnée stade II- III de la *New York Heart Association* (NYHA).

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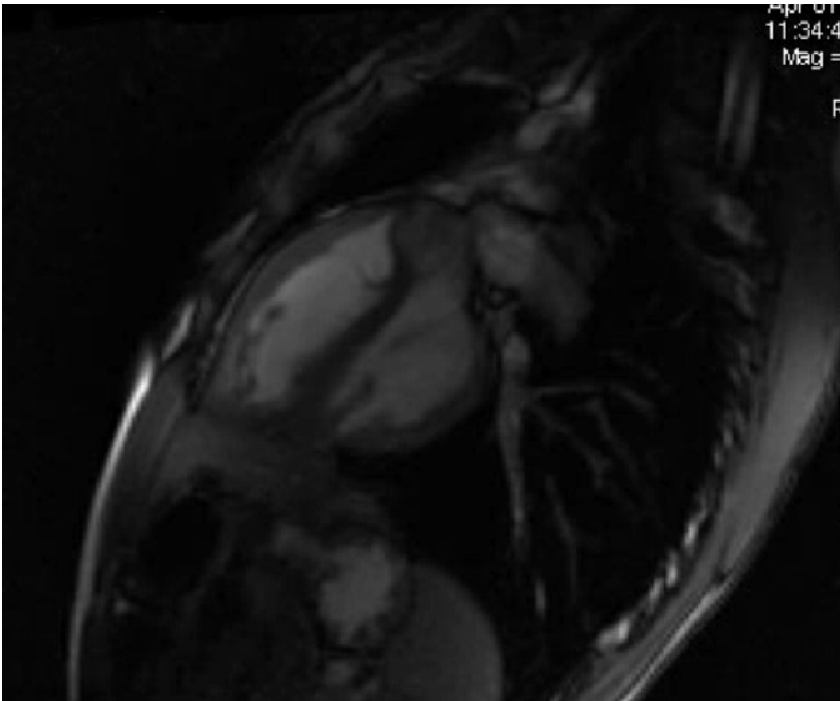


Figure 1 Coupe IRM petit axe basal montrant le kyste hydatique au niveau de la région infundibulaire

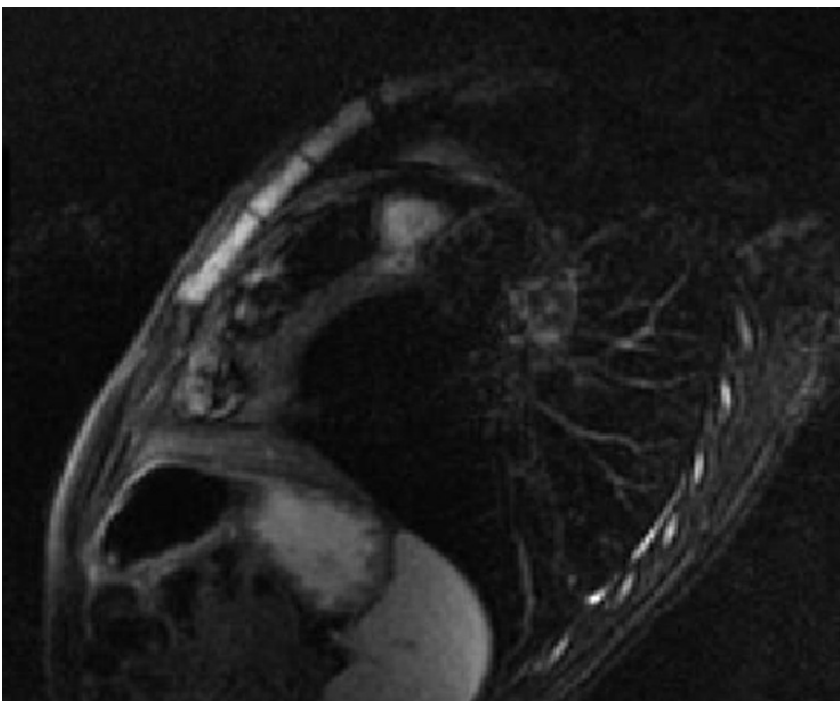


Figure 2 Coupe IRM passant par l'infundibulum pulmonaire montrant le kyste hydatique

L'examen clinique retrouve une légère cyanose, une tension artérielle à 95/60 mmHg. L'examen cardio-vasculaire relève un souffle systolique d'insuffisance tricuspide avec un éclat de B2 pulmonaire. L'électrocardiogramme s'inscrit en rythme régulier sinusal avec un axe QRS dévié à droite, un hémibloc postérieur gauche, une hypertrophie ventriculaire droite ainsi que des troubles diffus de la repolarisation secondaire. Le cliché thoracique laisse découvrir une image en lâcher de ballons avec une cardiomégalie V1 (Figure 4).

Bien que la dyspnée ait été rattachée aux lésions constatées à la radiographie pulmonaire, une exploration cardiaque a été proposée devant les anomalies de l'auscultation cardio-vasculaire et électrocardiographiques.

À l'échocardiographie, la pointe du VD est comblée par une masse kystique.

L'IRM cardiaque objective une formation kystique au niveau du VD mesurant 27 × 36 mm, adhérent à la paroi septale, à contenu impur sans aucun rehaussement (Figures 5-6).

Le kyste hydatique était adhérent au plan myocardique, contre-indiquant tout geste chirurgical. La malade a été mise sous traitement médical exclusif (albendazole) prévu pour une durée de six mois. Elle a été malheureusement perdue de vue après quelques mois de suivi en consultation.

Discussion

L'hydatidose est une affection parasitaire assez fréquente qui constitue un problème de santé publique dans les zones d'endémie, notamment le pourtour du bassin méditerranéen.

La localisation cardio-péricardique est toutefois rare : 0,5 à 2 % de l'ensemble des localisations, 2,6 % des localisations hydatiques intra-thoraciques [2], le cœur étant affecté par la circulation systémique

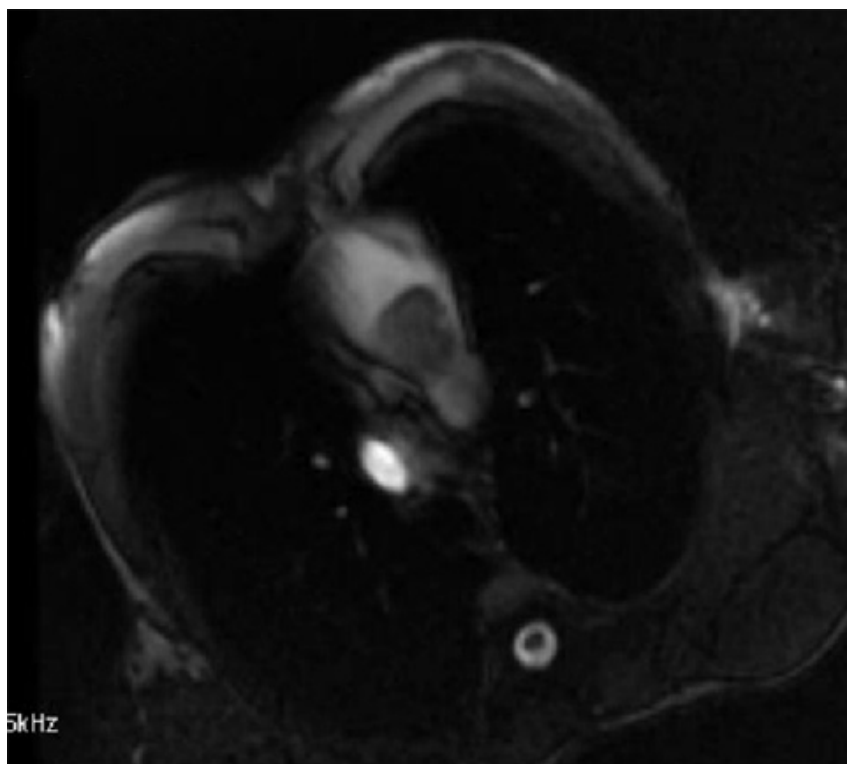


Figure 3 Coupe IRM infundibulaire en « sang noir » (*black blood*) montrant le kyste hydatique



Figure 4 Radiographie pulmonaire de face montrant des images en lâcher de ballons

ou pulmonaire, ou encore par extension à partir des organes de voisinage [3].

Le kyste hydatique se localise de préférence au niveau du ventricule gauche (75 %), suivi du ventricule droit (15 %), du septum interventriculaire (10 %), des oreillettes (5 à 8 %), et du péricarde dans (4 %) [4]. Dans nos deux cas, le kyste hydatique était localisé dans le ventricule droit.

Le kyste hydatique du cœur s'associe dans 20 à 40 % des cas à d'autres localisations viscérales. C'est le cas chez nos deux patients (localisation pulmonaire chez l'un, hépatique et rénale chez l'autre).

Sur le plan clinique, la présentation de l'hydatidose cardiaque est souvent atypique et polymorphe, responsable d'un retard diagnostique [5]. La douleur thoracique est le symptôme le plus couramment rapporté [6]. Le mode de révélation le plus fréquent reste cependant la découverte fortuite par radiographie pulmonaire (qui peut montrer une voussure localisée, une déformation étendue d'un arc de la silhouette cardiaque, ou encore une hydatidose pulmonaire associée) ou par échographie transthoracique.

Chez notre premier patient, bien que la symptomatologie fût déroutante, le retard diagnostique est exclusivement dû au retard de consultation, les anomalies de l'examen clinique ayant rapidement motivé une exploration cardiaque menant au diagnostic.

Par contre, la présentation clinique atypique du deuxième cas a mené à une démarche diagnostique mal ciblée, conduisant à un retard diagnostique et une dissémination de la maladie.

L'échocardiographie Doppler transthoracique (ETT) ainsi que l'échocardiographie Doppler transœsophagienne (ETO) constituent les techniques d'imagerie de première intention dans le diagnostic des kystes

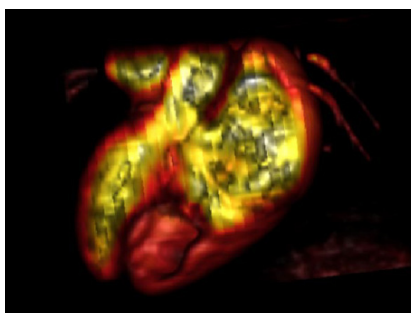


Figure 5 Image IRM de reconstruction montrant la pointe du VD comblée par le kyste hydatique

hydatiques cardiaques [6,7]. L'ETT reste un examen clé qui permet de visualiser le kyste, son siège, ses rapports et son retentissement. Néanmoins, les limites de cet examen sont représentées par l'échogénicité des patients et le diagnostic topographique précis.

La tomomodensitométrie (TDM) ainsi que l'IRM complètent les données en fournissant des éléments plus pertinents concernant la topographie, la morphologie ainsi que le bilan d'extension [8].

L'IRM détermine les rapports exacts du kyste hydatique avec les structures cardiaques, la nature des constituants internes et externes du kyste, ainsi que l'extension de l'hydatidose en intra ou extra-thoracique [9].

L'IRM montre typiquement une lésion hypo-intense en T1, hyper-intense en T2 avec hypo-signal périphérique en rapport avec la capsule fibreuse [8,10].

Un nombre de tumeurs cardiaques doit être considéré comme diagnostics

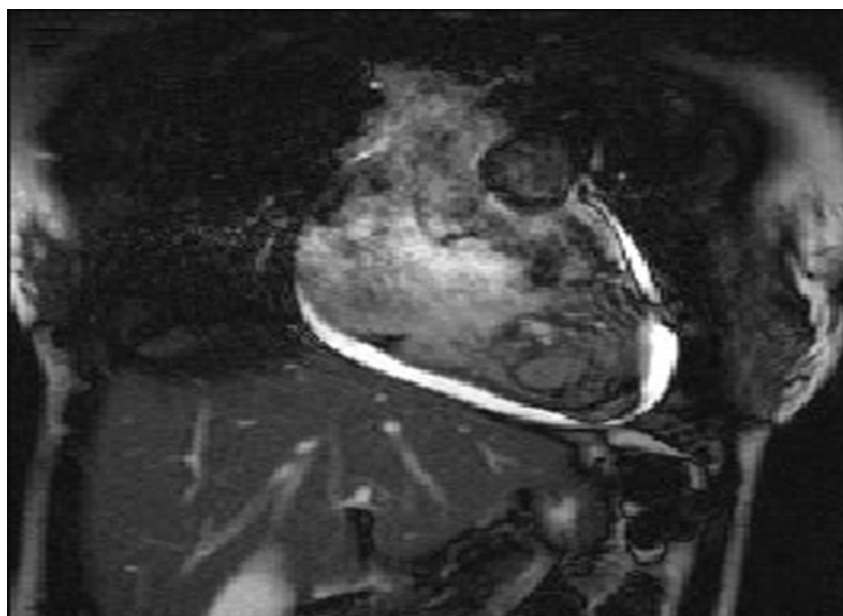


Figure 6 Coupe IRM 2 cavités le long du VD montrant le VD comblé depuis la région médio-ventriculaire jusqu'à l'apex par la masse hydatique avec une image kystique au niveau péricardique ainsi qu'un épanchement péricardique circonferentiel (IRM : imagerie par résonance magnétique ; VD : ventricule droit).

différentiels potentiels, notamment au stade pseudo-tumoral du kyste hydatique [11]. Cela dit, l'aspect multivésiculaire ou le détachement de membrane reste des éléments presque pathognomoniques [12,13].

En somme, l'IRM permet le plus souvent non seulement d'asseoir le diagnostic positif mais aussi de guider le geste chirurgical qui s'avère urgent [5,14]. Les antihelminthiques gardent une place de traitement adjuvant ou néo-adjuvant à la chirurgie, voire exclusif en cas de contre-indication formelle à celle-ci (le cas de notre deuxième patiente chez laquelle le kyste adhérait au plan myocardique).

L'IRM s'affirme également comme la technique d'imagerie de choix dans le suivi des malades, particulièrement dans la période post-opératoire.

Conclusion

Compte tenu de l'apport considérable de l'IRM dans le diagnostic et la décision thérapeutique des kystes hydatiques cardiaques, cet examen doit être sollicité devant toute suspicion de cette pathologie, menaçante par ses complications, et qui relève le plus souvent d'un geste chirurgical urgent.

Références

- Ministère de la Santé, Direction de l'Épidémiologie et de Lutte contre les Maladies (DELM). Situation épidémiologique de l'hydatidose et activités réalisées en 2005 et 2006. Rapport annuel d'activités - État d'avancement des programmes de lutte contre les maladies parasitaires Années 2005 - 2006 ([http://www.sante.gov.ma/Departements/DELM/Maladies Parasitaires/Rapport Annuel des maladies parasitaires 2005-2006.pdf](http://www.sante.gov.ma/Departements/DELM/Maladies%20Parasitaires/Rapport%20Annuel%20des%20maladies%20parasitaires%202005-2006.pdf), consulté le 19 octobre 2011).
- Perez-Gomez F et al. Cardiac echinococcosis: clinical pictures and complications. *British Heart Journal*, 1973, 35:1326-1331.
- Ozer N et al. Hydatid cyst of the heart as a rare cause of embolization: report of 5 cases and review of published reports. *Journal of the American Society of Echocardiography*, 2001, 14:299-302.
- Kaplan M et al. Cardiac hydatid cysts with intracavitary expansion. *Annals of Thoracic Surgery*, 2001, 71:1587-1590.
- Onursal E et al. Surgical treatment of cardiac echinococcosis: report of eight cases. *Surgery Today*, 2001, 31:325-330.
- Thameur H et al. Cardio-pericardial hydatid cysts. *World Journal of Surgery*, 2001, 25:58-67.

7. Tufekcioglu O et al. Echocardiography findings in 16 cases of cardiac echinococcosis: proposal for a new classification system. *Journal of the American Society of Echocardiography*, 2007, 20:895-904.
8. Kotoulas GK et al. Evaluation of hydatid disease of the heart with magnetic resonance imaging. *Cardiovascular and Interventional Radiology*, 1996, 19:187-189.
9. Oueslati S et al. Imagerie du kyste hydatique du cœur. À propos de 8 observations [Imaging cardiac hydatid cysts: 8 cases]. *La Presse Médicale*, 2006, 35(7-8):1162-1166.
10. Alper H, Yünter R, Sener NR. Intramural hydatid cyst of pulmonary arteries: CT and MR findings. *European Journal of Radiology*, 1995, 5:666-668.
11. Ben-Hamda K et al. Eighteen-year experience with echinococcosis of the heart: clinical and echocardiographic features in 14 patients. *International Journal of Cardiology*, 2003, 91:145-151.
12. McManus DP et al. Echinococcosis. *Lancet*, 2003, 362:1295-1304.
13. Polat P et al. Hydatid disease from head to toe. *Radiographics*, 2003, 23:475-494; quiz 536-537.
14. Gormus N et al. The clinical and surgical features of right-sided intracardiac masses due to echinococcosis. *Heart Vessels*, 2004, 19:121-124.

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