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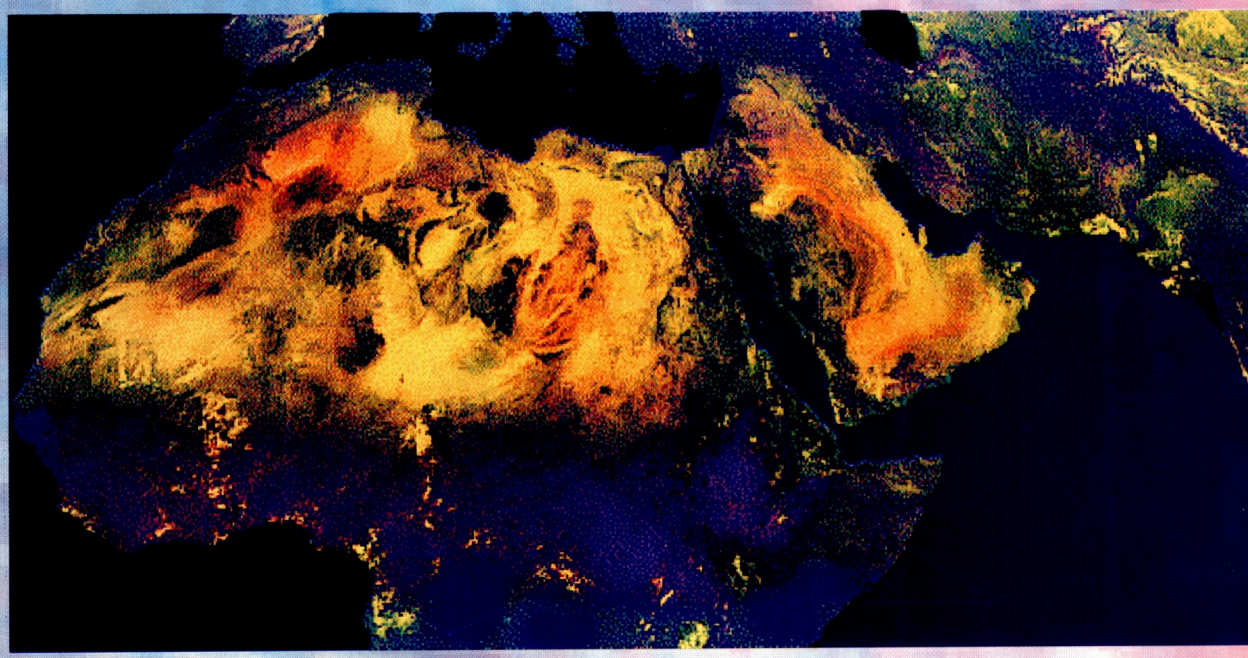

منظمة الصحة العالمية
World Health Organization
Organisation mondiale de la Santé

المكتب الإقليمي لشرق المتوسط
Regional Office for the Eastern Mediterranean
Bureau régional de la Méditerranée orientale

المجلة الصحية لشرق المتوسط

هي المجلة الصحية الرسمية التي تصدر عن المكتب الإقليمي لشرق المتوسط بمنظمة الصحة العالمية. وهي منبر لتقديم السياسات والمبادرات الجديدة في الخدمات الصحية والترويج لها، ولتبادل الآراء والمفاهيم والمعطيات الوبائية ونتائج الأبحاث وغير ذلك من المعلومات، وخاصة ما يتعلق منها بإقليم شرق المتوسط. وهي موجهة إلى كل أعضاء المهن الصحية، والكليات الطبية وسائر المعاهد التعليمية، وكذا المنظمات غير الحكومية المعنية، والمراكز المتعاونة مع منظمة الصحة العالمية والأفراد المهتمين بالصحة في الإقليم وخارجه.

EASTERN MEDITERRANEAN HEALTH JOURNAL

IS the official health journal published by the Eastern Mediterranean Regional Office of the World Health Organization. It is a forum for the presentation and promotion of new policies and initiatives in health services; and for the exchange of ideas, concepts, epidemiological data, research findings and other information, with special reference to the Eastern Mediterranean Region. It addresses all members of the health profession, medical and other health educational institutes, interested NGOs, WHO Collaborating Centres and individuals within and outside the Region.

LA REVUE DE SANTE DE LA MEDITERRANEE ORIENTALE

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-saniaire, aux ONG, Centres collaborateurs de l'OMS et personnes concernés au sein et hors de la Région.

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COVER: Remote sensing image of the area of the world that includes the Eastern Mediterranean Region. Cover image produced by the Canada Centre for Remote Sensing, Ottawa, Canada. (NOAA AVHRR Composite) Reproduced with permission

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Eastern Mediterranean Health Journal

Letter from the Editor

We are pleased to announce that with the publication of this final issue of Volume 9 we have published 2 volumes (Volumes 8 and 9) in the past 12 months and significantly shortened the delay in production.

Reducing our production delay and bringing the Journal up to date, while at the same time maintaining our high standards, has been a priority at EMHJ. In order to do this, therefore, greater resources have been allocated in terms of editors, layout professionals and printers. Judging by our output this year, this has had a very positive effect. We remain committed to accelerating production and will endeavour to become current in the coming year.

Included in this issue is the usual varied mix of papers. Of interest are three papers related to the mental health of young people, an area for which we have not received many submissions previously. There are also several papers on noncommunicable diseases, such as cardiovascular conditions and their risk factors, from various countries indicating the growing problem of these conditions in the Region.

As this is the final issue of Volume 9, we are again indebted to our reviewers for their invaluable input and contribution to the high standard of EMHJ.

رسالة من المحرِّر

يسرنا أن نعلن أننا بإصدارنا هذا العدد الأخير من المجلد التاسع نكون قد أصدرنا في غضون الاثني عشر شهراً الماضية مجلدَيْن من مجلدات المجلة الصحية، هما الثامن والتاسع، ونكون بذلك قد أفلحنا في تقليص فترة تأخُّر النشر.

ولقد كان تقليص فترة تأخُّر النشر وتحديث المجلة الصحية، والمحافظة في نفس الوقت على المعايير العالية التي نلتزم بها، من أولويات المجلة الصحية لشرق المتوسط. وقد استلزم بلوغ هذه الغاية تخصيص مزيد من الموارد من حيث المحرِّرون، والمصمِّمون، وآلات الطباعة. ورجاؤنا أن يكون لإنتاجنا خلال هذا العام تأثير إيجابي بالغ، آملينَ أن لا نتوانى بعون الله عن الالتزام بتسريع النشر، بحيث يأتي النشر في العام المقبل في مواعيده المقرَّرة.

وعلى غرار الأعداد السابقة، يحتوي هذا العدد على مجموعة متنوعة من الورقات البحثية، تتعلق ثلاث منها بالصحة النفسية للشباب، وهو مجال لم نكن نتلقّى إسهامات كثيرة فيه في الماضي. وهناك أيضاً عدد من الورقات مقدَّمة من عدة بلدان حول الأمراض غير السارية، مثل الأمراض القلبية الوعائية وعوامل الاختطار المقترنة بها، تشير إلى تفاقم مشكلة هذه الحالات في الإقليم.

ولما كان هذا العدد هو الأخير في المجلد التاسع، فنَوَدُّ أن نغتنم هذه المناسبة لنعبِّر مرة أخرى عن خالص تقديرنا لمراجعي المجلة لإسهامهم القيِّم في مراجعة الورقات البحثية ومحافظتهم على المعايير العالية للمجلة الصحية لشرق المتوسط.

Cardiovascular risk factors in Saudi Arabian and non-Saudi Arabian diabetic patients in Saudi Arabia

D.H. Akbar,[1] M.M. Ahmed[1] and A.A. Algamdi[1]

عوامل الاختطار القلبية الوعائية في السكّريّين من السعوديّين وغيرهم في المملكة العربية السعودية

دعد أكبر، ميمونة أحمد، عايشة الغامدي

الخلاصة: لدراسة تواتر عوامل الاختطار القلبية الوعائية في السكريّين من السعوديّين وغير السعوديّين، قمنا بدراسة المرضى الذين راجعوا مستشفى جامعة الملك عبد العزيز للمتابعة في الفترة بين كانون الثاني/يناير 1997 وكانون الأول/ديسمبر 2001 ودرسنا عوامل الاختطار القلبية الوعائية التي تشمل فرط ضغط الدم وفرط شحميات الدم والسِّمنة والتدخين إلى جانب درجة السيطرة على سكر الدم. وقد بلغ عدد المرضى المدروسين 1122 مريضاً منهم 48٪ من السعوديّين و52٪ من غير السعوديّين، ولم تلاحظ فروق يُعتدُّ بها إحصائياً في معدلات انتشار عوامل الاختطار القلبية الوعائية بين السعوديّين وغير السعوديّين، وقد أوضحت دراسة الترابُط بين كل عامل من عوامل الاختطار وعمر المريض ترابُطاً يعتدُّ به مع كلٍّ من فرط الدم والتدخين.

ABSTRACT To determine frequency of cardiovascular risk factors in Saudi and non-Saudi diabetics, we studied patients attending King Abdulaziz University Hospital for follow-up in the period January 1997 to December 2001. Cardiovascular risk factors, including hypertension, hyperlipidaemia, obesity and smoking, were studied as well as degree of blood glucose control. Of 1122 patients in the study, 48% were Saudis and 52% non-Saudis. No statistically significant difference was found for prevalence of cardiovascular risk factors between the two groups. Correlation of each of the risk factors to patient's age showed significant correlation to hypertension and smoking.

Les facteurs de risque cardio-vasculaire chez des patients diabétiques saoudiens et non saoudiens en Arabie saoudite

RESUME Afin de déterminer la fréquence des facteurs de risque cardio-vasculaire chez des diabétiques saoudiens et non saoudiens, nous avons étudié les patients qui sont venus à l'Hôpital universitaire King Abdulaziz en consultation de suivi durant la période janvier 1997-décembre 2001. Les facteurs de risque cardio-vasculaire, comprenant l'hypertension, l'hyperlipidémie, l'obésité et le tabagisme, ainsi que le degré de contrôle de la glycémie, ont été étudiés. Parmi les 1122 patients de l'étude, 48 % étaient des Saoudiens et 52 % des non-Saoudiens. Aucune différence statistiquement significative n'a été constatée entre les deux groupes pour la prévalence des facteurs de risque cardio-vasculaire. La corrélation de chacun des facteurs de risque à l'âge du patient montrait une corrélation significative avec l'hypertension et le tabagisme.

[1]Department of Medicine, King Abdulaziz University Hospital, Jeddah, Saudi Arabia.
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Introduction

Cardiovascular disease (CVD) is the leading cause of morbidity and death [*1,2*]. Diabetes mellitus (DM) is closely associated with ischaemic heart disease and patients with DM and no previous history of ischaemic heart disease have the same risk for cardiac events as patients with previous myocardial infarction [*3,4*]. This fact led the American national cholesterol education programme to state that, in terms of cardiovascular risk, DM was equivalent to having ischaemic heart disease [*3*]. People with diabetes have a 2–4 fold increase in the risk of dying from the complications of CVD [*5*]. Hyperlipidaemia, hypertension, smoking and obesity are well known, modifiable, cardiovascular risk factors in both diabetics and non-diabetics [*6–10*]. Rith-Najarian et al. have reported regional variation in CVD risk factors among American Indians and Alaskan natives with DM [*11*]. We aim in our work to study the prevalence of CVD risk factors in diabetics in two different groups, Saudi Arabians and non-Saudi Arabians.

Methods

The study was conducted at King Abdulaziz University Hospital, a teaching hospital in the Western Province of Saudi Arabia. Patients seen in our hospital include mainly Saudis as well as patients from neighbouring Asian and African countries. The study group comprised 1155 diabetic patients, all those attending the hospital for follow-up from January 1997 to December 2001. Thirty-three (3%) were excluded as some of their data were missing. The remaining 1122 were included in the study; 541 (48%) were Saudis, with male:female ratio of 1.3:1 and 581 were non-Saudis (52%), with male:female ratio 1.1:1 ($P = 0.3$).

CVD risk factors included hypertension (patient previously diagnosed or has 2 consecutive readings > 130 mm Hg systolic blood pressure, 85 mm Hg diastolic blood pressure), hyperlipidaemia (if the patient has been previously diagnosed or has low density lipoprotein > 2.6 mmol/L, triglyceride > 2.3 mmol/L, high density lipoprotein < 0.9 mmol/L for males and 1.0 mmol/L for females), obesity [defined as body mass index (BMI) > 30 kg/m^2], smoking history (either active or less than 5 years since cessation of smoking) were recorded from the medical records of the study group. In addition, participant's age, sex, nationality, degree of blood glucose control (poor blood glucose control defined as mean of the two most recent HbA1c readings > 9%), type and duration of DM were also recorded. The study group was divided into 2 groups according to nationality, Saudi or non-Saudi, and a comparative analysis was done regarding the prevalence of CVD risk factors and degree of blood glucose control. The group was also analysed according to age group, < 45 years or ≥ 45 years.

Statistical analysis was performed using *SPSS* software. Mean ± standard deviation was determined for quantitative data, and frequency for categorical variables. Chi-squared was used to analyse group difference for categorical variables. For continuous variables, *t*-test was used when comparing two groups. Pearson correlation was used to study the correlation of different cardiovascular risk factors to age. $P < 0.05$ was considered significant.

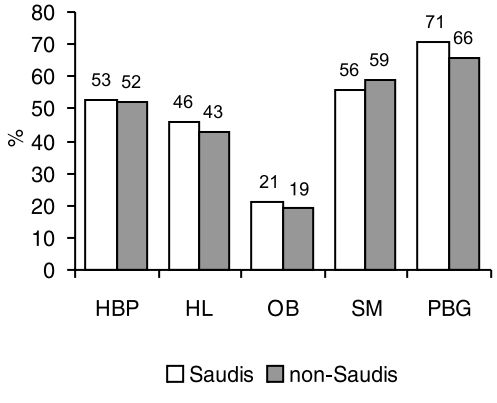
Results

Type 2 diabetes was the most prevalent type recorded in both Saudis and non-Saudis, 454 of 541 (84%) and 471 of 581

(81%) respectively (P = 0.4). Mean duration of diabetes was 8.9 ± 7.3 years in Saudis versus 8.8 ± 7.2 years in non-Saudis (P = 0.2). There were 406 of 541 (75%) Saudis aged 45 years or over and 407 of 581 (70%) non-Saudis (P = 0.06).

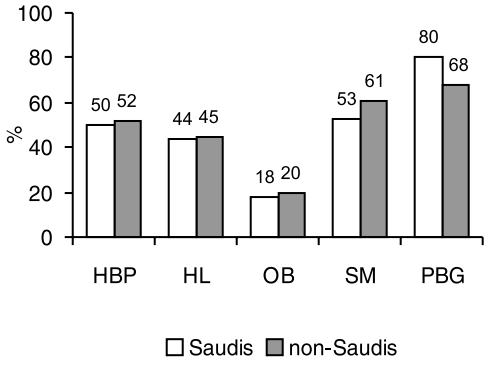
Hypertension, hyperlipidaemia, and smoking were common CVD risk factors in both Saudis and non-Saudis, while obesity was less common in both groups. Both groups had poor blood glucose control (Figure 1). There was no statistically significant difference in the prevalence of CVD risk factors in those above or below 45 years in both nationalities (Figures 2,3). Smoking was higher in young (< 45 years) non-Saudis (61%) compared to those 45 years or over (58%) (P = 0.06).

No significant difference in the frequency of cardiovascular risk factors in relation



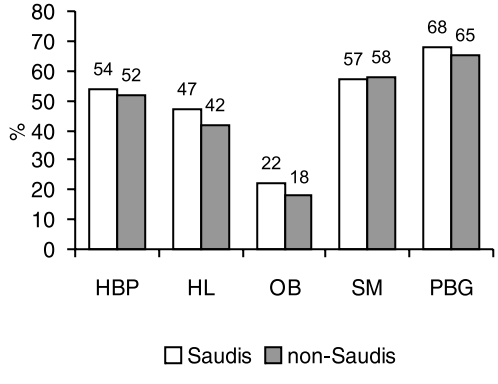
HBP = hypertension.
HL = hyperlipidaemia.
OB = obesity.
SM = smoking.
PBG = poor blood glucose control (HbA1c > 9%).
P-*value was significant for poor blood glucose control (*P *= 0.04).*

Figure 1 **Comparison between Saudi (*n* = 541) and non-Saudi (*n* = 581) diabetics according to cardiovascular risk factors**



HBP = hypertension.
HL = hyperlipidemia.
OB = obesity.
SM = smoking.
PBG = poor blood glucose control (HbA1c > 9%).
P-*value was significant for poor blood glucose control (*P *= 0.02).*

Figure 2 **Cardiovascular risk factors among Saudi (*n* = 135) and non-Saudi (*n* = 174) diabetics < 45 years**



HBP = hypertension.
HL = hyperlipidaemia.
OB = obesity.
SM = smoking.
PBG = poor blood glucose control (HbA1c > 9%).
P-*value was not significant (*P *= 0.3).*

Figure 3 **Cardiovascular risk factors among Saudi (*n* = 406) and non-Saudi (*n* = 407) diabetics ≥ 45 years**

to age was found between Saudis and non-Saudis in 3 age groups (< 30 years, 30–60 years and > 60 years) (Table 1). Correlation of each of the risk factors to patient's age showed significant correlation to hypertension and smoking ($P < 0.001$).

Discussion

CVD complications are the leading cause of death and disability in people with diabetes. People with diabetes have significantly higher cardiovascular mortality rates compared to people without diabetes [*12–14*]. Age is considered a risk factor for CVD in people with diabetes [*15*]. Howard et al [*16*] and others [*17,18*] have found that diabetes is the strongest CVD risk factor among individuals aged 45–74 years. The great majority of patients in our study, Saudis (70%) or non-Saudis (75%), were 45 years and over.

A large body of evidence from epidemiological, case–control, and cohort studies provides convincing documentation of the causal link between cigarette smoking and health risks [*10*]. Studies of individuals with diabetes consistently found a high risk of morbidity and premature death associated with the development of macrovascular complications among smokers [*19*]. Our study showed that, apart from poor control

Table 1. **Prevalence of cardiovascular risk factors in Saudi and non-Saudi diabetics for three different age groups**

Cardiovascular risk factor	Age group (years)	Patients having risk factor (%) *Saudi*	*Non-Saudi*	*P*
Hypertension	< 30	8	6	0.1
	30–60	39	38	
	> 60	57	47	
Hyperlipidaemia	< 30	34	32	0.4
	30–60	56	52	
	> 60	52	58	
Obesity	< 30	24	14	0.2
	30–60	40	39	
	> 60	43	36	
Smoking	< 30	26	33	0.2
	30–60	40	42	
	> 60	51	53	
HbA1c > 9%	< 30	4	6	0.9
	30–60	20	18	
	> 60	6	8	

< 30 years, Saudis (n = 54) (10%), non-Saudis (n = 41) (7%).
30–60 years, Saudis (n = 281) (52%), non-Saudis (n = 366) (63%).
> 60 years Saudis (n = 206) (38%), non-Saudis (n = 174) (30%).

of blood glucose, smoking is the commonest CVD risk factor in both Saudis and non-Saudis, being commoner in non-Saudis. Similarly high smoking rates were reported by the Inter-Tribal Heart Study [*20*] and others [*21,22*]. Smoking cessation is one of the few interventions that can safely and cost-effectively be recommended for all patients [*10*]. It had been shown that smoking cessation counselling is effective in reducing tobacco use in this high-risk group [*23,24*].

Hypertension is a common problem in people with diabetes. Reported prevalence varies from 42% to 70% [*11,25–27*]. We report a rate of 52% and 53% in Saudis and non-Saudis respectively. Data from the recent United Kingdom Prospective Diabetes Study hypertension study [*28,29*] and the Hypertension Optimal Treatment trial [*30*] demonstrated that aggressive lowering of blood pressure was accompanied by reduction in macrovascular events.

People with diabetes exhibit increased rates of prevalence of lipid-rich atheroma and more thrombosis than non-diabetics [*31,32*]. These differences suggest a greater vulnerability for plaque rupture and coronary thrombosis in patients with DM [*31–33*]. Some of these abnormalities may be related to the dyslipidaemia associated with DM [*32*]. Almost half of the patients studied, both Saudis (46%) and non-Saudis (43%), have hyperlipidaemia, a finding in agreement with what has been reported by Howard et al [*34*] and others [*11,17*]. Recent studies have shown that CVD morbidity and mortality associated with DM can be considerably reduced through intensified treatment of hyperlipidaemia [*35–37*].

Obesity is a major modifiable risk factor for coronary heart disease along with cigarette smoking and elevated serum cholesterol [*38*]. The incidence of coronary heart disease events has been correlated to BMI in a study of more than 23 000 employees in north-western Germany (PROCAM) [*39*]. This prospective study showed a rise in coronary events with increasing BMI over 8 years of follow-up from 31 events per 1000 at BMI < 20 kg/m^2 to 72 per 1000 at BMI > 30 kg/m^2.

In Saudi Arabia, obesity and diabetes have become major causes of morbidity in big cities in the last 2 decades, apparently due to the sudden change in lifestyle as a result of economic development, urbanization and competitive lifestyles [*40*]. In a study conducted in Riyadh [*41*], obesity (BMI > 30 kg/m^2) was reported in 33% of adult diabetics. Another study showed a figure of 27% in Bahrain [*42*]. In our study, overall around 20% of the patients were obese with no significant difference between Saudis and non-Saudis. These rates were much lower than those reported in some other countries where a rate around 50%–70% has been reported [*11,17, 22,43–45*]. Obesity is multifactorial, not only environmental but also genetic factors contribute to its development [*46*]. It has been estimated that the heritability for BMI is over 30% and the rest is accounted for by other factors like demographic, familial and personal factors [*46,47*]. The lower prevalence of obesity in our study group (Saudis 21% and non-Saudis 19%) could be related to the nature of the local diet, but the effects this along with duration of residency of non-Saudis or the time of appearance of diabetes (after reaching Saudi Arabia or before) were not investigated in our study. Further studies are needed on the cause of this lower rate of obesity in people with diabetes in the Gulf region compared to other regions of the world.

Several studies have shown the health benefits of weight loss in people with diabetes; it improved glycaemic control [*48*], insulin sensitivity [*49*], triglyceride and

high density lipoprotein levels [*50*], and it also increases life expectancy [*51*].

It has been shown that greater degree of hyperglycaemia is associated with increasing CVD mortality in individuals with diabetes [*52*]. We report a high frequency of poor blood glucose control in both Saudis (71%) and non-Saudis (66%). Several studies clearly demonstrated that tight blood glucose control is important in delaying the onset and slowing the progression of microvascular complications [*53*,*54*].

Our study showed that CVD risk factors (smoking, hypertension, hyperlipidaemia and obesity) and poor glycaemic control are common in both Saudi and non-Saudi diabetics. Lifestyle may have a role; most of the patients are living a sedentary life, without much activity and using automobiles for travelling even very short distances.

Poor compliance of patients to medications, dietary restriction and follow-up may have an effect on the prevalence of CVD risk factors. Patients may get fed up taking chronic multiple medications and restricting their diet for a disease which is almost asymptomatic. Some patients may not be able to afford the medications, especially the new expensive generation, or may be ignorant due to lack of information.

Patient education regarding the diabetes disease process, nutritional management, physical activity, weight loss, cessation of smoking, compliance to medication and follow up, glucose monitoring, and prevention and detection of complications is of great importance. The success of diabetic teaching programmes seems to be similar in the inpatient and ambulatory settings. A study conducted by Muller and colleagues showed that people with diabetes who received identical education programmes in 2 different settings were no different in regard to improvement in HbA1c, BMI, hypoglycaemic episodes and subsequent hospitalization after one year [*55*]. Another important issue is physician education regarding screening for CVD risk factors and initiation of early and aggressive treatment when indicated.

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Clustering of cardiovascular risk factors among Omani adults

A.A. Al Riyami[1] and M. Afifi[1]

تبويب عوامل الاختطار القلبية الوعائية لدى البالغين العُمانيين

آسيا الريامي ومصطفى عفيفي

الخلاصة: في سبيل التعرف على توزع وترابُطات مجموعات الاختطار القلبية الوعائية تم تحليل معطيات المسح الصحي الوطني العُماني لعام 2000 وتحليلها، وقد تم توزيع 5660 من الأشخاص المدروسين إلى فئات على أساس المعطيات الديموغرافية (ضغط الدم، سكر الدم على الريق، كوليستيرول المصل، الوزن، الطول، قياسات الخصر والورك) بحسب ما تشتمل عليه من عوامل الاختطار القلبية الوعائية الأربعة (فرط ضغط الدم، فرط كوليستيرول الدم، السكري، زيادة الوزن أو السِّمنة). وقد وجد أن لدى 72٪ من الأشخاص المدروسين أقل من عامل اختطار واحد، وأن لدى 2٪ منهم العوامل الأربعة مجتمعة. وتزداد عوامل الاختطار مع تقدُّم العمر، في حين يكون لعيش الإنسان في المناطق الريفية أو عيشه بمفرده دور وقائي. وتُعَدُّ المتلازمة القلبية الوعائية الاستقلابية من المشكلات الشائعة في الصحة العمومية في عُمان. ومن الضروري زيادة الوعي بين العاملين على إيتاء الرعاية الصحية وبين سائر أفراد المجتمع من خلال توزيع واسع للنتائج التي أسفرت عنها هذه الدراسة المسحيّة.

ABSTRACT To determine the distribution and correlates of clustering of cardiovascular disease (CVD) risk factors, data from the Oman National Health Survey, 2000 were analysed. Based on demographic data (blood pressure, fasting blood glucose, serum cholesterol, weight, height, waist and hip measurements), 5660 subjects were grouped according to how many of four CVD risk factors (hypertension, high cholesterol, diabetes, overweight/obesity) they had. We found that 72% of subjects had less than one risk factor and 2% had all four. Older age exacerbated risk, while living in rural areas or being single was protective. Metabolic cardiovascular syndrome is a public health problem in Oman. Increasing awareness in healthcare providers and the wider population by comprehensive dissemination of the survey results is crucial.

Association des facteurs de risque cardio-vasculaire chez des adultes omanais

RESUME Les données provenant de l'enquête nationale sur la santé réalisée à Oman en 2000 ont été analysées pour déterminer la distribution et les corrélats de l'association des facteurs de risque des maladies cardio-vasculaires. Sur la base des données démographiques (tension artérielle, glycémie à jeun, cholestérol sérique, mesures du poids, de la taille, du tour de taille et de hanches), 5660 sujets ont été groupés en fonction du nombre de facteurs de risque de maladie cardio-vasculaire qu'ils avaient parmi les quatre suivants : hypertension, cholestérol élevé, diabète, surcharge pondérale/obésité. Nous avons constaté que 72 % des sujets présentaient au moins un facteur de risque et que 2 % présentaient les quatre. L'âge avancé exacerbait le risque, tandis que le fait de vivre en milieu rural ou d'être célibataire constituait une protection. Le syndrome métabolique cardio-vasculaire est un problème de santé publique à Oman. La sensibilisation des prestataires de soins de santé et de la population générale par la large diffusion des résultats de l'enquête est cruciale.

[1]*Department of Research and Studies, Ministry of Health, Oman.*
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Introduction

Social advances in Oman since 1970 have been accompanied by cultural changes, a reduction in the prevalence of communicable diseases, increased life expectancy, changes in nutritional habits and habitual physical activity and increased prevalence of noncommunicable diseases such as hypertension and diabetes [*1*]. Environmental and behavioural changes such as the adoption of new dietary habits and a sedentary lifestyle, and the stress of urbanization and of working conditions have all contributed to the rise in cardiovascular disease (CVD) risk factors [*2*]. The primary risk factors for CVD are hypertension, high cholesterol, diabetes, overweight, cigarette smoking and physical inactivity. The first 4 of these may cluster in some persons and have been identified as components of a syndrome known as metabolic cardiovascular syndrome, or the "deadly quartet" [*3*].

Approximately 50% of hypertensive people can be considered to have insulin resistance and hyperinsulinaemia. It appears likely that insulin resistance and hyperinsulinaemia predispose to, rather than result from, hypertension. Insulin resistance is associated with abnormalities in lipoprotein metabolism, hypercoagulability, and endothelial function, which probably account in part for the increased cardiovascular risk among hypertensive patients [*4*]. Patients with at least 1 component of the metabolic syndrome have been found to be obese, hyperinsulinaemic, insulin resistant, hyperglycaemic, hypertensive, and dyslipidaemic [*5*].

The association between hyperinsulinaemia and cardiovascular risk factors has been investigated in Gulf countries. In the United Arab Emirates, Bener et al. examined the association between acanthosis negricans, hyperinsulinaemia and cardiovascular risk factors [*6*]. They found that patients with acanthosis negricans had a high prevalence of abnormal glucose tolerance and hyperinsulinaemia. In addition, euglycaemic patients with hyperinsulinaemia had a cluster of risk factors for CVD. In Bahrain, Musaiger and al-Roomi found that obesity, hypertension and diabetes were highly prevalent and significantly more frequently reported among women than men, with 79.6% of women overweight or obese, compared to 56% of men [*7*]. They also recommended the need for a national health policy to prevent and control CVD. In Egypt, Ibrahim et al. studied the clustering of CVD risk factors in hypertensive patients. They found that obesity was prevalent in 33% of hypertensive men and 47% of hypertensive women [*8*]. After adjusting for age, hypertensive men had significantly higher total cholesterol, fasting blood sugar, body mass index (BMI) and waist-hip ratio than their normotensive counterparts. In addition, hypertensive women had higher low-density lipoprotein (LDL) cholesterol.

Using World Health Organization criteria (WHO) [*9*], the Oman National Health Survey, 2000 identified the prevalence of hypertension, high cholesterol, diabetes, overweight and obesity among Omani adults. The National Health Survey was a cross-sectional community-based study involving all 10 regions of Oman. The aim of our study was to examine the aggregation or clustering of these CVD risk factors and the correlates of this clustering among those Omani subjects aged ≥ 20 years who had been included in the National Health Survey.

Methods

Sample design and participants

The sample for the survey was selected to be representative of the whole nation. The

survey adopted a multistage stratified probability sampling design. All 10 regions of the country were sampled proportionally. Depending on the size of the population for each region, one or more *wilayat* (districts) were randomly chosen from that region, with 16 *wilayat* selected for the survey from a national total of 59. Each *wilayat* was stratified into urban or rural (villages/remote areas), resulting in an urban:rural ratio of 2:1, similar to that of the 1993 national census. Within each of these strata, enumeration areas (EAs, census units used during the 1993 population census, each containing approximately 80 households) were randomly selected. Households within each of the EAs were then randomly selected. Maps of the selected EAs were updated, and a comprehensive listing of all Omani households in each EA was made to obtain the sampling frame.

All individuals aged ≥ 20 years (n = 7011) in the selected households (n = 1968) were invited to participate in the survey. The response rate varied from 81% to 91%, according to the type of measurement or laboratory investigation completed. Of the 7011 eligible participants, 5660 (81%) completed the questionnaire, had their blood taken to measure fasting blood glucose and completed the other necessary measurements and laboratory investigations in order to have their data analysed.

Questionnaire and measurements

The Household Health Status questionnaire covered demographic data such as age and sex, and marital, education and employment status, as well as self-reporting for diabetes mellitus and hypertension. Education status was classified into 3 groups: illiterate; those who could read and write and had completed either primary or preparatory school, or had spent some years in secondary school; and those who had completed secondary school, college, university or postgraduate tertiary studies.

Blood pressure (BP) was measured manually. This measure, together with data for weight, height, waist and hip circumference, was registered in the questionnaire. Waist-hip ratio was not considered as a variable in this analysis. WHO procedures were used to obtain the measurements [*9*]. The results of laboratory investigations taken for fasting blood glucose and serum cholesterol were also entered on the questionnaire. Certain important biochemical measurements related to CVD risk factors, such as high-density lipoprotein (HDL) cholesterol, LDL cholesterol, triglyceride or microalbuminuria levels were not collected during the survey.

Specimen collection and analysis

For specimen collection and analysis, 25 teams were assembled and trained in the methodology of the survey for 2 weeks. Each team consisted of a nurse to take measurements, a laboratory technician to draw samples, a health educator to interview subjects, a health inspector to transport laboratory samples and a field supervisor (statistician) to supervise and review the questionnaires in the field.

Eligible members of the selected households were requested to commence fasting 1–2 hours before midnight the night before they were to be visited by the survey team. At 07.00 the following morning, household members were interviewed, had their measurements taken and venous fasting blood glucose samples collected. Fasting blood samples for glucose were collected in sodium fluoride potassium oxalate tubes, labelled and transferred immediately in cold boxes, along with laboratory forms, to the laboratory at the *wilayat* hospital. Samples were immediately centrifuged, the plasma separated and fasting plasma glucose deter-

mined by a glucose oxidase method on the same day, using a Hitachi 911 automated clinical chemistry analyser (Boehringer Mannheim). The same manufacturer supplied the reagents. Samples for estimation of cholesterol were collected in tubes containing lithium heparin anticoagulants and transferred to the laboratory, where the investigations were carried out by the enzymatic colorimetric method, also using the Hitachi 911 analyser.

Diagnostic criteria

The 1999 WHO criteria [9] for diagnosis of hypertension, hypercholesterolaemia, anthropometric measurement and glucose intolerance were used.

Diastolic hypertension

Patients who self-reported being hypertensive were categorized as having diastolic hypertension (even if their blood pressure reading at the time of screening was normal) only if the interviewer either sighted their medication, or verified that the subject had been diagnosed as hypertensive by a medical practitioner. Patients were also categorized as having diastolic hypertension if the mean of two BP readings was ≥ 90 mm Hg diastolic phase 5, regardless of their systolic blood pressure readings. Hypertensive subjects were further classified in the logistic regression models as having mild hypertension (diastolic BP 90–104 mm Hg) or moderate/severe hypertension (diastolic BP ≥ 105 mm Hg).

Hypercholesterolaemia

Patients were categorized as having hypercholesterolaemia if their total cholesterol level was ≥ 5.2 mmol/L or ≥ 200 mg/dL.

Anthropometric measurements

Body mass index [BMI = weight (kg)/ height^2 (m^2)] was classified according to the accepted norms: underweight (BMI < 18.5 kg/m^2), normal (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), obese (30.0–39.9 kg/m^2) and morbidly obese (≥ 40.0 kg/m^2).

Diabetes mellitus

Participants were categorized as having diabetes mellitus if they self-reported having diabetes, or their fasting blood glucose reading was ≥ 7.0 mmol/L.

Data processing and analysis

Data were entered using *Epi-Info*, version 6.04 software. Preparation of the data was completed by July, 2000. Data were analysed using *SPSS*, version 9.0. Data were given as counts, means and percentages. Group means were compared using ANOVA, and the chi-squared test examined the distribution of data using the likelihood ratio.

Step-wise logistic regression was conducted to test for the factors most strongly associated with the dependent variable under study and to obtain the adjusted odds ratio (OR) for each factor. All independent variables used in the logistic models were dichotomous (after recoding some of them to be so). The OR shows the change in the odds of the dependent variable under study when the independent variable changed from 0 to 1. A P-value < 0.05 was considered statistically significant.

Results

Table 1 shows participants' demographic and social characteristics. Males and females were equally represented, a majority (62.1%) were aged between 20 and 39 years, 73% lived in rural areas, approximately 34% were illiterate, and 7% were current smokers.

The 4 CVD risk factors investigated in our study were diastolic hypertension, dia-

Table 1 **Demographic and social characteristics of National Health Survey participants, Oman, 2000**

Characteristic	No.	%
Age group (years)		
20–39	4353	62.1
40–59	1753	25.0
≥ 60	905	12.9
Total	7011	100.0
Sex		
Male	3506	50.0
Female	3505	50.0
Total	7011	100.0
Residence		
Urban	5143	73.4
Rural	1868	26.4
Total	7011	100.0
Education		
Illiterate	2333	33.8
< Secondary	2824	40.9
≥ Secondary	1753	25.3
Total	6910	100.0
Work status		
Working	2778	39.9
Not working	4191	60.1
Total	6969	100.0
Marital status		
Married	4668	66.7
Not married	2327	33.3
Total	6995	100.0
Family size		
≤ 10 members	3696	52.7
> 10 members	3315	47.3
Total	7011	100.0
Currently smoking		
Yes	488	7.0
No	6515	93.0
Total	7003	100.0

betes mellitus, hypercholesterolaemia, and overweight/obesity. Of the 5660 subjects tested (aged 20 years and above), 25.2% had high diastolic blood pressure, approximately 11% had diabetes, 41% had a high level of serum cholesterol and 48% were overweight or obese. Only 28% of subjects had none of these CVD risk factors (i.e. 72% had at least 1 CVD risk factor), 34.8% had 1 risk factor, 24.6% had 2 risk factors, 10.6% had 3 risk factors and 2% had all 4 risk factors.

Participants were divided into 2 groups, as having either ≤ 1 risk factor (63% of the study sample) or having ≥ 2 risk factors (37%). The dependent variable introduced in the logistic models was having (or not having) ≥ 2 risk factors. The independent variables were gender, age group, place of residence, marital status, level of education and work status.

Table 2 shows the means of the CVD risk factors in the overall sample and the comparison of these means among groups of subjects with 0, 1, or > 1 risk factors. The BP measurement increased steadily with clustering of risk factors. Subjects with none of the risk factors had a mean BP of 119.3/75.3 mm Hg, while those with 4 risk factors had a mean BP of 149/95.6 mm Hg (SBP measurements are not shown in Table 2). The differences between the mean values for diastolic blood pressure were significant for the groups overall and between each group, using the Tukey method ($P < 0.05$ is statistically significant). The mean values for fasting blood glucose, serum cholesterol and BMI also increased significantly with the number of aggregated risk factors.

To identify the significantly associated variables with the dependent binary variable having (or not having) 2 or more risk factors, we used multiple logistic regression. From the different models, we obtained the OR for each significant independently associated variable. The independent variables included in the models were: age, sex, place of residence, marital status, and level

Table 2 **Comparison of means of cardiovascular disease risk factors among groups of subjects with zero, one or more CVD risk factors, National Health Survey, Oman, 2000**

Variable	Mean (total sample)	Mean according to number of risk factors				*F*	*P*-value
	Overall *N* = 5660	0 *n* = 1586	1 *n* = 1970	2 *n* = 1394	3 *n* = 598	4 *n* = 112		
Diastolic blood pressure (mm Hg)	80.4	75.3	78.7	83.2	90.4	95.6	496.3	< 0.05
Fasting blood glucose (mmol/L)	5.5	4.8	5.1	5.8	7.2	10.5	332.6	< 0.05
Fasting serum cholesterol (mmol/L)	5.1	4.2	4.9	5.7	6.1	6.5	712.3	< 0.05
Body mass index (kg/m^2)	25.4	21.0	25.3	28.2	30.0[a]	30.9[a]	654.1	< 0.05

[a] *All differences of the means were significant below the 0.05 level by the ANOVA-Tukey method, except for the BMI mean difference between subjects with 3 risk factors and subjects with 4 risk factors.*

of education. The OR for each variable was adjusted for the other variables in the model to account for confounding between these variables.

Table 3 shows the significantly associated variables with the group having ≥ 2 risk factors, and the adjusted OR in 3 different multiple logistic models, i.e. for the whole sample and for male and female sex. The risk of being in this group (having ≥ 2 risk factors) increased with the higher age group and with living in urban areas in the 3 different models. Subjects aged ≥ 60 years were 2.6 times more likely to be in the group of ≥ 2 risk factors compared to younger age groups (20–39 years) in the total sample. Being single decreased the risk in the 3 models. Having a higher level of education (secondary and above) increased the risk for male subjects but decreased it for females.

Table 4 shows the adjusted OR for the group having ≥ 2 or more risk factors in the 3 different age groups. Urban residence increased the risk in the 3 age groups. Being female was protective in the age group 20–39 years, but increased the risk among the older age groups, 40–59 years and ≥ 60 years. The adjusted OR values were 0.73, 1.29 and 1.7 respectively.

Discussion

Health institution-based statistics usually give health planners an underestimation of the noncommunicable disease problem in Oman. For example, the registration of cases in diabetic registries nationwide is still unsatisfactory. In 2000 (the year of our study), the percentage of new and old cases of diabetes registered and treated in Ministry of Health institutions was 3.04% of the population aged ≥ 20 years. The hypertension figure for this age group was only

Table 3 **Adjusted odds ratio (OR) of factors significantly associated with subjects having ≥ 2 cardiovascular disease risk factors in the total sample population and among males and females, National Health Survey, Oman, 2000**

Variable	Total (*N* = 5557)[a]		Males (*n* = 2781)		Females (*n* = 2776)	
	Adjusted OR	*P*-value	Adjusted OR	*P*-value	Adjusted OR	*P*-value
Age group (years)						
20–39 = 1 (RC)	1.00		–	–	1.00	
40–59 = 2	2.83	< 0.001	2.93	< 0.001	3.04	< 0.001
≥ 60 = 3	2.61	< 0.001	2.43	< 0.001	3.85	< 0.001
Place of residence						
Urban = 0	–	–	–	–	–	–
Rural = 1	0.76	< 0.001	0.75	0.002	0.76	0.004
Work status						
Working = 0	–	–	–	–	–	–
Not working = 1	0.87	0.030	–	–	–	–
Education level						
Illiterate = 1 (RC)	–	–	1.00		1.00	
< Secondary = 2	–	–	1.40	0.003	1.04	0.747
≥ Secondary = 3	–	–	1.87	0.000	0.69	0.024
Marital status						
Single = 1	0.38	< 0.001	0.31	< 0.001	0.50	< 0.001
Divorced/separated = 2	1.22	0.200	0.82	0.478	1.51	0.032
Widowed = 3	1.24	0.080	1.15	0.685	1.07	0.628
Married = 4 (RC)	1.00		1.00		1.00	

[a]*The total number of subjects in the study was 7011, of whom 5660 (81%) completed the physical and laboratory measurements. However, the data of 3 subjects (0.05% of 5660 subjects) were not entered in the logistic regression models due to missing data in some of the independent variables. RC = Reference category*

4.8% [*10*], whereas in our study, the prevalence of diabetes and hypertension were 11% and 25%, respectively. Only by identifying the distribution and correlates of clustering of CVD risk factors in a community-based study were we able to obtain an accurate estimate of the magnitude of the problem in both urban and rural settings.

ANOVA results showed that the mean values for diastolic blood pressure, fasting blood glucose, cholesterol, and BMI were significantly higher among subjects with ≥ 1 risk factor. Lee et al. found similar results in their study [*5*]. Poulter found that other cardiovascular risk factors, including obesity, smoking, glucose intolerance, physical inactivity and dyslipidaemias often coexist with hypertension in both older and younger age groups [*11*]. He concluded that this 'clustering' of risk factors for cardiovascular disease has major implications for treatment thresholds and choice of antihypertensive therapy.

In Italy, Pasini et al. studied the clustering of different combinations of CVD risk factors (systolic and diastolic hypertension, total cholesterol, cigarette smoking and obesity) among nationals aged 40–59

Table 4 **Adjusted odds ratio of factors significantly associated with subjects having ≥ 2 cardiovascular disease risk factors among different age groups, National Health Survey, Oman, 2000**

Variable	20–39 years (*n* = 3367)		39–59 years (*n* = 1479)		≥ 60 years (*n* = 711)	
	Adjusted OR	*P*-value	Adjusted OR	*P*-value	Adjusted OR	*P*-value
Place of residence						
Urban = 0	–	–	–	–	–	–
Rural = 1	0.81	0.028	0.75	0.014	0.66	0.013
Education level						
Illiterate = 1 (RC)	–	–	1.00	–	–	–
< Secondary = 2	–	–	1.71	< 0.001	–	–
≥ Secondary = 31	–	–	2.88	< 0.001	–	–
Sex						
Male = 0	–	–	–	–	–	–
Female =1	0.73	< 0.001	1.29	0.038	1.70	< 0.001
Marital status						
Single = 1	0.36	< 0.001	–	–	–	–
Divorced/separated = 2	1.66	0.027	–	–	–	–
Widowed = 3	0.80	0.673	–	–	–	–
Married = 4 (RC)	1.00		–	–	–	–

The total number of subjects in the study was 7011, of whom 5660 (81%) completed the physical and laboratory measurements. However, the data of 3 subjects (0.05% of 5660 subjects) were not entered in the logistic regression models due to missing data in some of the independent variables.
RC = Reference category.

years [*12*]. When considering the prevalence of high SBP or DBP, high total cholesterol or cigarette smoking, he found that 72.3% of men and 67.7% of women had at least one of the main risk factors for coronary heart disease and usually higher values for SBP or DBP, whereas 29.3% of men and 21.2% of women had ≥ 2 factors. In our study, where the clustering of DBP, diabetes, overweight/obesity, and high fasting serum cholesterol was investigated, it was found that 72% of the total sample (aged ≥ 20 years) had ≥ 1 risk factor and 37.2% had ≥ 2 risk factors, a higher prevalence than reported in the Pasini study, despite that study's different clustering set and limited age group selection, which would be expected to increase rather than reduce prevalence.

Campos-Outcalt et al. studied another set of CVD risk factors (diabetes, hypertension, hypercholesterolaemia, obesity and smoking) clustering in a different age group among 230 Native Americans from a south-western tribe aged 25–65 years [*13*]. They found that 86% of the participants had ≥ 1 risk factor and 52% had ≥ 2 risk factors. The difference in results between this and our study can be explained by the different clustering set, the very large difference in sample size and the ethnic specificity of Native Americans, who were not a representative sample of the wider population of the United States of America.

Because of the importance of the clustering of CVD risk factors, Mancia concluded that the established major risk factors for CVD, hypertension, hypercholesterolaemia and smoking, are present, often in combination, in populations around the world [*14*]. He added that these factors have been found to interact in a synergistic manner to increase the risk of coronary heart disease. Mancia therefore, suggested that traditional antihypertensive treatments offered little protection against coronary heart disease, perhaps because antihypertensive drugs tend to be prescribed to reduce BP without taking account of the presence of other risk factors. However, it should be borne in mind that the Mancia study was conducted over 15 years ago (1988), and newer antihypertensive medications are increasingly targeting the co-occurrence of hypertension and other CVD risk factors.

Phillips et al. concluded that diabetic patients have a higher prevalence of CVD risk factors than those without diabetes, therefore requiring improved vigilance of diabetic patients and interventions to modify the associated risk factors [*15*]. Bog-Hansen et al. similarly reported a strong coexistence of hypertension and type 2 diabetes [*16*].

Regarding the demographic and social factors significantly associated with clustering in the present study, smoking was not significantly associated and is not shown in the logistic regression models in Table 3 and Table 4. Salgado-Sales found results similar to those in our study. He found that in Acapulco, Mexico, among 1011 women and 1001 men aged ≥ 20 years, the average levels of serum cholesterol were higher in older, overweight, hypertensive individuals and that the differences were statistically significant, but there was no difference in the cholesterol levels of individuals with tobacco smoking habits [*17*].

In our study, urban residence was significantly associated with clustering of CVD risk factors in the overall sample, in the male and female subsamples and in the different age group sub-samples, although this association was not statistically significant with each of the individual risk factors per se (data not shown). This is not necessarily contradictory. As el Mugamer et al. have previously observed for the United Arab Emirates, which has a similar culture to that of Oman, as socioeconomic development in the region intensifies, the difference in lifestyles between urban and rural residents is becoming increasingly blurred [*18*]. Abdul-Rahim et al. concluded that although no significant differences were found in the prevalence of hypertension and diabetes between urban and rural populations, other components of metabolic syndrome, namely elevated triglycerides, low HDL cholesterol and overall obesity were more prevalent in the urban population [*19*].

While being female gender was a protective factor in the younger 20–39-year-old age group (OR = 0.73, $P < 0.05$), it increased the clustering risk in the higher age groups, i.e. the 40–59-year-olds and those aged ≥ 60 years, where females were 1.3 and 1.7 times respectively more likely to have clustering than males in these age groups. This may be explained by the protective role of female sex hormones before the age of 40 years.

Having attained a higher level of education was protective for the female subsample (OR = 0.698, $P < 0.05$), while males who had attained a secondary education or above were 1.87 times more likely to have aggregated risk factors. This cannot be explained by the relatively young age of highly educated females in Oman, as the

OR was already age-adjusted for both genders. It could be explained by other psychosocial factors that should be addressed in future studies.

Conclusion and recommendations

Both diabetes mellitus and hypertension are important public health problems in Oman. There needs to be a heightening of the level of awareness among primary care physicians to be alert to the possible presence of these pathologies among their patients. General community awareness also needs to be raised about individual risk factors for diabetes and hypertension, and about their aggregated effect in the development of CVD.

Improving understanding and awareness among physicians and the general community will aid prevention, diagnosis and management of both diabetes and hypertension, and in turn CVD, and can potentially lead to a reduction in complications arising from these chronic conditions. Disseminating to physicians the results shown in the logistic regression models of those factors significantly associated with clustering will aid in their ability to predict the presence of clustering and prompt them to more closely monitor patients at risk. This will lead to more efficient registration and management of chronic diseases at the primary care level.

Medical practitioners should always suspect clustering of CVD risk factors in patients who are aged ≥ 40 years, married and living in an urban setting. Having an urban place of residence was a common risk factor in all models used in this study.

Improving community awareness of the problem by health education campaigns is essential if the prevalence of CVD risk factors and the burden of CVD in the general population are to be reduced. Patient education and a coordinated approach by physicians, nurses and other healthcare providers in a multidisciplinary approach to the treatment of obese patients are also of fundamental importance to reduce the prevalence of CVD in the population. Abdominal obesity is the earliest symptom of metabolic cardiovascular syndrome. Prevention or early treatment of such obesity can prevent or delay the onset of diseases associated with the syndrome. Vigilance and effecting positive behavioural change, not always easily achieved, are key factors in the prevention, early diagnosis, and reduced complications of risk factors leading to CVD.

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Burden of coronary heart disease on the Iranian oil industry (1999–2000)

B. Larijani,[1] H. Fakhrzadeh,[1] M. Mohaghegh,[2] R. Pourebrahim[1] and M.R. Akhlaghi[1]

عبء مرض القلب التاجي في شركات صناعة النفط الإيرانية (1999–2000)

باقر لاريجاني، حسين فخر زاده ، مصطفى محقق، رسول بور إبراهيم، محمد رضا أخلاقي

الخلاصة: لتقييم التكاليف المباشرة لمرض القلب التاجي على شركات صناعة النفط الإيرانية قمنا بحساب تكاليف الخدمات الأساسية لـ 1253 مريضاً بمرض القلب التاجي ممن أدخلوا إلى المستشفى المركزي للشركة الإيرانية الوطنية للنفط. وقد كانت التكاليف المباشرة لكل منهم 8.7 مليون ريال بحيث بلغ إجمالي التكلفة للمرضى المدروسين 940 10 مليون ريال (يعادل الدولار الأمريكي الواحد 8000 ريال). وقد قدِّرت التكاليف المباشرة لمرض القلب التاجي التي تتحملها شركات صناعة النفط الإيرانية بـ 770 22 مليون ريال، علماً بأن عدد أيام العمل الضائعة بسبب إدخال مرضى القلب التاجي إلى المستشفيات تقدَّر بـ 832 62 يوم عمل. إن هذا العبء الثقيل الذي يلقيه مرض القلب التاجي على شركات صناعة النفط الإيرانية يجعل من الضروري إدخال برنامج وقاية يشمل جميع الشركات العاملة في صناعة النفط الإيرانية ويُعنى بمرض القلب التاجي.

ABSTRACT To estimate the direct cost of coronary heart disease (CHD) to the Iranian oil industry, we calculated the cost of essential services for 1253 CHD patients admitted to the National Iranian Oil Corporation (NIOC) Central Hospital. The direct cost of CHD at the Hospital was 10 940 million rials (US$ 1 = 8000 rials), or 8.7 million rials per patient. The direct cost of CHD to the Iranian oil industry was estimated at 22 770 million rials. Working days lost to workers hospitalized for CHD amounted to 62 832. The heavy burden of CHD on the Iranian oil industry necessitates the introduction of an industry-wide prevention programme.

Charge imposée par les coronaropathies sur l'industrie pétrolière iranienne (1999-2000)

RESUME Afin d'estimer le coût direct des coronaropathies pour l'industrie pétrolière iranienne, nous avons calculé le coût des services essentiels pour 1253 patients souffrant de coronaropathie admis à l'hôpital central de la *National Iranian Oil Corporation*. Le coût direct des coronaropathies dans cet hôpital central s'élevait à 10 940 millions de rials (USD 1 = 8000 rials), soit 8,7 millions de rials par patient. On estime que le coût direct des coronaropathies pour l'industrie pétrolière iranienne s'élevait à 22 770 millions de rials. Il y a eu 62 832 journées de travail de perdues pour les ouvriers hospitalisés pour coronaropathie. La lourde charge imposée par les coronaropathies sur l'industrie pétrolière iranienne rend nécessaire l'introduction d'un programme sectoriel de prévention des coronaropathies.

[1]*Endocrine and Metabolism Research Centre, Doctor Shariati Hospital, Tehran University, Tehran, Islamic Republic of Iran.*
[2]*Health Research and Education Unit, Healthcare Organization, National Iranian Oil Corporation, Tehran, Islamic Republic of Iran.*
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Introduction

The restructuring of communities across Asia has been accompanied by an alarming increase in the incidence of coronary heart disease (CHD) [*1*]. Modern technology, increasing urbanization, rapid economic growth and lifestyle changes have made a significant contribution to the rising incidence of CHD in these communities. Mortality figures for Asian countries show a rising tide of CHD similar to that experienced by the industrialized West in the 1950s and 1960s [*2*].

The results of the World Health Organization Multinational Monitoring of Trends and Determinants in Cardiovascular Disease (MONICA) Project have shown that cardiovascular disease causes between 25%–45% of all deaths worldwide and is the leading cause of death in a majority of countries [*3,4*]. More than half of these deaths occur in developing countries [*5*].

Although not traditionally considered prevalent, CHD and cerebrovascular accidents, or strokes, have now become the leading causes of death in China [*6,7*]. In Southeast Asia too, the prevalence of CHD is on a steep upward curve. Cardiovascular disorders, primarily CHD, have also become a leading cause of death in India [*8,9*]. It has been estimated that the number of deaths due to CHD will have doubled there between 1985 and 2015, at which time CHD will displace infectious diseases as the leading cause of death [*10*].

The heavy economic burden of cardiovascular disease strains the imagination. In the United States of America, the cost of CHD in the year 2000 has been estimated at more than US$ 118 000 million [*11*]. In 1996–1997, the cost of patients with myocardial infarctions in the Islamic Republic of Iran was estimated at 170 000 million rials (US$ 1 = 8000 Iranian rials) [*12*].

To estimate the economic cost of coronary artery disease to the Iranian oil industry in 1999, the Research and Education Unit of the Healthcare Organization of the National Iranian Oil Corporation (NIOC) calculated total hospitalization costs of CHD patients admitted to the NIOC Central Hospital in Tehran in that year and then estimated the total burden imposed by CHD on the Iranian oil industry.

Methods

For this cross-sectional study, we obtained a list from the records office of the NIOC Central Hospital, Tehran, of all patients admitted between 21 March 1999 and 20 March 2000 because of coronary artery disease (International Classification of Diseases, 9th revision, codes 410–414). We estimated the overall cost using a pricelist of essential goods and services based on the tariffs set by the Healthcare Department of the NIOC Healthcare Organization. The final cost of hospitalized patients was calculated according to the following linear equation [*13*]:

$$\text{Total cost} = \Sigma\,(\text{Unit price of each service} \times \text{Number of units of service delivered})$$

At the same time NIOC-dependent healthcare centres throughout the country were requested to provide the study team with a statement of the cost of CHD patients in their care during the study interval.

Direct costs were defined as costs directly attributable to the production or delivery of a service, e.g. coronary angioplasty. Indirect costs were the social costs attributable to such items as loss of productivity, absenteeism and loss of manufacturing manpower.

We only assessed the cost of patients hospitalized with coronary events, i.e. angina pectoris, myocardial infraction and sudden cardiac death. We excluded the cost of outpatient services delivered during the study interval. Likewise, indirect costs due to structural wear and tear, use of diagnostic equipment and water and electric utilities that were not attributable to any specific function or action were not calculated as part of this study.

Results

Total inpatient admissions for cardiovascular disease were 1670 individuals, of whom 1253 (75%) were CHD patients. Of the patients with CHD, 877 (70%) were men and 376 (30%) women. Average patient age was 50.4 ± 8.3 years. Of all patients, 64.8% (812) were aged 40–55 years (Figure 1).

Of the 1253 patients, 89 (7.1%) died in hospital as a result of their disease. Of the 13 297 admissions overall to the NIOC Central Hospital, 201 (1.5%) died as a result of their disease. Therefore, 44.3% of all deaths and 9.4% of all admissions to the NIOC Central Hospital were due to CHD.

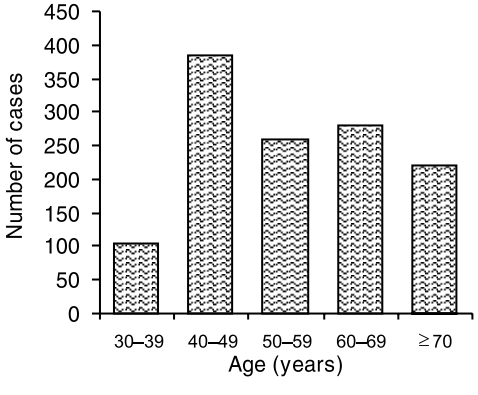

Figure 1 **Age distribution of coronary heart disease patients admitted to the National Iranian Oil Company Central Hospital in 1999–2000**

Figure 2 shows the overall cost of various services received by cardiovascular patients hospitalized in 1999–2000 at the NIOC Central Hospital. 'Bed–day' is the cost of having someone occupy a hospital bed for 1 day. 'Visit' is the average cost per patient per visit. The overall direct cost of patients hospitalized there was 10 940 million rials, equal to an expenditure of 8.70 million rials per patient. The overall number of patients hospitalized for CHD in 1999–2000 by NIOC healthcare centres was 2618. By taking the product of the latter figure and the per capita cost of hospitalization given above, the estimated direct cost of CHD patients to the oil industry during the study period was 22 800 million rials.

Cost of absenteeism

Patients spent 10 400 days in the hospital—including in the coronary care unit (CCU), cardiac intensive care unit (ICU) and cardiac surgery wards—during the study period. The average length of hospital stay for CHD was therefore 8.3 days. Of the 1253 patients, 660 were NIOC operational staff who were hospitalized for coronary artery by-pass grafting (CABG) because of an acute coronary event. Each of these patients was given at least 30 consecutive days sick leave after discharge from hospital. In contrast, patients admitted for CHD but not undergoing CABG were given an average of 14 consecutive days sick leave after discharge. Thus, a total of 38 502 days' absence from work [10 400 + (660 × 30) + (593 × 14)] were registered by CHD patients during the study period; that is, on average, 30.7 days off work per hospitalized CHD patient in 1999–2000.

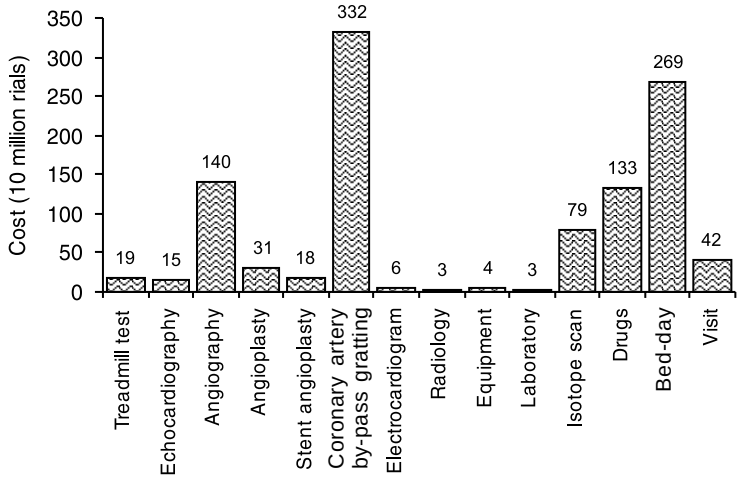

Figure 2 **Comparison of costs of medical services to coronary heart disease patients admitted to the National Iranian Oil Company Central Hospital in 1999–2000 (US$ 1 = 8000 Iranian rials)**

Given that 2618 people within the oil industry were hospitalized for CHD during the study interval, the total number of days absent from work because of CHD can be estimated at 80 373, i.e. nearly 220 person–years including holidays, compensated leave and weekend days. The majority of these patients were blue-collar workers in the oil industry who are paid per hour according to the service they provide. Only a minority of the patients, however, are administrative employees who receive these types of benefits. The average daily wage of an oil industry worker is 60 000 rials. Therefore, the cumulative financial loss caused by absenteeism due to CHD in the oil industry adds up to more than 4800 million rials.

This figure does not include indirect costs incurred by loss of productivity due to premature death. The overall total cost was calculated at 27.57 billion rials, which is approximately 12% of the running budget of the NIOC Healthcare Organization for the year 1999–2000.

Discussion

In the Iranian oil industry, the economic burden of CHD is significant, since both the direct cost of diagnostic and therapeutic interventions and indirect costs due to loss of productivity, permanent disability or premature death are staggering. The oil industry situation may be representative of the situation in the country as a whole [*14*]. According to figures released by the Iranian Ministry of Health and Medical Education, CHD is the leading cause of death in the country [*15*].

In the USA, in spite of extensive population-scale prevention programmes during the past 30 years, CHD is still the leading cause of death [*11*]. Likewise, the leading

cause of early and permanent disability in the USA is CHD [*11*].

A recent study estimated direct and indirect costs of CHD in Germany to be DM 39 000 million and DM 73 000 million respectively, or a total burden of DM 112 billion [*16*]. In 1993 the direct cost of CHD in New Zealand was estimated at NZ$ 200 million [*17*]. In Switzerland during the same year, US$ 21 million was spent on every 100 000 patients with heart disease [*18*]. The financial burden imposed by the loss of productivity due to CHD death in the state of California in 1991 was estimated at US$ 5300 million [*19*]; the 5–10 year cumulative direct costs in 1995 dollars for all patients with CHD were estimated to be US$ 71.5 billion and US$ 126.6 billion respectively [*20*]. In the USA as a whole, the calculated overall cost of cardiovascular disease in the year 2000 was US$ 326.6 billion (US$ 185.8 billion direct and US$ 140.8 billion indirect) [*11*].

The economic cost of coronary heart disease is so heavy that even a small reduction in incidence of CHD will produce remarkable savings. In Finland over the past 20 years widespread preventive measures have reduced cardiovascular mortality by 50%, accompanied by a 40% reduction in per capita cost of treating CHD in the 35–64 year-old age group [*21*]. This emphasizes the large-scale cost-effectiveness of preventive measures and policies and risk factor modifications [*22*].

In the wake of studies instituted by the USA National Institutes of Health, preventive programmes have become a fixture of health policy planning over the last 30 years. The USA government will provide the Centers for Disease Control and Prevention with US$ 25 million to further strengthen its cardiovascular prevention programmes in 18 states where CHD prevalence is highest.

The oil industry is the Islamic Republic of Iran's main source of income. Prevention of economic damage from CHD is of paramount importance in order to preserve a productive workforce. Tragically, 65% of those with acute CHD admitted to the NIOC Central Hospital in 1999–2000 were aged between 40 and 55 years, which are usually the most fruitful years of a person's life and career.

The diagnostic and therapeutic costs of CHD patients in our study were estimated with the heavily subsidized care and equipment offered by the NIOC Central Hospital, e.g. angioplasty balloons, stents and catheters. If we were to include in our calculations the costs of subsidies, outpatient services and indirect costs from structural and instrumental wear and tear and loss of manufacturing output and productivity due to premature coronary death and disability, we would have a figure far higher than 26 770 million rials for 1999–2000.

There is little choice for the oil industry but to institute a CHD prevention plan in order to preserve a healthy workforce and to maintain output and productivity. This is a tall order, which requires collaboration between senior management within the industry and healthcare medical and paramedical staff.

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WHO CVD-risk management package for low- and medium-resource settings

The WHO CVD-Risk Management package contains a variety of components to guide healthcare providers and health systems, even those with very minimal resources, to more effective CVD risk management through easy-to-follow risk-assessment and risk-management algorithms; lifestyle counselling protocols; drug treatment protocols; referral pathways; and follow-up schedules. The package has been designed primarily for the management of cardiovascular risk in individuals detected to have hypertension through opportunistic screening. However, it could be adapted for use with diabetes or smoking as entry points. The package is meant to be implemented in a range of health-care facilities in low- and medium-resource settings, in both industrialized and developing countries. The document can be obtained from Marketing and Dissemination, World Health Organization,20 Avenue Appia, 1211 Geneva 27, Switzerland (tel: +41 22 791 2476; fax: +41 22 791 4857; email: bookorders@who.int). It is also available free on line at: http://whqlibdoc.who.int/publications/2002/9241545852.pdf

Smoking patterns among primary health care attendees, Al-Qassim region, Saudi Arabia

N.S. Al-Haddad,[1] T.A. Al-Habeeb,[2] M.H. Abdelgadir,[3] Y.S. Al-Ghamdy[4] and N.A. Qureshi[5]

نماذج التدخين بين المتردِّدين على مرافق الرعاية الصحية الأولية في منطقة القصيم في المملكة العربية السعودية

ناصر الشاذلي الحدَّاد، طارق علي الحبيب، مزمِّل حسن عبد القادر، ياسر سعيد الغامدي، نسيم أختر قريشي

الخلاصة: تمت دراسة عرضانية لمعدل انتشار التدخين والنماذج الاجتماعية والديموغرافية والمراضة المرافقة له، بين المتردِّدين على مرافق الرعاية الصحية الأولية في المملكة العربية السعودية، وذلك باستخدام استبيان مصمم جزئياً من 44 مادة لجمع المعطيات من 1752 مريضاً في 25 مركزاً من مراكز الرعاية الصحية الأولية التي تم اختيارها عشوائياً. وكانت النسبة المئوية للمدخنين 52.3٪. ومع أن 85٪ من المدخنين كانوا من البالغين فإن 8.6٪ منهم بدأوا بالتدخين قبل عمر 12 سنة. وقد أبدى المدخنون أسباباً متراكبة للتدخين ذكروا فيها ضغوط الزملاء. أما غير المدخنين فذكروا الحجج الدينية والصحية التي تنفِّر من التدخين، ومن بين جميع المدخنين كان 92.8٪ راغبين في تعلُّم استراتيجيات الإقلاع عن التدخين، في حين كان 11.8٪ منهم يجهلون مخاطره وأبلغ 32.4٪ عن ظواهر الامتناع عن النيكوتين. وإلى جانب وجود 13.4٪ منهم يتعاطون الكحول فإن 81.8٪ أبلغوا عن مرض عضوي مرافق.

ABSTRACT Prevalence, sociodemographic patterns and medical co-morbidity of smoking among a cross-section of primary health care (PHC) clients in Saudi Arabia were examined. We used a 44-item semi-structured questionnaire to collect data from 1752 patients at 25 randomly selected PHC centres. Percentage of smoking was 52.3%. Although 85% were adult smokers, 8.6% began smoking before age 12. Smokers gave overlapping reasons to smoke including peer pressure; non-smokers gave religious and health logics against smoking. Of all smokers, 92.8% wanted to learn cessation strategies, 11.8% were ignorant of hazards and 32.4% reported manifestations of nicotine withdrawal. Besides alcohol use (13.4%), 81.8% had co-morbid physical disease.

Profil du tabagisme chez les personnes qui consultent dans les centres de soins de santé primaires, Région d'Al-Qassim (Arabie saoudite)

RESUME La prévalence, les caractéristiques socio-démographiques et la comorbidité médicale du tabagisme ont été examinés dans une étude transversale des utilisateurs des services de soins de santé primaires (SSP) en Arabie saoudite. Nous avons utilisé un questionnaire semi-structuré à 44 items pour recueillir des données auprès de 1752 patients dans 25 centres SSP choisis de manière aléatoire. Le pourcentage de tabagisme s'élevait à 52,3 %. Même si 85 % des sujets étaient des fumeurs adultes, 8,6 % avaient commencé à fumer avant l'âge de 12 ans. Les fumeurs ont donné des raisons de fumer qui se recoupent, notamment la pression des pairs ; les non-fumeurs ont avancé des arguments logiques religieux et sanitaires contre le tabagisme. Sur l'ensemble des fumeurs, 92,8 % souhaitaient apprendre à cesser de fumer, 11,8 % ne connaissaient pas les risques et 32,4 % signalaient des manifestations de sevrage à la nicotine. Outre la consommation d'alcool (13,4 %), 81,8 % avait une comorbidité physique.

[1]Primary Health Care, Buraidah, Al-Qassim Region, Saudi Arabia.
[2]Division of Psychiatry, King Khalid University Hospital, Riyadh, Saudi Arabia.
[3]Medical Education and Community Health Services, Al-Qassim Region, Saudi Arabia.
[4]Department of General Health Affairs, Al-Qassim Region, Saudi Arabia.
[5]Buraidah Mental Health Hospital, Buraidah, Saudi Arabia.
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Introduction

Evidence-based data robustly suggest the etiological role of smoking in physical and neuropsychiatric disorders among both active and passive smokers [*1–3*]. Moreover, tobacco smoking has been officially recognized as a substance use disorder that has epidemiological, etiological, phenomenological, pathophysiological, co-morbid, diagnostic, therapeutic, prognostic and outcome domains [*4*]. It is a major public health problem that causes millions of premature deaths and huge economic losses globally every year [*3*]. Despite substantial progress including enforced restrictions on smoking in workplaces, the public still remains misinformed about its health risks [*5–6*]. Furthermore, adolescents, who are the most vulnerable, receive vague messages about smoking [*7*]. Therefore, concerned authorities have started global 'quit smoking' campaigns and have also developed antismoking clinics, cessation strategies, drug therapies and rehabilitation programmes for smokers [*4,8*].

There is a tremendous amount of literature on smoking patterns in the Western world compared with what is available for developing countries. A review of smoking data in the Gulf countries found only 17 studies that primarily examined prevalence, predictors and patterns of smoking among healthy populations and provided strategies and recommendations for prevention, treatment and further research. Smoking among male psychiatric outpatients in Saudi Arabia has been examined, but to our knowledge, few studies have addressed smoking patterns in primary health care (PHC) settings [*9–13*]. Our cross-sectional study therefore aimed to explore prevalence, sociodemographics, medical comorbidity and patterns of smoking in a relatively large PHC population. We hypothesized that the prevalence of smoking would be higher than reported in healthy populations and that the smoking habits of PHC consumers would not differ much from studies in both the Gulf countries and the industrialized nations.

Methods

To achieve these objectives, 25 of the 142 PHC centres that are uniformly distributed throughout the Al-Qassim region of Saudi Arabia were selected randomly. The selected PHC centres were classified as either urban or rural by matching them to a previous categorization of each PHC centre [*12–13*]. Then 25 senior general practitioners (GPs) from the selected PHC centres were briefed and trained via telephone to administer the semi-structured questionnaire. In addition to clarification of immediate queries, GPs were informed that if they had any problems completing the form, they could contact the research team by telephone. Following this, 100 copies of the questionnaire were sent to each selected PHC centre. GPs were advised to select by non-systematic randomization only new male patients for personal interviews to complete the 100 questionnaires within 3 months. This was to be done without interfering with the regular delivery of administrative, technical and health services to PHC clients. Each questionnaire took approximately 30–45 minutes to complete.

A semi-structured questionnaire with 44 items that was used in our previous research on smoking among psychiatric outpatients was slightly modified for the current study [*9*]. In the final questionnaire, 2 questions were changed to accommodate the different focus of the current study; the phrase 'mental illness' was substituted with 'physical disorder' in 2 ques-

tions and the diagnosis of all diseases was sought.

During the first week of the study, GPs were briefed and were advised to read and understand the questionnaire. Most (96%) did not experience difficulty in completing it. A minority (4%) raised some queries, which were: 1) if the patient is a non-smoker, is the entire questionnaire to be completed? GPs were advised to complete only the demographic part and the reasons for not smoking. They were also requested to note their diagnosis plus any additional information about smoking the patient would like to offer. 2) If the patient is an ex-smoker that completely stopped smoking 6 months prior to our study, is the entire questionnaire to be completed? GPs were told to complete the demographic portion of the questionnaire plus reasons for quitting, date of quitting, use of treatments for smoking cessation and diagnosis along with any additional information about smoking. Our responses to these queries were disseminated to all participating GPs.

Current smokers were broadly defined as those who smoke regularly or occasionally on a daily, weekly or monthly basis. Non-smokers were defined as those who never smoked. Thus, the sociodemographics and diagnosis of all clients—smokers, ex-smokers and non-smokers—were recorded. The demographic data (11 items) included name, sex, file number, date, age, level of education, marital status, residence, occupation, family type and approximate monthly income. Family type was categorized as: 1) nuclear, consisting of only one married couple living with unmarried children or 2) joint or extended, that is a married couple living with married children. The questionnaire also comprised 32 items about smoking patterns and 1 item for diagnosis.

Frequency distributions and chi-squared test were used to determine associations among categorical variables between smokers and non-smokers. Student *t*-test was used to determine differences among continuous variables. *P*-value of ≤ 0.05 was significant. *SPSS* version 10.0 for Windows was used for data analysis.

Results

This study took place from July 1999 to July 2000 and 1752 PHC patients were included in our final analysis. Approximately 15% of participants had grossly incomplete responses and another 15% refused to participate; hence, only 70% (1752) of the original 2500 questionnaires were used in the final analysis. Nonetheless no statistically significant demographic differences were observed between participants and non-participants. The one-year study period included planning, briefing, data collection and analysis. Furthermore, the GPs, 100% of whom were expatriates, regularly took 45 days annual vacation, attended multiple training courses within and outside the region and attended regional meetings and conferences that were held during working hours. An audit is needed to determine the number of patients, new as well as repeat, attending each urban and rural PHC centre. The daily census of PHC clients was impressively high and differed between rural and urban settings. Although no females were included in this study, 4.7%–16% of women smoke cigarettes in Riyadh [*11,12*].

Sociodemographic parameters

Of 1752 PHC clients, 917 (52.3%) were current smokers. The mean age and standard deviation of PHC patients was 35.5 ± 11.5 years with 95% confidence interval (CI) 35–36. No significant age difference was observed between smokers (mean age ± SD = 35.43 ± 11.6 years) and non-

smokers (mean ± SD = 36.23 ± 13.10 years; $P > 0.5$). More than half were educated (938, 53.5%), unemployed (960, 54.8%), single (987, 56.3%), urban dwellers (992, 56.6%) or living in a joint or extended family (1000, 57.1%). Monthly mean income was 4105.29 Saudi rials (US$ 1.00 = 3.76 SR) with a standard deviation of 4059.24 and 95% CI 3848–4363. There was a significant difference between the income of smokers (mean ± SD = 4089.86 ± 310.97 SR) and non-smokers (mean ± SD = 4201.24 ± 1844.79 SR; $P < 0.05$). When variables for smokers and non-smokers were compared, significant differences were observed for education, employment status, marriage and family type ($P < 0.05$; Table 1).

Smoking patterns

According to our study, only 917 (52.3%) were current smokers and the remainder were either ex-smokers (71, 4.1%) or non-smokers (764, 43.6%). Non-smokers and ex-smokers (47.7%) gave the following overlapping reasons not to smoke: smoking is prohibited, or *haram*, in Islam (92%), smoking is disliked, or *makrooh*, in Islam (85%), smoking is injurious to health (87%) and cigarette buying is a waste of money (78%). Ex-smokers gave the following reasons for quitting: chronic physical ill health (85%), advice from key elderly relatives (68%) and death of a close relative attributed to smoking (8%).

Among the 917 smokers, 79 (8.6%) began smoking before age 12 and 780

Table 1 **Sociodemographic characteristics of smokers and non-smokers**

Variable	Smokers (n = 917)		Non-smokers (n = 835)		χ_1^2	P-value
	No.	%	No.	%		
Education						
Illiterate	382	41.7	432	51.7		
Literate	535	58.3	403	48.3	17.445	0.0001
Occupation						
Employed	344	37.5	448	53.7		
Unemployed	573	62.5	387	46.3	45.308	0.00001
Marital status						
Single	589	64.2	398	47.7		
Ever married	328	35.8	437	52.3	48.09	0.00001
Residence						
Urban	513	55.9	479	57.4		
Rural	404	44.1	356	42.6	0.304	NS
Family type						
Nuclear	504	54.9	248	29.7		
Extended or joint[a]	413	45.1	587	70.3	112.808	0.00001

[a]*Extended or joint family type = married couple living with married children.*
NS = not significant.

(85.1%) began smoking at a young age (13–30 years). No reason for smoking was given by 499 (54.4%) whereas 418 (45.6%) smoked because they were either unhappy or anxious or had experienced peer pressure prior to smoking. Approximately half (517, 56.4%) smoked 20 or more cigarettes daily. More than half (521, 56.8%) used Marlboro Reds and the reasons for their preferences were: first experience was with Marlboro Red, quick push/effect, more nicotine and no rapid effect with other brands. The majority (790, 86.2%) smoked any time during the day. A minor proportion of smokers (95, 10.4%) were also using sheesha, cigars and pipes. Approximately 71.6% of smokers (657) smoked anywhere they chose to.

Approximately 57.3% of smokers (525) reported positive family history of smoking. The majority of smokers (809, 88.2%) knew the injurious effects of smoking on health, whereas 11.8% (108) were ignorant. Several sources of information were reported, including television (192, 20.9%), magazines (631, 68.8%) and other media. Approximately 10.3% of smokers (94) had no access to any source of information about the ill-health effects of smoking. A minority of smokers (83, 9.1%) gave a positive family history of death attributed to smoking. Most smokers (681, 74.3%) reported that their family members were aware of their smoking and the majority had family members (707, 77.1%) who advised them not to smoke. Only 22.9% (210) reported that their families tolerated their smoking. More than half of the smokers (622, 67.8%) felt stressed, guilty and ashamed buying cigarettes.

Approximately 34.2% of smokers (314) reported considerable increases in smoking for a variety of reasons, including marital discord, job problems, financial difficulties and residential difficulties. Among smokers, 78% (715) had made attempts to quit. Of all smokers, 32.4% (297) reported symptoms including dizziness, craving, irritability, inattention, tiredness, headache, anxiety, weight gain and loneliness. Among smokers, 80.5% (738) expressed a desire to quit smoking. The majority (602, 65.6%) reported guilt, shame, anger, fear, anxiety, social embarrassment and minor quarrels during smoking. Only 13.4% of smokers (123) reported using alcohol. A little less than half (425, 46.3%) stated that they preferred taking either tea or Arabic coffee, or *qahwa*, while smoking. About 43.8% of smokers started smoking before developing physical problems or diseases whereas 11.5% began smoking after such illnesses. The majority of smokers (812, 88.5%) responded that smoking neither improves their ability to pay attention or focus, nor helps to quickly finish the job at hand. In response to additional information about smoking, the majority of smokers (851, 92.8%) reported that they need specific strategies for stopping smoking. PHC consumers with strong religious backgrounds, as reflected in their views related to 'additional comments', smoked considerably less ($P < 0.05$; Table 2).

Medical disorders and smoking

Of all PHC attendees, 18.2% (318 of 1752) had no medical disorders and more than half of these (213, 67%) were non-smokers. Table 3 shows that the specific medical diseases significantly associated with smoking were chest, musculoskeletal, allergic, dental and cardiac diseases ($P < 0.05$) while central nervous system and surgical diseases were significantly associated with non-smokers ($P < 0.05$). The distribution of medical disorders as a whole by smoking status (Table 4) revealed that medical diseases were significantly associated with smoking ($P < 0.05$).

Table 2 **Distribution of religious beliefs about smoking by smoking behaviour as arbitrarily reflected in additional remark responses**[a]

Variable	Smokers		Non-smokers		χ^2_2	*P*-value
	No.	%	No.	%		
Smoking is *haram* [b]	275	29.9	483	57.8		
Smoking is *makrooh* [c]	352	38.5	181	21.7		
Smoking has no religious meaning	290	31.6	171	20.5	139.12	0.00001
Total	917		835			

[a]*GPs asked participants to express their personal opinions about smoking.*
[b]Haram = *prohibited in Islam.*
[c]Makrooh = *disliked in Islam.*

Table 3 **Distribution of medical diseases by smoking status (1434 of 1752 participants, 81.8%)**

Medical diseases	Smokers (*n* = 812)		Non-smokers (*n* = 622)		Total	χ^2_1	*P*-value
	No.	%	No.	%			
Chest diseases	135	16.6	41	6.6	176	32.01	0.0001
Musculoskeletal disorders	123	15.2	46	7.4	169	19.62	0.0001
Abdominal diseases	85	10.5	73	11.7	158	0.46	NS
Trauma or surgical conditions	69	8.5	73	11.7	142	3.79	0.05
Allergic conditions	107	13.2	30	4.8	137	27.49	0.0001
Communicable diseases	67	8.3	61	9.8	128	0.86	NS
Ear, nose and throat diseases	64	7.9	49	7.9	113	0.01	NS
Dental diseases	76	9.4	26	4.2	102	13.53	0.0001
Skin diseases	53	6.5	41	6.6	94	0.01	NS
Metabolic diseases	39	4.8	33	5.3	72	0.96	NS
Cardiovascular diseases	48	5.9	17	2.7	65	7.50	0.0001
Central nervous system diseases	19	2.3	32	5.1	51	7.28	0.0001
Miscellaneous conditions	11	1.4	16	2.6	27	2.21	NS

NS = not significant.
Some smokers and non-smokers had more than 1 disease.

Table 4 **Distribution of medical diseases by smoking**

Variable	Smokers		Non-smokers		Total		χ^2_1	*P*-value
	No.	%	No.	%	No.	%		
With medical disease	812	88.6	622	74.5	1434	81.8		
Without medical disease	105	11.5	213	25.5	318	18.2	57.2	0.00001
Total	917		835		1752	100		

Discussion

We examined the prevalence of smoking, smoker sociodemographics and patterns among PHC patients. Our smoking prevalence of 52.3% was consistent with one study but was rather higher than in other Saudi studies, especially one of an adult PHC centre population in which smoking prevalence was 22% [*9,10,13*]. Smoking prevalence in other Gulf countries ranged from 18% to 42%, with the exception of Kuwait, where prevalence was 52% for Kuwaitis and 55% for non-Kuwaitis [*14*]. Thus, our study suggests that the prevalence of smoking is higher among patients visiting PHC centres. Selection bias may have influenced this rate.

In 1996, the reported prevalence of smoking in the US adult population was 50% and approximately 25% each were current smokers and ex-smokers and another 50% had never smoked cigarettes [*4*]. In 2000 and 2001, rates of smoking among US adults were approximately 23.3% and 22.8%, a modest but significant decline compared with 1993 when the prevalence rate was 25% [*15,16*]. Conversely, current smoking prevalence increased among persons aged 20–24 years with ≥ 13 years of education from 17.9% in 1992–1993 to 22.7% in 1999–2000. However, the prevalence of smoking in specialized populations such as persons with psychiatric disorders, cancers, obstructive lung diseases, coronary heart disease, hypertension, diabetes mellitus, osteoporosis and other diseases was reported to be approximately 2 to 3 times that of the general population, up to 40% to 100%. This was substantiated by a study in which approximately 58% of psychiatric outpatients were smokers [*9*].

Of course, methodological issues, sample characteristics, political and economic factors could explain the variable rates of smoking across cultures [*17–19*]. Overall, the prevalence of smoking is decreasing in the Western world and can be attributed to constant intensive antismoking campaigns, quit smoking programmes, public awareness of the ill effects of direct and secondhand smoke, antismoking education, school-based smoking prevention strategies, access to smoking treatment modalities and strict government antismoking policies. Health authorities, in coordination with the World Health Organization, must enhance their efforts by adopting such strategies for completely eradicating smoking from Gulf countries.

In our study, smokers were mostly adults who were unemployed, single, with some education and living in nuclear families with low income; this was similar to international data [*15–18*]. In contrast, smoking has been reported to be relatively more common among married, illiterate and employed people in Saudi Arabia in

1999 [*20*]. A US smoking survey suggested that smoking was relatively more common among people with General Educational Development diplomas, i.e. certification of the equivalent of 12 years of education proficiency, as compared with highly educated persons [*15*]. Researchers have questioned whether people with less formal education are more vulnerable to excessive smoking and to the variety of mass media campaigns that disseminate vague messages about unhealthy aspects of smoking [*6,7*]. Antismoking messages therefore should be clear, culture-specific and gender-specific and should target the illiterate [*7*].

We did not find any significant association between smoking and place of residence, unlike a study of female students in Riyadh; this might be attributed to sample differences and to the nature of co-morbid disorders [*11*]. However, early smoking behaviours and poverty along with rural residence have been strongly associated [*17,19*]. Unlike in fragmented nuclear families, joint families are a source of strong social support and a network that can absorb stresses linked to smoking and can help reduce smoking among teenagers and adults.

In our study, one-tenth of smokers were teenagers. These teenagers are likely to progressively develop nicotine addiction and medical diseases and, therefore, are in need of early school-based antismoking education and other relevant programmes [*3,17,18*].

Heavy smokers were more than 50% of our study population. They are probably less motivated to quit and are more harmful to others by spewing second-hand smoke into the air surrounding them. Heavy smokers have more psychomedical diseases like depression, anxiety disorders and psychoses comorbid with medical diseases and, by inference, require intensive smoking cessation help [*2–4,21*].

Of all our smokers, 72% smoked anywhere, suggesting that homes, work and public places are plagued with the second-hand smoke associated with multiple health hazards among passive smokers [*2,5,21*]. By implication, restrictive policies meant to discourage smoking, including increased cigarette taxes and prices, need immediate enforcement [*17,22*].

We considered whether smoking, like alcoholism, has an inheritable component. In our study, 57% of family members were also smokers. In 1999, a review of smoking research indicated that data from family, adoption and twin studies supported a substantial genetic influence on the initiation and maintenance of smoking [*22*].

Gulf countries should produce television programmes similar to those used in effective mass media campaigns that educate viewers about the harmful effects of smoking and its prevention and treatment strategies [*23*]. In our study, 10% to 12% of smokers did not know of the injurious effects of smoking and had no access to media. The number of smokers in our study who unsuccessfully attempted to quit smoking was approximately 2 times higher than in a Canadian report [*24*]. They may need formal smoking cessation programmes, cognitive-behavioural therapies or counselling to motivate them and provide social support and suitable pharmacotherapies [*4,5,8*]. Most smokers expressed a desire to quit, and a great majority wanted to know more about smoking prevention and treatment strategies. A summary of pharmacological and psychosocial therapies is provided in Tables 5 and 6 to inform nurses, GPs, administrators and physicians who want to offer smoking cessation services to smokers [*4,8,25*].

Table 5 **Main pharmacotherapies of smoking**

Pharmacotherapy	Examples	Adverse effects
Nicotine replacement therapies	Nicotine gum, patch, nasal spray, inhalers and lozenges and lobeline	Irritation, coughing, sneezing, rhinitis, sore jaw, skin reactions, insomnia, vivid dreams and nausea
Antagonists	Mecamylamine hydrochloride	Abdominal cramps, constipation, dry mouth and headache
	Naltrexone hydrochloride	Elevated liver enzymes and nausea
Aversive medications	Silver acetate	Argyrism
Nicotine-mimicking medications	Clonidine hydrochloride	Dry mouth, sedation, constipation, rarely hypotension, rebound hypertension and depression
	Anxiolytics including benzodiazepines, non-benzodiazepines and buspirone hydrochloride	Abuse
	Beta-blockers	Various side-effects
Buspirone hydrochloride	Minimal sedation, abuse	
	Antidepressants including bupropion hydrochloride, nortriptyline hydrochloride, doxepin hydrochloride, tryptophan and selective serotonin reuptake inhibitors	Substantial side-effects
	Stimulants like amphetamines and methylphenidate hydrochloride	Abuse potential and other adverse effects
	Anorectics like fenfluramine hydrochloride and phenylpropanolamine hydrochloride	
Sensory replacement	Black pepper extracts, capsaicin, de-nicotinized tobacco, flavourings and regenerated de-nicotinized smoke	
Atypical antipsychotics	(For schizophrenic patients with nicotine addiction)	Substantial adverse effects
Others	Acupuncture	

Table 6 **Nonpharmacotherapies of smoking**

Nonpharmacotherapy	Example
Behaviour–cognitive therapy	Skills training and relapse prevention Stimulus control Aversive therapy Social support Contingency management Cue exposure Nicotine fading Relaxation Physiological feedback
Self-help material	
Educational and supportive group	
Hypnosis	
Exercise	
Family counselling and therapy	
Motivation enhancing interview	
Brief motivational intervention	
Counselling	The 5As or Brief Intervention Method = Ask, Advise, Assess, Assist/aid and Arrange
Biofeedback	
Interpersonal therapy	
Psychodynamic therapy	
Other	

A variety of medical diseases, the majority of which were significantly associated with smoking, were found in 88.6% of smokers. Non-smokers were significantly protected from smoking-related medical diseases with the exceptions of central nervous system and surgical diseases. The multiple co-morbidity of alcohol abuse, smoking and physical disorders enhances morbidity and mortality and requires intensive drug and social therapies [*8,25*]. Smoking is a major risk in more than 20 medical diseases, in particular, chest and cardiovascular diseases, that are preventable [*26*]. Notably, smokers hospitalized with medical diseases are highly malleable and motivated to quit with behavioural intervention. Indeed, smoking is a slow suicidal and homicidal killer, and hence, there should be culturally sensitive and effective means to prevent and treat both smoking and addiction worldwide [*2,4,21,27*].

Conclusions

Despite some limitations of our study, we concluded that cigarette smoking is a com-

mon problem among PHC clients. Clients were characterized by certain sociodemographics, co-morbid diseases and patterns of smoking that were somewhat similar to national and international research. Although our study did not directly address what the primary care team of nurses and GPs can do for PHC clients, their roles in smoking prevention and treatment are essentially unequivocal. Besides establishing antismoking clinics in PHC centres, GPs and nurses should offer condensed training courses on smoking prevention and treatment. Finally, in addition to identifying the underlying risk factors in community-based studies, future intervention research should explore the role of psychosocial and drug therapies in the management of tobacco addiction.

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Current and never smokers: differentials in characteristics, knowledge and perceptions

R.M. Youssef,[1] S.A. Abou-Khatwa[1] and H.M. Fouad[1]

المدخنون حالياً ومن لم يدخنوا أبداً: فوارق في الخصائص الديموغرافية والمعارف والمدارك

رندة يوسف، سامية أبو خطوة، هبة فؤاد

الخلاصة: أُجريت دراسة مسح عرضاني المقابلات حول التدخين في الإسكندرية، مصر، للمقارنة بين المدخنين حالياً وبين من لم يدخنوا أبداً. واتضح أنه بين الرجال يكون اختطار استعمال التبغ أعلى بشكل ملحوظ بين المتزوجين، ونسبة الأرجحية 1.74، ولاسيَّما لدى من لا يتمتعون بقسط كافٍ من الثقافة أو بدخل مرتفع. وبالمقابل ورغم قلة عدد المدخنات فإن نسبة من يحمل منهن درجة جامعية هي نسبة مرتفعة، ونسبة الأرجحية لديهنَّ 15.33، أما من لم يدخنوا أبداً فمعارفهم تزيد على معارف المدخنين حول المخاطر التي قد يسببها التدخين (الـحَرَز score الوسطي 25.77 ± 8.3 مقابل 24.96 ± 6.97). كما أن هؤلاء الذين لم يدخنوا أبداً هم أفضل إدراكاً لخطر تعاطي التبغ، ومدى سرعة التأثر بالمخاطر الصحية الناجمة عن ذلك، ومدى فائدة عدم التدخين. وقد أظهر التحليل المتعدد المتغيرات أن من الممكن التنبؤ بشكل مستقل بتعاطي التبغ اعتماداً على السن والعمر والتحصيل الدراسي والمدارك.

ABSTRACT A cross-sectional interview survey of tobacco use was conducted in Alexandria, Egypt, comparing current smokers with never smokers. Among men, the risk of current tobacco use was significantly higher among married participants (OR = 1.74), especially those with low educational or occupational status. In contrast, although few women smoked, tobacco use was significantly higher among those holding a university degree (OR = 15.33). Never smokers were significantly more knowledgeable than current smokers about tobacco-related health hazards. Never smokers had significantly better perceptions of the danger of tobacco use, susceptibility to health-related hazards and the benefits of being tobacco-free. Multivariate analysis revealed that tobacco use is independently predicted by participants' sex, age and educational attainment as well as their perceptions.

Fumeurs actuels et personnes n'ayant jamais fumé : différences dans les caractéristiques démographiques, les connaissances et les perceptions

RESUME Une enquête transversale par entretien sur la consommation de tabac a été réalisée à Alexandrie (Egypte), comparant les fumeurs actuels et les personnes n'ayant jamais fumé. Chez les hommes, le risque de consommation actuelle de tabac était significativement plus élevé chez les participants mariés (OR = 1,74), notamment chez ceux qui avaient un faible niveau d'instruction ou un statut professionnel peu élevé. Par contre, même si peu de femmes fumaient, la consommation de tabac était significativement plus élevée chez celles qui étaient titulaires d'un diplôme universitaire (OR = 15,33). Les personnes n'ayant jamais fumé connaissaient beaucoup mieux les risques pour la santé liés au tabagisme que les fumeurs actuels. Les personnes n'ayant jamais fumé avaient des perceptions significativement meilleures du danger de la consommation de tabac, de la sensibilité aux risques pour la santé liés au tabagisme et des avantages de ne pas fumer. L'analyse multivariée a révélé que la consommation de tabac est prédite indépendamment par le sexe et l'âge des participants, par leur niveau d'études ainsi que par leurs perceptions.

[1]Department of Community Medicine, Faculty of Medicine, University of Alexandria, Alexandria, Egypt.
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Introduction

In many industrialized countries, tobacco use and cigarette consumption have been declining [*1*]. However, data reported by the Eastern Mediterranean Region of the World Health Organization indicated that, in contrast to the other 5 regions, cigarette consumption was not declining in any of the member countries, and in fact the great majority of countries showed a trend towards increasing consumption [*2*].

An Egyptian survey conducted in 1977 revealed that 32.5% of men and 1.5% of women were tobacco users [*3*]. In a survey in Cairo in 1982, the prevalence among men had increased to 39.8% while that of women remained low at 1.0% [*3*]. In fact, Egyptians' demand for tobacco is strongly increasing as tobacco sales grow at a rate of 5% to 10% per year [*4*]. Simultaneously, the average annual per capita cigarette consumption by those aged 15 years and over rose from 730 in 1972 to 1210 in 1992 [*2*]. Expenditure on tobacco imports, which represent 1% of Egypt's total imports, is relatively large and poses a significant burden on the country's economic development [*2*,*5*].

Public surveys illustrating patterns of tobacco use and laying emphasis on factors influencing smoking behaviour have been identified as areas of research priority for developing countries and an important component of the global health research agenda [*6*]. These tobacco surveys should be conducted at a minimum of 5-year intervals to illustrate trends over time [*7*]. Surveys that include broad sectors of the population as well as different age groups can identify populations at risk. Moreover, the assessment of public knowledge and perceptions in respect to tobacco use and its adverse consequences will help in the development of targeted health education programmes. For this purpose, a community-based survey was conducted in Alexandria, Egypt's second largest city and main port, with a population of 3 339 076 in 1996. A previous paper from this survey has reported on the prevalence and age of initiation of smoking among this population [*8*]. This paper compares current smokers with never smokers in respect to demographic characteristics, knowledge of tobacco-associated morbidity and perceptions of tobacco-related health risks, as well as the benefits of staying tobacco-free.

Methods

A community-based survey using cluster sampling was conducted in Alexandria city between May and August 2000, including 2120 subjects aged 15 years and over. Further details of the sampling methods are reported in an earlier paper [*8*].

Questionnaire

Data were collected using a pre-tested, precoded interview questionnaire. Section I recorded the participants' characteristics (age, sex, education, occupation, and marital status), chronic health problems (including hypertension, diabetes, bronchial asthma, ischaemic heart disease and rheumatic heart disease) and level of physical activity. Physical activity was classified into 'sedentary' for absence of any physical activity, 'light' for walking during usual activities, 'moderate' for brisk walking and 'vigorous' if the participant played a sport.

Section II used the WHO core questions for tobacco surveys [*7*] to classify the smoking status of participants as: current smokers, never smokers or ever smokers.

Section III assessed participants' knowledge of tobacco-associated morbidity using 14 questions based on a review of

the literature. Participants were first requested to nominate problems without being prompted, and were then prompted to test their recall. Answers were scored as follows: problem mentioned without being prompted (score 2), problem recalled when prompted (1) and problem neither mentioned nor recalled (0). The total score ranged from 0–28 with higher scores indicating better knowledge (α-reliability = 0.91). Participants were asked to state their source of knowledge about tobacco-related conditions.

Section IV assessed participants' perceptions of tobacco-related risks with a total of 19 questions covering 3 areas of perceptions: danger, susceptibility and benefits. For each question, responses were scored as follows: strongly agree (score 2), somewhat agree (1) and don't agree (0). There were 7 questions about the hazards associated with tobacco use (range of scores 0–14); higher scores indicated a stronger perception of danger (α-reliability = 0.92). Five questions were about the susceptibility of tobacco users to tobacco-associated illnesses (range 0–10); higher scores indicated stronger perception of susceptibility (α-reliability = 0.90). Seven questions asked about the benefits associated with refraining from tobacco use (range 0–14); higher scores on this scale indicated stronger perception of benefits (α-reliability = 0.93).

Data analysis

The data were analysed using *SPSS*, version 8.0 and *Epi-Info*, version 6.04. Data gathered from the cross-sectional survey were analysed using the case–control approach where current smokers represented the cases and never smokers the controls with the aim of identifying risk factors underlying continuing use of tobacco. The mean ± standard deviation (*s*), odds ratio (OR) and the corresponding 95% confidence interval (CI) were computed. The chi-squared and the Student *t*-test were used to test the significance of the results. Tobacco use was modelled as a function of participants' characteristics as well as their knowledge and perceptions.

Results

The total sample was 1162 men and 958 women. Among the men, 48.5% (95% CI: 45.63–51.37) were current smokers compared with 1.5% (95% CI: 0.74–2.26) of women. Current smokers had maintained their habit for nearly 20 years (mean 21.1 ± 1.3 years) with an average daily consumption of 23.2 ± 12.5 cigarettes.

Table 1 shows the demographic characteristics of current smokers compared with those who never smoked. In the surveyed community, men were 71 times more likely to be current tobacco users than were women. A significant linear association was observed between age and current tobacco use ($P < 0.001$). Relative to the youngest age group (15–24 years), the likelihood of current tobacco use increased steadily with increasing age and was nearly 3 times higher among those aged 35 years and older.

A statistically significant association between educational level and tobacco use was observed for both men ($\chi^2_3 = 47.87$, $P < 0.001$) and women ($\chi^2_3 = 18.50$, $P < 0.001$). Among men, a significantly higher percentage of current smokers were illiterate or just able to read and write (51.6%) compared with never smokers (32.1%) (Table 1). Relative to university graduates, those who were illiterate or just able to read and write were 2.62 times more likely to be tobacco users. The risk decreased among those who had accomplished basic (OR = 1.59) or high school education (OR =

Table 1 **Demographic characteristics of participants by smoking status**

Demographic characteristics	Never smokers No.	%	Current smokers No.	%	OR	95% CI
Age (years)	(*n* = 1469)		(*n* = 577)			
15–<25	471	32.1	88	15.2	1.00	
25–<35	372	25.3	127	22.0	1.83	1.35–2.48
35–<45	286	19.5	147	25.5	2.75	2.03–3.72
45–<55	212	14.4	139	24.1	3.51	2.56–4.79
55+	128	8.7	76	13.2	3.18	2.21–4.57
					$\chi^2 = 73.70$, $P < 0.001$	
Sex	(*n* = 1469)		(*n* = 577)			
Women	940	64.0	14	2.4	1.00	
Men	529	36.0	563	97.6	71.46	41.61–122.73
Education						
Men	(*n* = 529)		(*n* = 563)			
Illiterate/read and write	170	32.1	291	51.6	2.62	1.83–3.75
Primary/preparatory	75	14.2	78	13.9	1.59	1.02–2.47
Secondary	180	34.0	126	22.4	1.07	0.73–1.56
University/higher	104	19.7	68	12.1	1.00	
					$\chi^2 = 44.97$, $P < 0.001$	
Women	(*n* = 940)		(*n* = 14)			
Illiterate/read and write	465	49.5	2	14.3	1.00	
Primary/preparatory	147	15.6	2	14.3	3.16	0.44–22.65
Secondary	237	25.2	4	28.5	3.92	0.71–21.57
University/higher	91	9.7	6	42.9	15.33	3.05–77.14
					$\chi^2 = 13.21$, $P < 0.001$	
Occupation[a]						
Men	(*n* = 341)		(*n* = 476)			
Professional/ semiprofessional	68	19.9	62	13.1	1.00	
Skilled/semiskilled	57	16.7	54	11.3	1.04	0.61–1.69
Manual	162	47.5	265	55.7	1.79	1.21–2.67
Others[b]	54	15.9	95	19.9	1.93	1.19–3.12
					$\chi^2 = 12.26$, $P < 0.001$	
Women	(*n* = 109)		(*n* = 7)			
Professional/ semiprofessional	53	48.6	3	42.9	1.92	0.19–19.26
Skilled/semiskilled	22	20.2	3	42.9	4.64	0.45–47.44
Manual	32	29.4	1	14.2	1.00	
Others[b]	2	1.8	0	0		
					$\chi^2 = 0.11$, $P = 0.74$	
Marital status[c]						
Men	(*n* = 400)		(*n* = 530)			
Single[d]	125	31.2	110	20.8	1.00	
Married	275	68.8	420	79.2	1.74	1.27–2.36

Table 1 **Demographic characteristics of participants by smoking status** *(concluded)*

Demographic characteristics	Never smokers No.	%	Current smokers No.	%	OR	95% CI
Women	(*n* = 799)		(*n* = 13)			
Single[d]	151	18.9	3	23.1	1.00	
Married	648	81.1	10	76.9	0.78	0.19–3.60

n = *total number of respondents.*
[a]*Applicable only to those who were employed at the time of the survey.*
[b]*Others include drivers, traders and fishermen.*
[c]*Not applicable to students and those below the age of 18 years.*
[d]*Single includes never married, divorced, separated and widowed.*
χ^2 *= chi-squared for linear trend.*

1.07). The trend of greater tobacco use with lower educational level was significant statistically ($P < 0.001$). The trend was reversed among women ($P < 0.001$), as nearly half the women who were current smokers held a university degree (42.9%). Relative to women who were illiterate or just able to read and write, a 3- to 4-fold increase in the risk of current tobacco use was observed among women who accomplished their basic or high school education whereas it was 15 times higher among those holding a university degree.

Considering those who were employed at the time of the survey, a significant linear association was observed between tobacco use and occupational categories among men ($P < 0.001$) (Table 1). Drivers, traders and fisherman were 1.93 times more likely to be current tobacco users than were professionals and semi-professionals, whereas the risk was 1.79 times among manual labourers and decreased to 1.04 among skilled and semi-skilled workers. On the other hand, no statistically significant difference was observed among women in relation to different occupational categories ($P = 0.74$).

Among men, a significantly higher percentage of current smokers (79.2%) were married than never smokers (68.8%). Married men were 1.74 times more likely to be tobacco users than single men. Among women, those who were married were less likely to be tobacco users than were single women yet this difference was not statistically significant (Table 1).

Significantly more chronic health problems were reported among men who were current smokers (9.6%) than never smokers (5.9%) (Table 2). Indeed, current smokers were 1.70 times more likely to suffer chronic health problems than never smokers. For women, more current smokers (21.4%) reported chronic health problems than did never smokers (6.6%), but this was not significant statistically. Adjusted for sex, current smokers were 1.81 times more likely to endure chronic health problems than never smokers. As regards physical activity, slightly more current smokers reported leading a sedentary life or performing light activity compared with never smokers among men (92.7% versus 90.1%) and women (100.0% versus 97.3%); however, the differences were not significant.

Table 3 shows the proportion of participants who were able to recognize the health problems associated with tobacco use without being prompted. Nearly equal percentages of current smokers and never

smokers knew that tobacco use is associated with a risk of chronic bronchitis and lung cancer among both active and passive smokers and is associated with atherosclerosis, heart diseases and cerebrovascular stroke. On the other hand, significantly more never smokers than current smokers knew that tobacco use is associated with a wide range of carcinomas, namely carcinoma of the larynx, oral cavity, urinary bladder and the female genital system as well as premature death. In addition, significantly more never smokers knew that tobacco use among women is associated with infertility as well as abortion, intrauterine fetal death and low birth weight. On the knowledge scale, the mean score of never smokers (25.77 ± 8.38, range 14–42) was significantly higher than that of current smokers (24.96 ± 6.97, range 14–42) (P = 0.04).

The great majority of current smokers (94.3%) knew that they were endangering the health of others who are exposed to tobacco smoke. Similarly, the majority of never smokers (90.3%) recognized that their health was affected by being exposed to environmental tobacco smoke.

The mass media was the source of knowledge about the health effects of tobacco use for the majority of current smokers (89.7%) and never smokers (93.7%). On the other hand, few of the current smokers (6.8%) and never smokers (3.6%) obtained their knowledge from medical personnel, whereas family mem-

Table 2 **Reported chronic health problems and amount of physical activity by sex and smoking status**

Health problems/ activities reported	Never smokers No.	%	Current smokers No.	%	OR	95% CI
Chronic health problems						
Men	(*n* = 529)		(*n* = 563)			
Yes	31	5.9	54	9.6	1.70	1.05–2.77
No	498	94.1	509	90.4	1.00	
Women	(*n* = 940)		(*n* = 14)			
Yes	62	6.6	3	21.4	3.87	0.83–15.47
No	878	93.4	11	78.6	1.00	
Sex-adjusted values					1.81	1.15–2.94
Physical activity						
Men	(*n* = 529)		(*n* = 563)			
Sedentary/light	477	90.1	522	92.7	1.39	0.89–2.18
Moderate/vigorous	52	9.9	41	7.3	1.00	
Women	(*n* = 940)		(*n* = 14)			
Sedentary/light	915	97.3	14	100.0	0.38	0.05–8.09
Moderate/vigorous[a]	25	2.7	0	0	1.00	
Sex-adjusted values					1.34	0.86–2.10

n = *total number of respondents.*

[a]*An arbitrary 1 was added to the empty cell for the calculation of OR.*

bers and acquaintances were the source of knowledge for the remaining proportion.

Never smokers had significantly higher mean scores than current smokers on the scales measuring their perceptions of the danger associated with tobacco use ($P < 0.001$), the susceptibility of tobacco users to tobacco-related illnesses ($P < 0.001$) and the benefits associated with not starting or giving up tobacco use ($P < 0.001$) (Table 4).

Tobacco use was modelled as a function of participants' characteristics as well as their knowledge and perceptions (Table 5). The characteristics included were: age, sex, education, marital status, existing health problems and level of physical activity (occupation was excluded from the model as it is related to educational attainment and it would have reduced the number of participants). The model revealed that the independent predictors of continuous use of tobacco were: male sex, older age, illiteracy, low perceptions of the benefits of staying tobacco-free and low perceptions of the susceptibility of tobacco users to health-related illnesses. This model correctly classified 82.8% of the participants.

Table 3 **Unprompted knowledge of participants about adverse health effects of tobacco by smoking status**

Health effects recognized without prompting	Never smokers (n = 1469)		Current smokers (n = 577)		χ^2_1-value	P-value
	No.	%	No.	%		
Chronic bronchitis	1049	71.4	408	70.7	1.00	0.754
Lung cancer	849	57.8	308	53.4	3.29	0.070
Chronic bronchitis in passive smokers	773	52.6	304	52.7	0.00	0.979
Heart disease	778	53.0	285	49.4	2.11	0.146
Atherosclerosis	711	48.4	255	44.2	2.94	0.086
Lung cancer in passive smokers	615	41.9	223	38.6	1.77	0.183
Laryngeal cancer	536	36.5	176	30.5	6.54	0.011
Cerebral stroke	381	25.9	151	26.2	0.01	0.914
Cancer of oral cavity	342	23.3	98	17.0	9.73	0.002
Bladder cancer	335	22.8	95	16.5	10.03	0.002
Cancer of female genital tract	291	19.8	78	13.5	11.09	0.001
Infertility in women	267	18.2	71	12.3	10.35	0.001
Premature death	232	15.8	67	11.6	5.80	0.016
Abortion, intrauterine fetal death and low birth weight	220	15.0	56	9.7	9.86	0.002

n = *total number of respondents.*

Table 4 **Means scores on perceptions of risks of tobacco use by smoking status**

Risks perceived	Never smokers (*n* = 1469) Mean score ± *s*	95% CI	Current smokers (*n* = 577) Mean score ± *s*	95% CI	*t*-value	*P*-value
Dangers of smoking	12.84 ± 2.14	12.74–12.95	9.64 ± 3.45	9.36–9.93	25.29	< 0.001
Susceptibility to illness	9.14 ± 1.64	9.06–9.22	6.85 ± 2.38	6.66–7.05	25.94	< 0.001
Benefits of not smoking	12.85 ± 1.93	12.73–12.96	9.54 ± 3.41	9.26–9.82	24.73	< 0.001

s = *standard deviation.*

Discussion

Tobacco surveys are important tools for identifying key issues and target groups, monitoring progress over time and placing tobacco control on the public agenda [*9*]. The prevalence of smoking from this survey has already been reported in more detail [*8*]; nearly half of the men (48.5%) were current smokers compared with only 1.5% of women. The current rate is suggestive of an increasing trend of smoking prevalence among men [*3*].

Table 5 **Independent predictors of tobacco use**

Independent predictor	Coefficient	SE	Adjusted OR	95% CI	*P*-value
Age (years)					
15–24[a]					
25–34	0.5840	0.1978	1.79	1.22–2.64	0.003
35–44	1.0216	0.2034	2.78	1.86–4.14	< 0.001
45–54	1.1818	0.2107	3.26	2.16–4.93	< 0.001
55+	0.7197	0.2428	2.05	1.28–3.31	0.003
Sex					
Women[a]					
Men	4.0309	0.2839	56.31	32.28–98.24	< 0.001
Education					
University/higher[a]					
Illiterate/read and write	0.4311	0.2024	1.54	1.03–2.28	0.033
Primary/preparatory	0.0006	0.2488	1.00	0.61–1.63	0.998
Secondary	0.0673	0.2142	1.06	0.70–1.63	0.753
Perception scales					
Perception of benefits	–0.1743	0.0537	0.84	0.75–0.93	0.001
Perception of susceptibility	–0.1501	0.0744	0.86	0.74–0.99	0.044

[a]*Reference category.*
SE = standard error.

This study as well as others [*10–12*] has shown higher tobacco use among men who are currently married. Tobacco use by parents or future parents increases the risk of smoking among children as their attitudes towards smoking are influenced by their parents' behaviour [*13–15*]. More importantly, exposure to smoking is a hazard to all household inhabitants as it increases the risk of acute respiratory diseases and asthma among children [*1,16,17*] as well as lung cancer, late asthma and ischaemic heart diseases among adults [*18,19*].

Social class, measured by participants' educational attainment and occupational category, significantly predicted current tobacco use. Among men, the risk of current tobacco use increased progressively with decreasing occupational rank and educational attainment. Eisner et al. pointed to educational attainment as the most potent predictor of smoking among the general population [*20*]. Similar associations between educational attainment and smoking prevalence were reported from Europe [*21,22*], the USA [*16*] and Mauritius [*23*] while a reversed association was reported from Saudi Arabia [*10,11*]. It has been observed that when antismoking campaigns take effect, prevalence rates tend to fall among the better educated, resulting in a higher prevalence among the lower socioeconomic groups, with a widening gap over time [*7*]. The fact that tobacco use by women is mostly among the highly educated matches with the evolution of tobacco use in industrialized societies. At the beginning of the epidemic, when the overall prevalence among women was low, as in the present case, the habit was first adopted by the more affluent and educated, usually in large cities [*13*].

The fact that tobacco use starts during adolescence is undisputed [*13,24*], yet our findings provide substantial evidence that increasing current age of participants independently predicts continuing use. It is likely that after many years of smoking, users become strongly dependent on their drug [*9*]. Also, many long-term smokers may lack the motive to quit because they may believe that they are no longer susceptible to the risk of tobacco-related disease after surviving smoking for many years, whereas others may believe that any damage that may have accrued is irreversible [*17*]. In this study, more current tobacco users than never smokers reported chronic ailments that may have been caused by smoking. However, those who are disease-free can still benefit by giving up the habit as the benefits of cessation extend to quitting even at older ages [*17*].

Surveys of public knowledge about tobacco use and the associated health hazards are essential for revealing gaps in knowledge and are important tools for the planning and evaluation of educational campaigns. In this respect, both prompted awareness and unprompted knowledge were verified. Prompted responses that reflect recognition may be useful for testing the impact of new education or communication campaigns whereas unprompted responses reflect knowledge that is more likely to influence behaviour [*9*]. Previous knowledge surveys [*13,25,26*] have demonstrated that users of tobacco products are less knowledgeable about the health risks of smoking than those who remain tobacco-free and our survey is no exception to these findings. Both current smokers and never smokers recognized the risk of cardiovascular and cerebrovascular accidents as well as respiratory illnesses. This is expected, as these are the major health issues commonly addressed by antismoking educational activities. In contrast, current smokers were much less aware that the adverse effects of tobacco use extend to malignancy in other organs, prema-

ture death, infertility and poor pregnancy outcomes. This lack of awareness could be attributed to a denial mechanism, as cancer and premature death are highly feared. Unfortunately, smokers also tend to attribute positive qualities to smoking, including attractiveness, a masculine appearance and sophistication [*26*], and refuse to admit the danger it carries [*25*,*26*]. The hazards of tobacco use, susceptibility of users and the benefits of being tobacco-free were poorly perceived by current smokers in the present survey. Indeed, it was individuals' perceptions, rather than their knowledge, that independently predicted continuing tobacco use. This is not surprising, as beliefs are a more lasting and more powerful influence on behaviour than merely having knowledge. However, most theories of behaviour assume that knowledge is necessary for shaping an individual's perceptions and attitudes.

It is evident that public education is an important component of anti-smoking campaigns. Health education messages should emphasize the fact that smoking represents the most extensively documented cause of disease ever investigated in the history of biomedical research [*17*]. The health risks of tobacco use may even be underestimated due to the 30 to 40 year lag between initiation and the death that may result [*7*,*16*]. The mass media was the source of relevant knowledge about smoking for about 90% of the interviewed population. Health education messages should definitely consider the cultural background, characteristics of the target groups and level of literacy. It is likely that health messages, which are largely cognitive in nature, mainly affect the behaviour of the highly educated sector of the population [*21*]. A major priority for public health is the development of health education messages tailored to the lower socioeconomic groups, stressing equally the seriousness of the habit and the benefits of remaining tobacco-free.

Despite the low prevalence of smoking among women in our study, women's education should not be overlooked, as their smoking patterns usually mirror those of men after many years' delay. This is particularly likely in view of weakened cultural norms, better education and higher career achievement among women, with subsequent increases in women's spending power. If this occurs, it will undo much of the progress made in health and development of women in developing parts of the world including Egypt [*13*].

There are sound economic reasons for improving health education about smoking in Egypt. Tobacco use results in a global net cost of US$ 200 billion per year, half of this in developing countries. Meanwhile, in developing countries with a per capita gross production of US$ 2000, smoking prevention costs approximately US$ 20–40 per year of life gained. On the other hand, lung cancer treatment, which can prolong the lives of only about 10% of the affected people, costs US$ 18 000 per year of life gained [*5*]. Thus, prevention is among the most cost-effective of all health interventions against smoking-related diseases.

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EMRO's Tobacco Free Initiative (TFI) website

We would like to draw our readers' attention to the Tobacco Free Initiative (TFI) website of the WHO Regional Office for the Eastern Mediterranean. This site provides a wealth of information on TFI which is a WHO cabinet project created to focus international attention, resources and action on the global tobacco pandemic that kills nearly 5 million people a year. Included on the site is information on numerous aspects of TFI such as: the Framework Convention on Tobacco Control which is the flagship of WHO's efforts to control tobacco; Religion and tobacco; Legislation; TFI events; EMR country profiles; Press material; Key areas and groups; Tobacco industry's activities; and Partners involved in TFI. The site can be accessed free at: http://www.emro.who.int/tfi/tfi.htm

Hyperhomocysteinaemia, hyperlipidaemia and risk of venous thromboembolism in Shiraz

A. Zamani,[1] G.R. Omrani [2] and K.B. Lankarani[1]

فرط هوموسيستئين الدم وفرط شحميات الدم واختطار الانضمام الوريدي الخثاري في شيراز، الجمهورية الإيرانية الإسلامية

علي زماني، غلامحسين رنجبر عمراني، كامران باقري لنكراني

الخلاصة: لتقييم اختطار الانصمام الوريدي الخُثاري المرافق لفرط هوموسيستئين الدم وفرط شحميات الدم، أجرينا دراسة للحالات والشواهد، وقمنا بقياس مستوى الهوموسيستئين والغليسريدات الثلاثية والكوليستيرول لدى 43 مريضاً مصاباً بانصمام وريدي خُثاري ولدى 43 مريضاً شاهداً. وقد وُجد أن وسطي مستوى الهوموسيستئين كان أعلى بشكل واضح لدى مجموعة الاختبار، وقد كانت نسبة الأرجحية للإصابة بالانصمام الوريدي الخُثاري في المصابين بفرط هوموسيستئين الدم 2.7، مع ترابط بشكل أوضح لدى النساء ولدى الذين تقل أعمارهم عن 50 عاماً. أما نسبة الأرجحية لمن كان لديهن فرط والغليسريدات الثلاثية وفرط الكوليستيرول، فقد كان أكبر بشكل ملحوظ لدى مَنْ هم دون 50 عاماً. يتبيّن من ذلك أن فرط هوموسيستئين الدم من عوامل الاختطار الهامة بين الإيرانيين، وأنه قد لوحظ ازدياد في اختطار الخُثار الوريدي بين من تقل أعمارهم عن 50 عاماً ممّن يعانون من نوعَيْ اضطرابات الشحميَّات معاً (أي فرط الكوليستيرول والغليسريدات).

ABSTRACT To assess the risk of venous thromboembolism (VTE) associated with hyperhomocysteinaemia (hyper-Hcy) and hyperlipidaemia, we performed a case–control study. Fasting total homocysteine (Hcy), triglyceride and cholesterol levels were assessed in 43 patients with VTE and 43 controls. Mean Hcy level was significantly higher in the test group. Odds ratio (OR) for VTE in patients with hyper-Hcy was 2.7, with the association stronger in women and those under 50. The OR for those with both hypertriglyceridaemia and hypercholesterolaemia was significantly greater in those under 50. Increased risk for venous thrombosis was found among those under 50 having both lipid abnormalities.

L'hyperhomocystéinémie, l'hyperlipidémie et le risque de thromboembolie veineuse à Chiraz (République islamique d'Iran)

RESUME Nous avons réalisé une étude cas-témoins afin d'évaluer le risque de thromboembolie veineuse associé à l'hyperhomocystéinémie et à l'hyperlipidémie. Les taux d'homocystéine totale, de triglycérides et de cholestérol à jeun ont été mesurés chez 43 patients présentant une thromboembolie veineuse et chez 43 témoins. Le taux moyen d'homocystéine était significativement plus élevé dans le groupe expérimental. Le risque relatif de thromboembolie veineuse chez les patients atteints d'hyperhomocystéinémie était de 2,7 ; l'association était plus forte chez les femmes et les personnes de moins de 50 ans. Le risque relatif pour ceux qui présentaient à la fois une hypertriglycéridémie et une hypercholestérolémie était significativement plus élevé chez les moins de 50 ans. Un risque accru de thrombose veineuse a été constaté chez les moins de 50 ans porteurs des deux anomalies lipidiques.

[1]*Department of Internal Medicine, Shiraz University of Medical Sciences, Shiraz, Islamic Republic of Iran.*
[2]*Endocrine and Metabolism Research Centre, Nemazee Hospital, Shiraz, Islamic Republic of Iran.*
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Introduction

Most case–control studies have suggested that hyperhomocysteinaemia (hyper-Hcy) is a risk factor for venous thromboembolism. Also, hyperlipidaemia is implicated in the development of venous thrombosis. To assess the risk of venous thromboembolism (VTE) associated with these factors in our population, we performed a case–control study.

The development of venous thrombosis is a dynamic and multifactorial process. Conventional risk factors such as surgery do not account for all cases, and only a fraction of those with these risk factors develop VTE [*1–3*]. There is considerable epidemiological evidence from retrospective studies linking mild to moderate hyper-Hcy and VTE, however, no prospective study has demonstrated such a relationship except for idiopathic VTE in men [*4*]. The controversy surrounding the role of hyperlipidaemia in the development of VTE is even more prominent [*5*], and may be related to the small number of studies that have been carried out up to now.

In our study, we evaluated the relationship between mild to moderate hyper-Hcy and VTE in hospitalized patients, considering the possible genetic differences between the general population of the Islamic Republic of Iran and other populations. We also investigated the relationship between hyperlipidaemia and VTE.

Methods

In a case–control study, all patients diagnosed with VTE and subsequently admitted to hospitals affiliated to the University of Shiraz were invited to take part in this study, which was conducted from May to September 2001. Overt cancer, history of atherosclerosis, known inherited or acquired hypercoagulable states and abnormal renal function tests were exclusion criteria. None of the cases were using vitamin supplements.

VTE was diagnosed by the following methods:

- for deep vein thrombosis, duplex ultrasonography;
- for pulmonary embolism, combination of compatible medical presentation, echocardiography and ventilation-perfusion scan;
- for clot in the inferior vena cava, Doppler sonography or computed tomography with venous phase contrast.

We matched each of the 43 cases in the study group to one control according to both sex and age within 5 years. Controls were randomly selected from a large sample of healthy adults who were participating in an ongoing national osteoporosis risk survey in Shiraz, Iran. No specific medical history, including history of VTE or vitamin supplementation was available for controls. After fasting for 10 hours, two separate blood samples were collected from each subject, one of them anticoagulated with EDTA. The plasma and serum were separated within one hour of venepuncture and frozen and stored at –20 °C until time of analysis.

Plasma total homocysteine (Hcy) was assessed by enzyme immunoassay (DRG Instruments GmbH, Marburg, Germany) essentially according to the method of Frantzen et al [*6*]. Serum triglycerides and cholesterol were measured by an enzymatic colorimetric method [*7,8*].

We used the *t*-test for comparing the mean values of plasma total Hcy, serum triglycerides and cholesterol of patients and controls. A two-sided *P*-value of less than 5% was considered statistically significant. The cut-off point for defining hyper-Hcy

was the upper limit of the laboratory reference range (15 µmol/L). Hypertriglyceridaemia and hypercholesterolaemia are defined as a fasting serum level ≥ 200 mg/dL [*9*]. Conditional and unconditional logistic regression analyses for matched and unmatched data respectively were used for calculating the crude odds ratio (OR) as estimates of relative risk. Data were analysed using *SPSS*, version 9 and *Egret* software (Egret Software Corporation, Seattle, Washington).

Results

The characteristics of the patients and controls are shown in Table 1. The mean ages of the patients and the controls were 47.1 (range 16–89) years and 45.2 (range 19–86) years respectively. Sex distribution was equal in both groups.

Most cases had deep-vein thrombosis of the lower extremities (88.4%). A minority of them had pulmonary embolism (4.7%), deep-vein thrombosis of upper extremities (4.7%) or clot in the inferior vena cava (2.3%). For the majority of cases (79.1%) we found one or more predisposing factors, including minor events such as a prolonged trip and minor surgery [*10*].

In the 43 cases, the mean (± standard deviation) total Hcy level was significantly higher than for the controls (20.2 ± 6.3 µmol/L versus 17.0 ± 5.7 µmol/L respectively, $P = 0.015$). The difference in mean serum triglyceride between cases and controls was not statistically significant (144.5 ±76.5 mg/dL versus 161.6 ± 90.5 mg/dL respectively, $P = 0.29$). The cholesterol level was significantly higher in the control group compared with the patient group (205.3 ± 46.6 mg/dL versus 182.1 ± 55.1 mg/dL respectively, $P = 0.026$) (Table 1).

Thirty-four patients (79.1%) had fasting total Hcy level above the cut-off point of 15 µmol/L compared with 25 (58.1%) in the control group (OR 2.70, 95% CI: 1.10–7.10). For patients aged below fifty years the OR was 3.60 (95% CI: 1.10–11.25) while for those aged 50 and over it was lower (OR = 1.60, 95% CI: 0.20–11.30). The OR for women was higher than for men (4.20, 95% CI: 1.00–17.30 versus 1.90, 95% CI: 0.50–6.97). The calculated ORs for these and other subgroups are shown in Table 2.

In the control group we determined the 90th percentile of distribution of Hcy measurements as 24.2 µmol/L, and redefined hyper-Hcy as anything above this. From the analysis of data using this cut-off point we obtained an OR of 2.53 (95% CI: 0.73–9.14) (Table 2).

When we stratified the Hcy measurements of both patients and controls into quartiles and calculated OR for thrombosis in the patients at the three highest levels as compared with those at the lowest level [*11*], the risk of thrombosis increased gradually with increasing Hcy concentrations (Table 3).

Eleven (25.6%) patients had hypertriglyceridaemia compared with 9 (20.9%) in the control group. The OR was 1.30 (95% CI: 0.47–3.55). Although the calculated ORs for women (2.46, 95% CI: 0.51–11.80) and those < 50 years (2.42, 95% CI: 0.63–9.30) showed a trend toward increased risk, they were not statistically significant (Table 4).

Hypercholesterolaemia was seen in 16 (37.2%) patients but in 23 (53.5%) controls. The computed OR was 0.52 (95% CI: 0.22–1.22). In subgroup analysis, no significantly increased risk was detected (Table 4).

Table 1 **Characteristics of cases and controls**

Characteristic	Cases (*n* = 43)	Controls (*n* = 43)
Age, years (mean ± *s*)	47.1 ± 18.1	45.2 ± 16.9
Age range, years	16–89	19–86
Female:male ratio	24:19	24:19
Recurrent venous thromboembolism, No. (%)	7 (16.3)	NA
Predisposing factors for venous thromboembolism, No. (%)	34 (79.1)	NA
Trauma, No. (%)	7 (16.3)	NA
Immobilization, No. (%)	9 (20.9)	NA
Estrogen related[a], No. (%)	6 (14.0)	NA
Recent surgery, No. (%)	1 (2.3)	NA
Previous deep-vein thrombosis, No. (%)	2 (4.7)	NA
Minor events,[b] No. (%)	9 (20.9)	NA
Fasting plasma total homocysteine, µmol/L (mean ± *s*)	20.2 ± 6.3	17.0 ± 5.7
Fasting serum triglycerides, mg/dL (mean ± *s*)	144.5 ± 76.5	161.6 ± 90.5
Fasting serum cholesterol, mg/dL (mean ± *s*)	182.1 ± 55.1	205.3 ± 46.6

[a]*Using oral contraceptive pill or estrogen, pregnancy and postpartum period.*
[b]*Minor surgery, prolonged trip or sitting.*
NA = not applicable.
s = *standard deviation.*

Finally, 10 (23.3%) patients had both abnormally high levels of triglyceride and cholesterol compared with 7 (16.3%) of the 43 controls with OR of 1.60 (95% CI: 0.50–4.60). In subgroup analysis OR of 5.30 (95% CI: 1.004–27.70) for those < 50 years and 2.46 (95% CI: 0.50–11.80) for female patients were computed (Table 4).

Discussion

This case–control study identified hyper-Hcy as a risk factor for VTE in the general Iranian population, a finding seen when we used either the upper reference laboratory value or the 90th percentile of the control group as the cut-off point. The prevalence of mild to moderate hyper-Hcy is estimated to be 5%–7% in the general population [*12–14*] and even higher in the older population [*15*]. These facts, in addition to a high prevalence of VTE, its lethality and the magnitude of resources needed for detection, treatment and prevention of VTE, make our finding (OR = 2.6–2.7) more clinically significant.

In addition, we found a higher OR for those in the younger age group compared

Table 2 **Odds ratios for thrombosis associated with hyperhomocysteinaemia, according to age and sex**

Age group	Odds ratio (95% CI)	
	Hcy level > 15.00 µmol/L[a]	Hcy level > 24.20 µmol/L[b]
< 50 years		
Men	1.87 (0.39–9.01)	1.64 (0.23–11.70)
Women	7.50 (1.31–43.03)	1.65 (0.23–11.99)
Both sexes	3.60 (1.10–11.25)	1.64 (0.40–6.63)
≥ 50 years		
Men	2.25 (0.20–29.77)	NC
Women	1.00 (0.05–20.83)	NC
Both sexes	1.60 (0.20–11.30)	NC
All ages		
Men	1.90 (0.50–6.97)	2.89 (0.50–16.67)
Women	4.20 (1.00–17.30)	2.27 (0.36–14.18)
Both sexes	2.70 (1.10–7.10)	2.58 (0.73–9.14)

[a]*Upper limit of laboratory reference range.*
[b]*90th percentile of control distribution.*
CI = confidence interval.
NC = could not be calculated due to missing data.

with the older individuals. This was compatible with observations of the other studies generally [*1*], and specifically with the fact that homocystinuria presents with early onset thromboembolic events [*12*].

To explore the possibility of a dose–response relationship, we stratified the patients and controls according to their Hcy concentrations. An increasing OR with increasing Hcy concentration was observed. As with cholesterol in the pathogenesis of atherosclerosis, a graded response rather than a threshold effect may also be possible for hyper-Hcy in the genesis of arterial and venous thrombosis, [*16–19*] although at least one study showed a different inference [*20*].

Table 3 **Odds ratios for thrombosis according to plasma homocysteine level**

Homocysteine level (µmol/L)	Cases No. (*n* = 43)	Controls No. (*n* = 43)	Odds ratio (95% CI)
< 15	9	18	1[a]
15–19	12	14	1.71 (0.56–5.20)
20–23	11	6	3.67 (1.02–13.10)
> 23	11	5	4.40 (1.17–16.57)

[a]*Reference category, odds ratio = 1.*

Table 4 **Odds ratios for thrombosis associated with different classes of hyperlipidaemia according to age and sex**

Age group	Odds ratio (95% CI)		
	Hypercholesterolaemia[a]	Hypertriglyceridaemia[b]	Both[c]
< 50 years			
Men	0.74 (0.16–3.39)	1.00 (0.16–6.10)	3.50 (0.30–39.10)
Women	1.00 (0.20–4.67)	7.50 (0.73–76.80)	7.50 (0.70–76.80)
Both sexes	0.86 (0.29–2.51)	2.42 (0.63–9.30)	5.30 (1.004–27.70)
≥ 50 years			
Men	0.07 (0.01–0.80)	0.58 (0.07–4.60)	0.26 (0.02–3.06)
Women	0.50 (0.05–5.15)	0.40 (0.02–6.17)	0.40 (0.03–6.20)
Both sexes	0.20 (0.04–0.91)	0.50 (0.09–2.62)	0.30 (0.05–1.90)
All ages			
Men	0.33 (0.10–1.13)	0.79 (0.20–3.04)	1 (0.22–4.56)
Women	0.81 (0.23–2.90)	2.46 (0.51–11.80)	2.46 (0.50–11.80)
Both sexes	0.52 (0.22–1.22)	1.30 (0.47–3.55)	1.60 (0.50–4.60)

[a]*Cholesterol ≥ 200 mg/dL.*
[b]*Triglycerides ≥ 200 mg/dL.*
[c]*Cholesterol ≥ 200 mg/dL and triglycerides ≥ 200 mg/dL.*
CI = confidence interval.

It is also important to address the potential strengths and limitations of our study. We used enzyme immunoassay (EIA) for determining the Hcy level instead of high-pressure liquid chromatography (HPLC). Although HPLC is a very precise method, it is expensive, time consuming and needs trained staff and special facilities which are not available everywhere. Moreover, recent studies have confirmed the precision and reliability of EIA for measuring Hcy levels [*6,21,22*], with some studies favouring EIA over HPLC for use in the clinical laboratory [*21*]. So our results are comparable with those that would be obtained by HPLC. We could not exclude the possibility of the presence of other established inherited thrombophilia and calculate the risk in their absence or presence to explore the independence of hyper-Hcy as a causative factor in VTE. We did not take into account vitamin deficiency or vitamin supplementation, factors known to affect Hcy levels. Vitamin supplementation is not frequently used in our country, fruits and vegetables are preferred, however, lack of vitamin supplementation may explain the higher level of Hcy found in our healthy control group compared with those obtained for the United States of America and Western European countries [*12,13*]. In our study, confounding variables such as the presence of overt malignancy or renal failure were excluded, a correction which has not been done in most studies.

We did not have any information on the occurrence of a previous VTE or atherosclerotic event in our control group or their renal function status. The presence of any such factors would lead to an underestimation of true risks.

Several lines of evidence suggest that Hcy level has a cause and effect relationship with venous thrombosis and is not simply a marker for another risk factor

[*12*]. Endothelial dysfunction has been implicated as the major underlying mechanism by which Hcy exerts its deleterious effect [*23*]. It may be caused by oxidative damage promoted by Hcy [*23*], loss of antithrombotic function of endothelium by enhancing the activities of coagulant factors [*24*,*25*] or depressing the levels of heparan sulfate [*26*] and thrombomodulin [*27*] and impairing the production of nitric oxide as a relaxing factor for both conduit and resistance vessels [*28*].

Our findings in this retrospective study do not support the hypothesis that hyperlipidaemia plays a role in the pathogenesis of VTE. No significant difference in the risk of developing the condition was seen between those with and those without hyperlipidaemia, although those who were younger than 50 years showed a significantly increased risk of developing VTE in the presence of both hypercholesterolaemia and hypertriglyceridaemia.

Kawasaki et al., in two separate case–control studies, showed the interrelation between hyperlipidaemia and hypercholesterolaemia among an Asian population [*29*,*30*]. In their prospective study, Goldhaber and colleagues found no associated increased risk for pulmonary embolism in the presence of hypercholesterolaemia [*31*]. Evaluating risk factors for VTE among women, McColl et al. observed a lower cholesterol level among cases versus controls [*32*]. The small number of these studies, in addition to their conflicting results, mandates more deliberation.

There are several sources of bias in the current study, one of them being the collection of specimens from our patients during hospital treatment, as we could not assure continuous follow-up out of hospital. Specimen collection remote from the initial VTE event may be important, since cholesterol is known to decrease in the presence of acute vascular events such as myocardial infarction or VTE [*33*,*34*], potentially introducing a negative confounding effect between VTE and cholesterol. On the other hand, stressful events such as myocardial infarction may increase the triglyceride level [*33*] (even up to 1 year after the event), thus exerting a positive confounding effect between triglyceride and VTE.

In summary, we found that hyper-Hcy may be a risk factor for VTE in the general population of the Islamic Republic of Iran, similar to populations of the United States and Western European countries. A similar finding was not seen for hyperlipidaemia except for a significantly increased risk for younger patients with both lipid abnormalities. Unlike the other thrombophilic disorders, a simple, safe therapy using pyridoxine, folic acid and vitamin B12 is available for hyper-Hcy [*35*]that may prove effective in the primary and secondary prevention of VTE in future studies. Due to the benign nature of this therapy, it can be offered to those with VTE and hyper-Hcy, while waiting for more evidence from further clinical trials.

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Profile of acute poisoning cases presenting to health centres and hospitals in Oman

S.B. Lall,[1] S.S. Al-Wahaibi,[1] M.M. Al-Riyami,[1] and K. Al-Kharusi[1]

مُرْتَسَم حالات التسمُّم الحاد في المراكز الصحية والمستشفيات في عُمان

شيام بالا لال، سالم سيد الوهيبي، مطر محكوم الريامي، خالد الخاروسي

الخلاصة: استخدمت استمارات مبسَّطة معدَّة لدراسة استعادية لحالات التسمُّم في 45 من المؤسسات في عُمان خلال الفترة بين كانون الثاني/يناير وكانون الأول/ديسمبر 2000. ولم يتم تسجيل أية وفاة ضمن 2009 حالة من التسمُّم الحاد. وكان ربع الحالات (أي ما يعادل 55.8٪ من حالات الأطفال) لدى أطفال تتراوح أعمارهم بين 1–4 سنوات. وكانت أعلى نسبة بين فئات التسمُّم (59.5٪) ناجمة عن عضَّات الحيوانات ولسعات الحشرات؛ منها 25.4٪ لم يتم تشخيصها بالضبط و19.7٪ من لسعة العقرب، 7.6٪ من لسعة النحل أو العناكب أو الزنابير و6.8٪ من لدغات الثعابين. أما المجموعة التالية من حيث نسبة الحدوث (38.5٪) فتتمثَّل في ابتلاع بعض المواد الخطرة: منها 18.2٪ من المستحضرات الصيدلانية، و8.2 من الأطعمة و4.7٪ من المنتجات المنزلية. وقد نجمت معظم الحالات المرتبطة بالأدوية عن الباراسيتامول، الذي يعد مسؤولاً عن معظم إحالات المصابين بالتسمم إلى مستشفيات الرعاية الثالثية. وشكَّلت محاولات الانتحار 6.0٪ من إجمالي الحالات ويوصي الباحثون بضرورة جمع المعطيات المتعلقة بالتسمم في سجل مركزي، لتنفيذ برامج وقائية في المستقبل وتقييمها.

ABSTRACT A simple pro forma was used for a retrospective study of poisoning cases at 45 health institutions in Oman during January–December 2000. No deaths were recorded among 2009 cases of acute poisoning. A quarter of all cases (55.8% of paediatric cases) were children aged 1–4 years. The largest category (59.5%) was animal bites and stings: 25.4% undiagnosed, 19.7% scorpion stings, 7.6% bee, spider or wasp stings and 6.8% snake bites. Next highest (38.5%) was ingestion of substances: 18.2% pharmaceuticals, 8.2% food and 4.7% household products. Most drug-related cases were due to paracetamol. Suicide attempts were recorded for 6.0%. Collection of poisoning data through a central registry system is needed for the implementation and future assessment of prevention programmes.

Profil des cas d'intoxication aiguë se présentant dans les centres de santé et les hôpitaux à Oman
RESUME Un simple formulaire type a été utilisé pour une étude rétrospective des cas d'intoxication dans 45 établissements de santé à Oman de janvier à décembre 2000. Aucun décès n'a été enregistré parmi les 2009 cas d'intoxication aiguë. Un quart de tous les cas (55,8 % des cas pédiatriques) concernait des enfants âgés de 1-4 ans. La catégorie la plus importante (59,5 %) était celle des morsures d'animaux et des piqûres : non diagnostiquées 25,4 %, piqûres de scorpions 19,7 %, piqûres d'abeilles, d'araignées ou de guêpes 7,6 % et morsures de serpents 6,8 %. La catégorie qui venait tout de suite après (38,5 %) était l'ingestion de substances : produits pharmaceutiques 18,2 %, denrées alimentaires 8,2 % et produits ménagers 4,7 %. La plupart des cas d'intoxication associée à des médicaments étaient dus au paracétamol. Les tentatives de suicide concernaient 6,0 % des cas. Le recueil de données sur les intoxications au moyen d'un système de registre central est nécessaire pour la mise en œuvre de programmes de prévention et leur évaluation future.

[1]Directorate of Environmental Health and Malaria Eradication, Ministry of Health, Muscat, Oman.
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Introduction

Poisoning is an important health problem in every country of the world. Occupational exposure to industrial chemicals and pesticides, accidental or intentional exposure to household and pharmaceutical products and poisoning due to venomous animals, toxic plants and food contamination, all contribute to morbidity and mortality. However, the magnitude of the problem, the circumstances of exposure and the types of poisoning vary from country to country. The variables include the degree of industrialization and urbanization, the type of agricultural activities and the available medical facilities and expertise to prevent and manage toxic exposures.

The health impact of chemical exposures and poisoning is well recognized in most industrialized countries, where chemical safety and poison control programmes are established. The Toxic Exposure Surveillance System (TESS) data, compiled by the American Association of Poison Control Centers, for example, provides evidence about toxic exposures and subsequent health effects throughout the United States, and is utilized to identify emerging hazards, to focus prevention and education programmes and to guide clinical research and training [*1*]. In contrast, most developing countries have not yet fully recognized the risks posed by chemicals on human health and the environment. One reason is the lack of sound national epidemiological data on toxic exposures and poisoning. Some case studies and hospital-based retrospective and prospective studies have documented poisoning-related morbidity and mortality and the changing trend of chemical exposures [*2–6*]. However, such data remain insufficient to guide decision-makers in developing preventive and management strategies at country level.

The Sultanate of Oman, with a population of 2.4 million, has undergone a rapid economic growth in the last 3 decades, with diversification from an oil-based economy to other industries, agriculture and fishing. In the process, more chemicals and commercial products are being imported and used, thus exposing the population to the increased risk of occupational, accidental and intentional poisoning. This is in addition to the existing risks of poisoning from venomous animals, food contamination, pharmaceuticals and traditional remedies. The data on clinical case registration, compiled in the Ministry of Health (MOH) based on the *ICD-10* system, shows significant morbidity due to poisoning and toxic exposures in every region of the country [*7*]. However, the current system of data collection is inadequate to provide complete epidemiological information. As poisoning is classified with injuries, the data accounts only for accidental exposures. There is no information on the circumstances of exposure, type of chemicals involved and severity of poisoning. A large number of exposures are due to unknown substances. The data do not allow for an assessment of the available diagnostic and treatment facilities and expertise at each health care level.

In view of the high incidence and morbidity due to toxic exposures and growing risk of chemical accidents and environmental contamination in Oman, the country plans to initiate chemical safety and poison control programmes. Sound epidemiological data on the toxic risks is essential for planning the activities of the poison control centre in a rational way. This 1-year retrospective study of poisoning cases was conducted to generate necessary data to help in evidence-based decision-making related to

prevention and management of toxic exposures and poisoning in Oman.

Methods

The Sultanate of Oman is administratively divided into 10 health regions with 59 *wilayat*. Each health region has an upgraded regional hospital and an office of the Directorate General of Health Services to strengthen decentralization of health services. Each region provides primary, secondary and tertiary health care to the population, through primary health centres, extended health centres and secondary and tertiary care hospitals. Four MOH referral hospitals catering to different specialties are located in Muscat, where patients are referred from the regional hospitals. Each *wilayat* hospital provides health services to about 30 000–50 000 people in the region. They have 10–20 inpatient beds with polyclinic facilities. These hospitals are well connected to the regional hospitals for referral and administration. The local hospitals have more bed strength and extended facilities than *wilayat* hospitals. Extended health centres (6/114 health centres) provide 24-hour polyclinic facilities.

The director general of each region was contacted by phone and informed about the aims and objectives of the study and their role in the project. The pro formas were then faxed to the regional office, and further faxed to various health centres and hospitals in the region to supply the necessary information. The follow-up and collection of pro formas was carried out by representative health workers or sanitary inspectors from each region.

Forty-five health institutions were selected to cover primary, secondary and tertiary levels: 4 MOH referral hospitals in Muscat (Royal Hospital, Khoula Hospital, Al Nahdha Hospital and Ibn Sina Hospital), 7 regional hospitals, 3 *wilayat* hospitals, 16 local hospitals, 10 health centres, 3 extended health centres, and 2 other non-MOH referral hospitals (Sultan Qaboos University Hospital and the Armed Forces Hospital).

A simple 1-page database pro forma was prepared to collect information about each poisoning case treated at each institution during the period January–December 2000. The parameters included in the pro forma were: name of the patient, age, sex, type of poison, mode and route of exposure, time since exposure, management outside hospital, presenting symptoms, examination, investigations, treatment and outcome.

The medical officers of all the hospitals were contacted by telephone and were informed about the aims and objectives of the study, their role and responsibility in the project and about the various terms used in the pro forma. In addition, representative health workers or sanitary inspectors from all 10 regions of the country were invited to the Directorate of Environmental Health and Malaria Eradication and were briefed about the importance of data collection and the terms used in the pro forma. These workers helped in the follow-up and collection of pro formas. Representatives at the Royal (the main general referral hospital), Sultan Qaboos and the Armed Forces hospitals were personally contacted and briefed about the study before the pro forma was handed over. A time period of 3 months was allotted for sending back the completed pro formas. When there was no response or incomplete information reminders were sent.

The pro formas received from individual hospitals were analysed and the data was then computed to provide region-wide and nationwide information on the incidence of

poisoning, age and sex of patients, mode and route of exposure, regional variations, and the expertise and facilities available for managing poisoning cases at each health care level.

Results

Data from primary and secondary health care levels

Of 45 health institutions included in the study, 40 sent data about poisoning cases, while 5 reported having no poisoning cases during the study period. Data from 2 hospitals and 1 extended health centre (n = 513 cases) were excluded because of incomplete information. Analysis of the data was made on a total of 2009 poisoning cases during the year.

The age distribution was analysed among the 1569 poisoning cases where the patient's age was specified (440 sheets coded 'A' for adults were excluded). Of these cases, 867 (55.3%) were adolescents and adults aged 13–76 years and 702 (44.7%) children aged 6 months–12 years (Figure 1). Further analysis showed poisoning between the ages 1–4 years constituted 55.8% of the paediatric cases. More of the cases were male than female (936:633, a M:F ratio of 1.5:1), especially among children (445:257). Due to lack of information about the occupation and address of the patients in the submitted pro formas, the rate of poisoning in relation to socioeconomic status, occupational exposure or rural/urban residence, could not be analysed.

The route of exposure was skin contact from bites/stings from venomous animals or insects in 59.5% of the 2009 cases or ingestion of substances in 38.5%. The route of exposure remained unknown in 41 cases (2.0%) (Table 1). Ingestion of substances was recorded as accidental for 32.0%, and intentional (suicidal attempts) for 6.0%.

Poisoning was categorized into 10 types, based on the *ICD-10* with slight modifications. The largest category was poisoning due to unknown animal or insect bites (25.4%), followed by scorpion stings

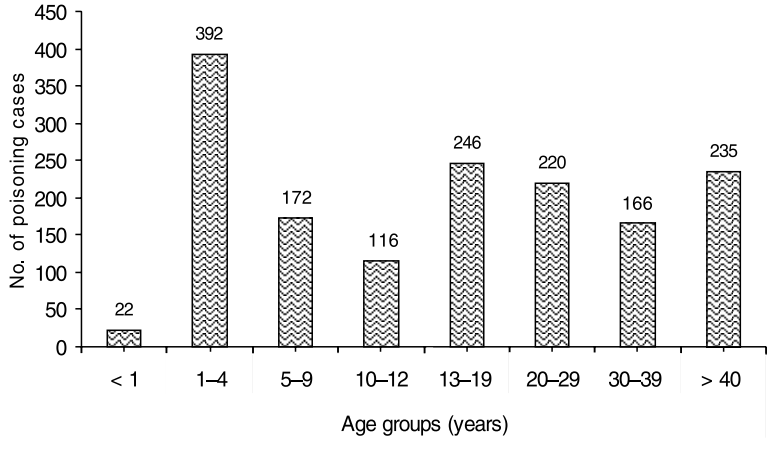

Figure 1 **Age distribution of 1569 poisoning cases**

Table 1 **Total number of poisoning cases and their distribution across 10 regions of Oman**

Type of poisoning	Total cases		No. of cases by region									
	No.	%	Muscat	North Batinah	South Batinah	North Sharqiyah	South Sharqiyah	Dakhliyah	Dhahirah	Musandam	Dhofar	Al-Wusta
Bites/stings												
Unknown animal/ insect bite	510	25.4	20	267	0	35	0	94	43	1	23	27
Scorpion sting	396	19.7	24	18	0	45	0	10	253	46	0	0
Bee/spider/wasp sting	153	7.6	5	1	0	22	0	9	116	0	0	0
Snakebite	136	6.8	25	18	10	18	0	20	9	0	36	0
Substance ingestion												
Pharmaceutical	365	18.2	151	85	0	15	27	45	11	11	18	2
Food	164	8.2	23	72	0	22	6	26	14	0	1	0
Household product	94	4.7	34	10	0	11	0	10	9	0	17	3
Industrial product	59	2.9	10	36	0	0	0	6	5	0	0	2
Kerosene/petrol	53	2.6	14	2	0	11	12	7	3	3	1	0
Pesticide	38	1.9	16	11	2	1	1	2	1	3	1	0
Unknown/other	41	2.0	10	7	0	1	7	9	3	1	2	1
Total	2009	100.0	332	527	12	181	53	238	467	65	99	35

Population of each region (millions): Muscat 0.66, North Batinah 0.42, South Batinah 0.24, North Sharqiyah 0.14, South Sharqiyah 0.17, Dakhliyah 0.27, Dhahirah 0.22, Musandam 0.03, Dhofar 0.23 and Al-Wusta 0.02 [*7*].

(19.7%) and ingestion of pharmaceutical substances (18.2%) (Table 1). Pesticide poisoning was rare (1.9%).

Analysis by age showed that the maximum number of poisonings in adults were for unknown insect bites and stings (30.0%) and scorpion stings (26.0%). The highest proportion of poisonings in children were due to ingestion of pharmaceutical substances (27.0%), whereas only 13.5% of adult cases were due to pharmaceuticals. Of the paediatric cases, food poisoning was recorded in 12.0%, exposure to household products in 8.5% and kerosene in 7.0%, compared with 5.5%, 2.5%, and 0.2% respectively in adults.

The incidence and types of poisonings varied across the 10 regions (Table 1). However, similar types of poisoning cases presented at primary and secondary health care levels in each region, suggesting a role for geographical and climatic factors. For example, the highest incidence of snakebites was recorded in Dhofar region (26.5% of all snakebites) and poisoning due to scorpion stings was extremely high in Dhahirah (63.9% of scorpion stings). Muscat region had the highest number of cases due to poisoning from pharmaceuticals (41.4% of pharmaceutical exposures) and household products (36.2% of household exposures). Insect bites categorized as 'unknown animal/insect bite' were greatest in North Batinah region (52.4% of all unknown bites).

Data from referral hospitals

The Royal Hospital and Sultan Qaboos University Hospital sent complete data on all poisoning cases admitted: 159 and 65 respectively. The other national referral hospitals either had no poisoning cases or a few cases that were computed with the national data reported above.

More of the cases admitted to the Royal Hospital were children than the University Hospital (Table 2): 43% versus 26% in the age 1–4 years, all accidental poisonings.

Table 2 **Demographic data of poisoning cases treated at 2 referral hospitals in Oman**

Variable	Royal Hospital (*n* = 159)		Sultan Qaboos University Hospital (*n* = 65)	
	No.	%	No.	%
Sex				
Male	91	57	32	49
Female	68	43	33	51
Age group (years)				
Adults >13	68	43	43	66
Children <1–13	91	57	22	34
Children 1–4	69	43	17	26
Type of poisoning				
Ingestion of pharmaceuticals	100	63	40	62
Ingestion of pesticide/kerosene/ household and industrial products	36	23	16	25
Bites/stings/other	23	14	9	14

n = *total number of poisoning cases.*

Adult poisonings due to pharmaceuticals were the most common category in both hospitals: 63% in the Royal Hospital and 62% in the University Hospital. Most of these cases were suicide attempts (80% in the Royal, 90% in the University Hospital**)**

The types of drug poisoning in these hospitals are shown in Table 3. Paracetamol poisoning was the most frequent category of drug poisoning with the 30 cases constituting 21% of total pharmaceutical poisonings (*n* = 140). Of these 30 cases, 14 were children and 16 were adults.

Treatment and outcome

Data about the treatment and outcome of poisoning cases suggested that the diagnostic and treatment facilities at primary care level are inadequate. Primary care centres reported administering anti-snake ven-

Table 3 **Pharmaceutical products ingested by poisoning cases treated at 2 referral hospitals in Oman**

Pharmaceutical product	Royal Hospital (*n* = 100)		Sultan Qaboos University Hospital (*n* = 40)	
	No.	%	No.	%
Paracetamol	18	18	12	30
Other NSAID	13	13	0	
Antidepressant	6	6	3	8
Antipsychotic	0	0	2	5
Antiepileptic	5	5	4	10
Anti-anxiety	3	3	2	5
Opioids	3	3	0	0
Antihypertensive	7	7	0	0
β-agonist	2	2	0	0
Anticoagulant	1	1	0	0
Antitussive	2	2	0	0
Antidiabetic	1	1	1	3
Anti-allergic	6	6	3	8
Antispasmodic	3	3	1	3
Antibiotic	2	2	2	5
Hormone	5	5	0	0
Tonic	6	6	0	0
Iron	4	4	6	15
Purgative	3	3	0	0
Skin cream	4	4	0	0
Combined	1	1	3	8
Unknown	5	5	1	0

n = *total number of pharmaceutical poisoning cases.*
NSAID = non-steroidal anti-inflammatory drug.

om and hydrocortisone injections in 90% of the snakebite cases even in the absence of systemic symptoms and positive laboratory findings. Though coagulation profiling was done at some centres, renal function tests were rarely done. The scorpion sting cases were treated by local infiltration of xylocaine and oral administration of antihistamines and analgesics. Blood pressure was rarely measured in these cases. Undiagnosed cases of insect bites were treated as scorpion stings.

Gastric lavage was carried out at both primary and secondary care levels for all cases of gastric poisoning, including kerosene ingestion. Activated charcoal and antidotes were usually not available at primary care level. Most of the drug and pesticide poisonings presenting to primary care facilities were referred to secondary level hospitals, indicating inadequate facilities and expertise to manage these patients. Nevertheless, initial supportive care facilities are available in primary care. The secondary level hospitals have antidotes such as naloxone, atropine, pralidoxime (2-PAM) and activated charcoal; however, the facilities for monitoring blood levels of drugs and some of the important antidotes such as N-acetyl cysteine are not available.

No poisoning-related deaths were recorded in any of the hospitals or health centres over the 1-year period of the study.

Information from the Royal and University Hospitals suggest that the experience and facilities to manage poisoning cases are adequate in both referral hospitals.

Discussion

Acute poisoning is an important clinical emergency and contributor to morbidity and mortality [*8*]. Early diagnosis, treatment and prevention is crucial in reducing the burden of poisoning-related injury in any country. Baseline epidemiological data depicting the susceptible groups in the community, high-risk circumstances, toxic risks, and the availability of diagnostic and treatment facilities are essential to evolve strategies for strengthening poisoning prevention and management at all health care levels. The present study was undertaken to generate such data for planning poison control activities in Oman.

The study recorded 2009 cases of acute poisoning treated at primary, secondary and tertiary health care institutions during a 1-year period. The number is close to the number of inpatient cases of poisoning (2342) recorded by the Omani MOH in the same year [*7*]. However, since not all institutions participated in the study and some were excluded for not submitting complete information, our data does not depict the actual countrywide incidence, which would in fact be much higher. Moreover, poisoning cases treated as outpatients were not accounted for, as complete records were not available. The national health statistics showed the number of outpatients treated for poisoning in the same year was 9646 [*7*]; these data are also unreliable as there was overlap between inpatient and outpatient numbers, a sampling method was used for outpatient data collection and poisoning was classified with injuries. Nevertheless, all the data indicates that poisoning and toxic exposures are a significant health problem in this country. Furthermore, non-availability of records and incomplete information about the cases suggests the need for harmonized data sheets for collection of poisoning data through a central registry system, from inpatient, outpatient and emergency departments of all hospitals and health centres in the country.

Interestingly, there were no poisoning-related deaths among the 2009 inpatient cases in our study. The national health statistics recorded only 8 deaths from poisoning during the year, 7 of whom were drug abusers [*7*]. Such low mortality indicates good supportive care and quick referral to tertiary care hospitals. This is apparent from the records of the 2 referral hospitals. A report from one of these hospitals showed that there were no deaths in 1999; however, high morbidity was indicated by 78% of the poisoning cases admitted for 1–10 days occupying a total of 134 bed days with an average lodging cost of US$ 5550 excluding medical care costs [*9*]. A recent 4-year prospective hospital-based study from Sultan Qaboos University Hospital revealed that 73% of poisoning cases were admitted to hospital, for periods ranging from 1–175 days, further confirming the high poisoning-related morbidity in this country [*10*]. The only comparable nationwide hospital data available in the literature is from Sri Lanka for the year 1994, where total hospital admissions and deaths due to poisoning were 55 079 and 2283 respectively. The very high mortality (4%) in Sri Lanka was due to pesticide poisoning [*11*].

Our results further revealed that 44.7% of the poisonings involved children below 12 years of age and that children aged 1–4 years were the most vulnerable to accidental exposures. The results are in accordance with hospital-based reports from other countries [*5,9,12,13*]. A recent study from the United States of America showed that children under 5 years of age had a significantly higher average annual rate of poisoning-related visits to emergency departments than other age group [*8*].

Among adolescents and adults, the highest frequency of poisoning was in the age range 13–19 years; however, attempted suicide by poisoning was not common in the sample overall (6.0%). This contrasts with studies from south-east Asian countries where the highest rates of intentional poisoning (60%–82%) were in adults [*4,10,14*].

In our study, male cases of poisoning outnumbered females, among both adults and children, as has been observed by others [*5,9,13*]. However, a 12-year study from the UK [*15*], and short-term retrospective studies from Iran [*16*] and Turkey [*17*] reported more cases of acute poisoning in females.

Our data showed that 59.5% of the poisoning cases overall were due to bites and stings and nearly half of these cases were categorized as 'unknown animal/insect bite'. The highest proportion of undiagnosed stings and bites (52.4% and 18.4% of unknown bites respectively) were from 2 regions: North Batinah and Dakhliya. Since most of these cases were treated as scorpion stings, lack of proper diagnosis was probably responsible for such high figures. The most common known category of poisoning was scorpion stings (19.7% of poisoning cases), and these were most common in the desert region of Dhahirah.

The next most common category of poisoning was ingestion of pharmaceuticals (18.2%) and these were highest in the Muscat region. The inpatient data of the 2 referral hospitals in Muscat showed the highest proportion of admissions were due to ingestion of pharmaceutical agents (63%, 62%). A similar high percentage of drug poisoning (62%) was reported in recent retrospective studies from referral hospitals in Tehran [*16*] and China [*18*]. Our data further indicated that the total number of pharmaceutical exposures was higher in children (27.0%) than in adults (13.5%). This could be due to a number of factors: the non-availability of childproof containers in this country; unsafe storage

of medicines in the home; the free and easy access to medicines from the government that leads to hoarding; and lastly the lack of awareness of parents about use of drugs. Paracetamol poisoning was the most frequent category in children as well as in adults. This is in accordance with some other reports [*10,16*]. The reasons might be that it is one of the most common drugs available in households and that treatment facilities at the health centres are inadequate to manage these patients. In Asian countries, however, paracetamol poisoning is reported infrequently among children [*13,20,21*], who more often suffer from kerosene and food poisoning [*4,13*].

Pesticide poisoning is lowest category of poisoning in Oman (1.9% of total cases). It could be due to misdiagnosis of accidental exposures since the incidence of suicides by poisoning in our study was low and was mostly due to pharmaceutical rather than pesticide ingestion. This is in contrast to the high incidence of pesticide poisoning recorded in some Asian countries [*2,4,5*].

That there were no deaths due to acute poisoning at tertiary health care level clearly indicates that the management facilities for toxic exposures are adequate. However, unnecessary referrals, morbidity and health care cost could be reduced if the facilities and expertise are strengthened at primary and secondary health care level. Training programmes for health professionals to update knowledge and practice in diagnosis and treatment are needed. Due to regional differences in the incidence of poisoning, these should be tailored to regional needs. Prevention programmes for reducing accidental exposures to pharmaceuticals and household product, especially in children, are required in some regions.

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Pregnancies past the estimated date of confinement: labour and delivery outcome

M. Al-Taani[1]

الأحمال الممتدَّة: نتائج المخاض والولادة

محمد الطعاني

الخلاصة: أجُريت هذه الدراسة الاستباقية للمقارنة بين نتائج الولادات في الحوامل اللاتي خضعن لتحريض الولادة مع أولئك اللاتي بدأ المخاض لديهن تلقائياً بعد أن تجاوزت فترات حملهن المدَّة المقدرة لهن. وقد شملت الدراسة 395 من الحوامل لأجنة مفردة وغير مصحوبة بمضاعفات. وتم تحريض المخاض لدى 175 حاملاً، وكان المعدل الإجمالي لإجراء العملية القيصرية 9.4٪ بدون فروق يُعتدّ بها إحصائياً بين المجموعتين، وقد زاد المعدل الإجمالي للولادات المساعَدة عن طريق المهبل في مجموعة الحوامل اللاتي تلقين التحريض عن اللاتي في مجموعة البدء التلقائي للمخاض بمقدار 7٪، وهي زيادة لا يُعتدُّ بها إحصائياً. ولم يكن هناك اختلاف يُعتدُّ به من حيث حدوث العقي أثناء المخاض ولا من حيث مراضة الأمهات. ولم يكن هناك حاجة للتنبيب في الولدان، ولم تحدث وفيات في الفترة المحيطة بالولادة، بل كانت المراضة والوفيات في هذه الفترة مما يمكن اتقاؤه. واتضح أن إنهاء الحمل قبل الأسبوع الثاني والأربعين مبرَّر لاتّقاء النتائج الضائرة.

ABSTRACT To compare labour and delivery outcomes in women undergoing induction and those having spontaneous onset for pregnancies past the estimated date of delivery, a prospective study of 395 singleton, uncomplicated pregnancies was performed. Labour was induced in 175 women. Overall caesarean section rate was 9.4%, with no significant difference between the 2 groups. Overall rate of assisted vaginal deliveries was 7%, higher in the induction group than the spontaneous onset group but the difference was not significant. There was no significant difference in occurrence of intrapartum meconium, nor for maternal morbidity. No neonate needed intubation. No perinatal deaths occurred. Perinatal mortality and morbidity are preventable, and induction of labour before 42 weeks is justifiable to prevent adverse outcomes.

Grossesses prolongées : issue du travail et de l'accouchement

RESUME Une étude prospective de 395 grossesses uniques sans complications a été réalisée afin de comparer l'issue du travail et de l'accouchement chez des femmes pour lesquelles le travail a été déclenché et chez d'autres ayant eu un accouchement spontané pour les grossesses dont le terme est dépassé. Le travail a été déclenché chez 175 femmes. Le taux global de césariennes était de 9,4 %, sans différence statistiquement significative entre les deux groupes. Le taux global d'accouchements par voie basse assistés était de 7 % ; il était plus élevé dans le groupe de l'accouchement déclenché que dans le groupe de l'accouchement spontané, mais la différence n'était pas statistiquement significative. Il n'y avait aucune différence significative pour la survenue d'une émission de méconium pendant le travail, et il n'y en avait pas non plus pour la morbidité maternelle. Aucun nouveau-né n'a eu besoin d'une intubation. Il n'y a eu aucun décès périnatal. La mortalité et la morbidité périnatales sont évitables, et une interruption de grossesse avant 42 semaines est justifiable pour éviter les issues défavorables.

Department of Obstetrics and Gynaecology, Queen Alia Military Hospital, Amman, Jordan.
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Introduction

Fetal loss in pregnancies that have passed the estimated date of confinement is a stressful experience for woman and physician alike. In prolonged pregnancies, there is a significantly greater chance of high-risk conditions developing, leading to a rise in perinatal morbidity and mortality. The presumed pathogenesis of the complications associated with postdate pregnancies is related to progressive uteroplacental insufficiency, a condition, which leads to oligohydramnios, meconium aspiration, fetal asphyxia or dysmaturity, and in severe cases fetal central nervous system damage and even death [*1*,*2*]. Furthermore, several studies have recognized the association between macrosomia and adverse maternal and fetal outcome, with advancing gestational age being the only contributing factor to increased morbidity and mortality [*3–6*].

This study was undertaken to explore the preventability of the high incidence of perinatal mortality and morbidity associated with advancing gestational age beyond term. Labour and delivery outcomes were compared for pregnancies which had passed the estimated date of confinement in women undergoing labour induction and those having spontaneous onset of labour. Pregnancies become at risk at the end of the 41st week of amenorrhoea [*7*,*8*].

Methods

Six hundred and forty-four (644) pregnant women who had passed the estimated date of confinement were admitted for delivery at Queen Alia Military Hospital, Amman, between 1 January 2001 and 31 July 2002. Of these, 249 pregnancies were excluded because of nonvertex presentation (87), associated medical or obstetric problems (31) and late antenatal booking (131). The final study population comprised 395 uncomplicated singleton pregnancies. Of these, 220 were admitted having spontaneous onset of labour (defined as the presence of painful, regular uterine contractions at least once every 5 minutes associated with at least 80% cervical effacement, with or without spontaneous rupture of membranes). The remaining 175 pregnancies were admitted from the outpatient clinic for induction of labour.

Upon admission, estimated date of confinement was assessed based on regular and good menstrual histories and early antenatal booking, where early dating examination in early gestation was calculated from the last menstrual period. This was confirmed by sonograms obtained in the first and second trimester, but before 20 weeks gestational age. Full physical and pelvic examination was performed for all the study population. Nonstress tests and liquor evaluation on sonogram were performed for all pregnancies in the induction group. Intravenous access and baseline laboratory tests were obtained.

Women admitted for induction (defined as the initiation of labour in woman with intact membranes and having no *regular* uterine contractions, but modified Bishop score ≤ 6) had cervical priming, which was done by administering dinoprostone 3 mg vaginal pessaries inserted in the posterior vaginal fornix. This was repeated after 6 hours if indications of onset of labour had not been detected.

For both groups, amniotomy was performed within 1–2 hours of labour diagnosis (or as soon as clinically feasible) unless membranes were spontaneously ruptured. Labour progress was monitored by pelvic examination every 2 hours. If labour abnormalities, as defined by Friedman's criteria [*9*], were detected, oxytocin augmentation was started and administered in the manner

outlined by O'Driscoll and Meagher [*10*]. This was stopped in cases of uterine hyperstimulation or changes suggestive of fetal hypoxia. Continuous fetal heart rate monitoring during labour was performed in each woman. Fetal distress was defined as the occurrence of a fetal heart rate abnormality that necessitated termination of labour and immediate delivery, either by assisted vaginal or abdominal delivery. The presence of meconium was noted either at the time of amniotomy or subsequently during labour. Every infant had immediate suctioning of the oropharynx at the time of delivery.

The Student *t*-test was used for analysis of continuous data, while for categorical data the Fisher exact test or chi-squared test was used where appropriate; $P < 0.05$ was considered significant.

Results

Between January 1, 2001 and July 31, 2002, 5859 deliveries were performed at Queen Alia Military Hospital. The caesarean section rate was 11.9%, while the rate of assisted vaginal deliveries was 2.9%. There were 644 (11%) deliveries which had passed the estimated date of confinement, and 395 (6.7%) uncomplicated singleton pregnancies met the criteria for inclusion in this study.

The two groups (spontaneous labour and induced labour) were comparable for age, parity and gestational age as shown in Table 1, revealing no statistically significant differences. Upon admission, nonstress test results and liquor evaluation on sonogram indicated a normally grown, uncompromised fetus.

Table 2 shows the labour and delivery outcomes. There were no statistically significant differences in complication of labour between the groups. Incidence of labour augmentation using oxytocin was higher in the induction of labour group, but there was no significant difference when compared with the spontaneous onset group. There was also no statistically significant difference between groups for mode of delivery, but the incidence of assisted vaginal delivery was higher in the labour induction group. Analysing the indications for abdominal delivery, fetal distress had the highest rate for both groups, but comparison showed no statistically sig-

Table 1 **Demographic characteristics of the study population according to labour type**

Demographic characteristics	Spontaneous labour (*n* = 220)	Induced labour (*n* = 175)	Significance
Maternal age ± *s* (years)	28.6 ± 6.1	28.1 ± 6.4	0.89
Gestational age ± *s* (days)	291 ± 2.0	292 ± 3.0	0.61
Parity			
0 [No. (%)]	51 (23.2)	41 (23.4)	0.94
1–3 [No. (%)]	98 (44.5)	79 (45.1)	0.89
> 4 [No. (%)]	71 (32.3)	55 (31.4)	0.81

s = *standard deviation.*

Table 2 **Labour and delivery outcome according to labour type**

Outcome measure	Spontaneous labour (*n* = 220)		Induced labour (*n* = 175)		Significance
	No.	%	No.	%	
Augmentation	137	62.3	121	68.6	0.68
Intrapartum fever	5	2.3	8	4.6	0.52
Antepartum bleeding	5	2.3	7	4.0	0.47
Chorioamnionitis	3	1.4	5	2.9	0.83
Transfusion	2	0.9	3	1.7	0.75
Shoulder dystocia	1	0.5	3	1.7	0.44
Delivery					
Spontaneous vaginal	187	85.0	143	81.7	0.37
Vacuum	9	4.1	11	6.3	0.53
Forceps	3	1.4	5	2.9	0.65
Abdominal because of:	21	9.5	16	9.1	0.88
Fetal distress	11	5.0	6	3.4	0.63
Abruptio placenta	1	0.5	2	1.1	0.51
Cord prolapse	2	0.9	0	–	0.76
Dilatation arrest	3	1.4	3	1.7	0.81
Arrest of descent	4	1.8	4	2.3	0.79

nificant difference. Comparison for maternal morbidity between groups showed no statistically significant difference.

Fetal and neonatal outcome as shown in Table 3 revealed no statistically significant differences in outcome measures between the groups. No neonate needed intubation. No prenatal deaths occurred. All mothers and babies were discharged in good condition.

Discussion

It is common for pregnancy to pass the estimated date of confinement and this presents a difficult problem for the physician, who must decide between facing the problems of unfavourable cervix at induction and those of postmaturity complications if it is decided to let the pregnancy continue. Problems of the second option become evident when the aging placenta cannot keep pace with the demands of the fetus, leading to a chronically or acutely compromised fetus.

Several studies have shown that fetal complications (macrosomia, distress, and meconium aspiration) significantly increase as pregnancy continues postterm [*11–13*]. Therefore, induction of labour is undertaken when the risks of labour and delivery to both mother and fetus are less than the risks of letting the pregnancy continue and the benefits of success outweigh the disadvantages of failure.

This study revealed no significant differences in operative deliveries, either vaginal or abdominal, and in the incidence of fetal distress between the groups. This differs from the results of James et al. who recommended a policy of induction at 291 days gestation in uncompromised pregnan-

Table 3 **Fetal/neonatal outcome according to labour type**

Outcome measure	Spontaneous labour (n = 220)[a]		Induced labour (n = 175)[a]		Significance
	No.	%	No.	%	
Intrapartum meconium	24	10.9	18	10.3	0.88
5-minute Apgar score < 7	7	3.2	8	4.6	0.77
Meconium aspiration	4	1.8	3	1.7	0.63
Hyperbilirubinaemia	19	8.6	11	6.3	0.90
Cephalhaematoma	2	0.9	3	1.7	0.76
Seizures	3	1.4	2	1.1	0.71
Admission to neonatal intensive care unit > 24 hours	16	7.3	11	6.3	0.83
Perinatal death	0	–	0	–	0.69

[a]*The mean birth weight ± standard deviation for the spontaneous labour group was 3724 ± 488 g; the mean birth weight ± standard deviation for the induced labour group was 3713 ± 434 g. The difference was not statistically significant.*

cy [*14*]. Kaplan et al. reported reduced perinatal morbidity using prostaglandin induction of labour to ripen a stubborn cervix [*15*]. In our study, cervical priming was carried out using intravaginal pessaries of dinoprostone 3 mg, a safe and efficacious method giving excellent results for induction. This is in agreement with the results of Prysak and Castronova [*16*]. Herabutya et al. reported an increased incidence of neonatal intubation in postdate pregnancies managed expectantly and concluded that there was no particular advantage to letting pregnancy go beyond 42 weeks, especially if prostaglandin is available [*17*]. We had no perinatal deaths and no significant differences in maternal morbidity between groups was observed.

In summary, the risk to the fetus and mother increases as pregnancy continues postterm. Fetal and maternal morbidity are preventable by taking a prompt decision to induce labour in uncomplicated pregnancies that have passed the estimated date of confinement. Therefore, measures to deliver the baby between 41 and 42 weeks are justifiable to prevent adverse outcomes. Intervention before 42 weeks gestation when the fetus is not in jeopardy and is capable of withstanding the stress of labour should be encouraged.

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Breastfeeding indicators in Dakahlia Governorate

A-H. El-Gilany[1]

مؤشِّرات الإرضاع من الثدي في محافظة الدقهلية

عبد الهادي الجيلاني

الخلاصة: أُجريت هذه الدراسة في محافظة الدقهلية لتقييم الممارسات الحالية للإرضاع من الثدي باستخدام المؤشِّرات المعيارية للإرضاع من الثدي التي أَعَدَّتها منظمة الصحة العالمية، وذلك لإيضاح أثر بعض العوامل الاجتماعية والديمغرافية والعوامل التي تتعلق بالأمهات على هذه المؤشِّرات. وقد أجريت مقابلات مع أمهات 1200 رضيعاً وطفلاً ممن تقل أعمارهم عن 24 شهراً خلال حملة التطعيم ضد شلل الأطفال في مواقع ريفية ومدنية. ودلَّت النتائج على أن 84.6٪ من الرضَّع الذين تقلُّ أعمارهم عن 4 أشهر يعتمدون في تغذيتهم على الرضاعة من الثدي، وأن 42.5٪ منهم يقتصرون في تغذيتهم على الرضاعة من الثدي، وأن 42.1٪ منهم تكون تغذيتهم في معظمها من الرضاعة من الثدي. وقد تبيَّن أن الرضَّع في الأرياف تقتصر تغذيتهم على الرضاعة من الثدي أكثر من الرضَّع في المدن، وأنهم يستمرون في الرضاعة من الثدي حَوْلاً كاملاً، وأنهم يبدأون الرضاعة من الثدي أبكر من الرضَّع في المدن. كما تبيَّن أن الأمهات اللاتي لا يعملن خارج المنزل يَقْصُرْنَ تغذية أطفالهن على الرضاعة من الثدي مع الاستمرار فيها لمدة سنة كاملة، أكثر من الأمهات اللاتي يعملن خارج المنزل.

ABSTRACT This study was carried out in Dakahlia Governorate to assess current breastfeeding practices using the standardized breastfeeding indicators developed by the World Health Organization and to highlight the impact of some socioeconomic and maternal factors on these indicators. An interview was carried out with mothers of 1200 infants and children < 24 months during a poliomyelitis immunization campaign in urban and rural areas. The findings indicate that 84.6% of infants aged 0–4 months are fully breastfed, with 42.5% and 42.1% of them exclusively and predominantly breastfed respectively. Rural infants are more likely to be exclusively breastfed, to continue breastfeeding for 1 year and to initiate breastfeeding early. Non-working mothers are more likely to breastfeed exclusively and more likely to continue breastfeeding for 1 year.

Indicateurs relatifs à l'allaitement au sein dans la Gouvernorat de Dakahlia

RESUME Cette étude a été réalisée dans le Gouvernorat de Dakahlia afin d'évaluer les pratiques actuelles d'allaitement au sein à l'aide des indicateurs types de l'allaitement au sein établis par l'Organisation mondiale de la Santé et de montrer l'impact de certains facteurs socioéconomiques et maternels sur ces indicateurs. Les mères de 1200 nourrissons et enfants de moins de 24 mois ont été interrogées durant une campagne de vaccination contre la poliomyélitique dans des localités urbaines et rurales. Les résultats indiquent que 84,6 % des nourrissons âgés de 0-4 mois sont complètement allaités au sein, avec pour 42,5 % et 42,1 % d'entre eux un allaitement maternel exclusif et prédominant, respectivement. Les nourrissons des localités rurales ont plus de chances d'être exclusivement allaités au sein, de continuer à être allaités au sein pendant une année et de commencer à être allaités au sein tôt. Les mères qui ne travaillent pas sont plus susceptibles d'allaiter leur enfant au sein exclusivement et de poursuivre l'allaitement maternel pendant un an.

[1]*Department of Community Medicine, Faculty of Medicine, University of Mansoura, Mansoura, Egypt.*
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Introduction

Breastfeeding has been extensively investigated in numerous studies in developing as well as industrialized countries. Egypt is no exception, but the surveys have been conducted in different parts of the country and among special groups using different questionnaires and methodologies and therefore lack uniformity. This has made comparison of the results and assessment of the impact of intervention and promotional programmes most difficult.

The World Health Organization (WHO), United Nations Children's Fund (UNICEF), United States Agency for International Development (USAID) and Swedish International Development Cooperation Agency (SIDA) jointly sponsored a workshop that developed a standardized set of breastfeeding indicators and specific methodologies for their measurements that are simple, easy to measure and operationally feasible. They can be used for national and international comparisons, to monitor secular trends and to assess the impact of intervention [*1*]. These indicators include:

- Full breastfeeding rate: the proportion of infants less than 4 months of age who are either exclusively breastfed, i.e. without other liquids or solids except for drops or medicinal syrups (exclusive breastfeeding rate) or who are predominantly breastfed, i.e. the infant may also have received water and/or water-based drink (predominant breastfeeding rate).
- Timely complementary feeding rate: the proportion of infants 6–9 months of age who are receiving breast milk plus complementary solid or semi-solid food.
- Continued breastfeeding rate (1 year): the proportion of children 12–15 months of age who are breastfeeding.
- Continued breastfeeding rate (2 year): the proportion of children 20–23 months of age who are breastfeeding.
- Bottle-feeding rate: the proportion of infants less than 12 months who are receiving any food or drink from a bottle.
- Time of first suckling rate: the proportion of infants less than 12 months who first suckled within 1 hour of birth.
- Ever breastfeeding rate: the proportion of infants less than 12 months of age who were ever breastfed.

In this research article the above-mentioned indicators were used to assess breastfeeding practices and to study the influence of different maternal and socioeconomic factors on them.

Methods

This work was carried out in both urban and rural areas of Dakahlia governorate. From urban localities, Mansoura and Sherbin Health Offices were randomly chosen. From rural localities, 4 rural heath units were randomly chosen from the villages of Nikata, Ewish El-Hagar, Kafr El-Shenawie and El-Ahmadia. These belong to Mansoura and Sherbin districts.

The target population was children below 2 years of age and their mothers. During the first and second doses of a poliomyelitis vaccination campaign, the researcher carried out an exit interview with the mothers and completed a structured questionnaire covering family socioeconomic status and maternal characteristics as well as feeding practices during the previous 24 hours. The social standard of the family was calculated according to Fahmy and El-Sherbini [*2*]. For 10 mother–child pairs in each completed month, up to the age of 12 months, as well as in the age

groups of 12–15 months and 20–23 months, the mother was interviewed in each health facility. The mother–child pairs were randomly chosen through systematic random sample. Thus a total of 1200 mother–child pairs were included in the study (60 in each target month of age). The breastfeeding indicators were based on the current status data, i.e. the age and other information for the 24 hours preceding the interview as recommended by WHO [*1*]. Age was ascertained by reviewing the birth certificate, which was available in the majority of cases.

Data analysis

Data entry, processing and statistical analysis were carried out using *SPSS*, version 9.5. Because exclusive and predominant breastfeeding rates are mutually exclusive, further analysis was restricted to exclusive breastfeeding rate. Chi-squared and Fisher exact tests of significance were used to compare different groups, as appropriate. $P \leq 0.05$ was considered to be statistically significant.

Because many co-factors affecting breastfeeding practices are interrelated, logistic regression analysis was undertaken to gain insight into factors associated with this practice. Factors that were found to be significant on univariate analysis were included in the logistic regression model.

Results

Table 1 shows breastfeeding rates in Dakahlia governorate. Exclusive and predominant breastfeeding rates were 42.5% and 42.1% respectively. As these 2 rates are mutually exclusive, 84.6% of infants were currently fully breastfed at the time of the interview. The timely complementary feeding rate was 44.2%. The continued breastfeeding rates at 1 and 2 years of age were 67.9% and 58.8% respectively. The bottle-feeding rate was 35.7%. The time of first suckling rate was 28.5% and the ever breastfeeding rate was 92.9%. The causes of never breastfeeding among infants less 12 months of age were: no or insufficient milk (51.0%), breast or nipple problems (27.5%), infant refusing to suck (15.7%), infant's illness (9.8%) and maternal illness (9.8%).

Table 2 reveals that the exclusive breastfeeding rate was significantly higher among infants of rural residence, non-working mothers, less educated mothers, those having low social standards and short interpregnancy interval. The timely complementary feeding rate was significantly higher among infants of urban residence, working mothers, more educated mothers, those of high or middle social standards and short interpregnancy interval.

Table 3 reveals that the continued breastfeeding rate at 1 year was significantly higher among rural children, children of non-working mothers, those of less educated mothers, low social standards, second and third parity, long interpregnancy interval and male infants. The continued breastfeeding rate at 2 years was significantly higher among rural children, children of non-working mothers, those of less educated mothers, low social standards, older age groups and long interpregnancy interval.

Table 4 shows that the bottle-feeding rate was significantly higher among urban infants, those of working mothers, more educated mothers, high social standards, younger age groups, primipara and fourth para or more and long interpregnancy interval. The ever breastfeeding rate was significantly higher among rural infants, those of less educated mothers, low social stan-

Table 1 **Breastfeeding (BF) indicators among the infants and children in Dakahlia Governorate**

Indicator	Related age (months)	Total children	Rate No.	Rate %
Key indicators				
Full BF rate	< 4	240[a]	203/240	84.6
Exclusive BF rate	–	–	102/240	42.5
Predominant BF rate	–	–	101/240	42.1
Timely complementary feeding rate	6–9	240	106/240	44.2
Continued BF rate (1 year)	12–15	240	163/240	67.9
Continued BF rate (2 years)	20–23	240	141/240	58.8
Bottle-feeding rate	< 12	720	257/720	35.7
Optional additional indicators				
Time of first suckling rate	< 12	720	205/720	28.5
Ever BF rate	< 12	720	669/720	92.9

[a] *16 (6.7%) infants were never breastfed and 21 (8.8%) infants were given non-human milk in addition to breastfeeding.*

dards, as well as mothers of second and third para. The time of first suckling rate was significantly higher among rural infants, those of more educated mothers, low social standards and long interpregnancy interval.

Table 5 reveals that rural infants are 3.5 times more likely to breastfeed exclusively and 0.2 times less likely to receive timely complementary feeding than urban infants. Infants of non-working mothers are 11.5 times more likely to breastfeed exclusively than those of working mothers. On the other hand, mothers with short interpregnancy interval are 0.08 times less likely to breastfeed their infants exclusively. Mothers with short interpregnancy interval are about 7 times more likely to give timely complementary feeds to their infants than those with long interval. Rural infants and children of non-working mothers are 5.8 and 5.0 times more likely to continue breastfeeding for 1 year, respectively. Children of mothers with short interpregnancy interval are 0.04 times less likely to continue breastfeeding up to one year. Children of less educated mothers and those of mothers with low socioeconomic status are 9.8 and 6.0 times more likely to breastfeed up to 2 years, respectively. On the other hand, children of mothers with short inter-pregnancy interval are 0.01 times less likely to continue breastfeeding for 2 years. Bottle-feeding is less likely to be practised by rural infants, those of less educated mothers, of low and middle social status, of middle aged mothers and of mothers of parity 2 or 3. Rural infants are 3.7 times more likely to initiate breastfeeding early than urban infants, while infants of less educated mothers and those of mothers with short inter-pregnancy space are 0.3 and 0.4 (respectively) less likely to initiate breastfeeding early.

Discussion

The superiority of breastfeeding is unchallenged. Its benefits to both child and mother have been widely documented [*3,4*]. The

Table 2 **Factors affecting exclusive breastfeeding and timely complementary feeding rates**

Variable	Exclusive breastfeeding rate (1–4 months)			Timely complementary feeding rate (6–9 months)		
	Total	No.	%	Total	No.	%
Residence						
Rural	160	81	50.9***	160	58	36.3***
Urban	80	21	26.3	80	48	60.0
Mother working						
Yes	152	83	54.6***	157	60	38.2*
No	88	19	21.6	83	46	55.4
Mother's education						
Less than secondary	145	69	47.6*	155	58	37.4**
Secondary and above	95	33	34.7	85	48	56.5
Social standard						
Low	112	59	52.7**	147	50	34.0***
Middle	92	33	35.9	64	39	60.9
High	36	10	27.8	29	17	58.6
Mother's age (years)						
< 20	28	9	32.1	32	10	31.3
20–35	155	69	44.5	158	70	44.3
> 35	57	24	42.1	50	26	52.0
Parity						
Primipara	56	17	30.4	49	21	42.9
2 and 3	115	54	47.0	103	40	38.8
4 and more	69	31	44.9	88	45	51.1
Interpregnancy interval[a] (years)						
< 3	113	44	38.9***	111	64	57.7***
3	64	41	64.1	80	21	26.3
Sex of infant						
Female	116	48	41.1	110	47	42.7
Male	124	54	43.5	130	59	45.4

[a]*Primiparae were excluded.*
**Significant at* $P \leq 0.05$, ***significant at* $P \leq 0.01$, ****significant at* $P \leq 0.001$.

Egyptian government has adopted a national policy in line with the WHO/UNICEF policy for protection, promotion and support of breastfeeding.

In this study, we found that the majority (84.6%) of infants less than 4 months of age were on full breastfeeding, either exclusively or predominantly, while 8.8% of them were on mixed feeding. In all, 93.4% were on breastfeeding, whether full or mixed. It has previously been reported that the majority of Egyptian children are breastfed for some period of time [*5–7*]. The full breastfeeding rate in Alexandria,

Table 3 **Factors affecting continued breastfeeding rates**

Variable	Continued breastfeeding rate (1 year) (12–15 months)			Continued breastfeeding rate (2 years) (20–23 months)		
	Total	No.	%	Total	No.	%
Residence						
Rural	160	120	75.0***	160	103	64.4**
Urban	80	43	53.8	80	37	46.3
Mother working						
No	156	123	78.8***	158	102	64.6*
Yes	84	40	47.6	82	39	47.6
Mother's education						
Less than secondary	152	112	73.7*	141	92	65.2*
Secondary & above	88	51	58.0	99	49	49.5
Social standard						
Low	99	79	79.8**	100	71	71.0***
Middle	81	52	64.2	76	43	56.6
High	60	32	19.6	64	27	42.2
Mother's age (years)						
< 20	30	17	56.7	35	12	34.3**
20-35	148	107	72.3	144	89	61.8
> 35	62	39	62.9	61	40	65.6
Parity						
Primipara	51	29	56.9*	69	37	53.6
2 and 3	116	88	75.9	91	58	63.7
4 and more	73	46	63.0	80	46	57.5
Interpregnancy interval[a]						
< 3 years	98	58	59.2***	95	50	52.6*
3 years or more	91	76	83.5	76	54	71.1
Sex of infant						
Female	110	66	60.0*	114	62	54.4
Male	130	97	74.6	126	79	62.7

[a]*Primiparae were excluded.*
**Significant at* $P \leq 0.05$, ***significant at* $P \leq 0.01$, ****significant at* $P \leq 0.001$.

Egypt has been reported as 63.3% among infants less than 4 months of age [*8*]. A much lower rate of full breastfeeding (41.8%) has been reported for the Republic of Yemen [*9*]. In rural Thailand, the proportions of infants who were fully breastfed for at least 12 and 24 weeks were 12% and 6% respectively [*10*].

In Indonesia, the full breastfeeding rate at 3 months ranged from 45% to 79% in different urban areas [*11*]. The present study indicates that only 42.5% of the infants were on exclusive breastfeeding in Dakahlia. This rate is much lower than the 80% target set for the year 2000 [*12*]. A higher rate (57.8%) was found in rural Da-

Table 4 Factors affecting bottle-feeding, ever breastfeeding and time of first suckling rates

Factor (1–12M)	Total	Bottle-feeding rate		Ever breastfeeding rate		Time of first suckling rate	
		No.	%	No.	%	No.	%
Residence							
Rural	480	119	24.8***	456	95.0**	160	33.3***
Urban	240	138	57.5	213	88.8	45	18.8
Mother's education							
Less than secondary	458	122	26.6***	434	94.8*	110	24.0***
Secondary & above	262	135	51.5	235	89.7	95	36.3
Social standard							
Low	383	96	25.1***	364	95.0**	95	24.8*
Middle	226	88	38.9	210	92.9	79	35.0
High	111	73	65.8	95	85.6	31	27.9
Mother's age (years)							
< 20	85	42	49.4***	76	89.4	28	32.9
20–35	471	144	30.6	444	94.3	132	28.0
> 35	164	71	43.3	149	90.9	45	27.4
Parity							
Primipara	149	64	43.0***	133	89.3*	34	22.4
2 and 3	365	100	27.4	347	95.1	107	29.3
4 and more	206	93	45.1	189	91.7	64	31.1
Interpregnancy interval[a]							
< 3 years	308	89	28.9**	291	94.5	63	20.5***
3 years or more	263	104	39.5	245	93.2	108	41.1
Sex of infant							
Female	319	121	37.9	294	92.2	86	27.0
Male	401	136	33.9	375	93.5	119	29.7

[a]*Primiparae were excluded.*
**Significant at* $P \leq 0.05$, ***significant at* $P \leq 0.01$, ****significant at* $P \leq 0.001$.

kahlia [*5*]. The reported rate in Alexandria was 42.2%. The Egypt Demographic and Health Survey (EDHS) 1995 reported that the overall Egypt exclusive breastfeeding rate was 24.1% at 4–6 months of age [*7*]. An exclusive breastfeeding rate of 49.0% was reported for Assiut and Qena, Egypt [*13*]. The exclusive breastfeeding rate among infants less than one year of age was 37.0% and 22.5% in rural Minia and 32.3% and 12.5% in Cairo slums [*14*]. In the Republic of Yemen, the exclusive breastfeeding rate was reported to be 39.8% among infants less than 4 months age [*9*]. In Saudi Arabia, 50% of infants were exclusively breastfed at 3 months of age [*15*]. It was found that 46.3% of infants received decoctions before the age of 4 months [*16*]. Some studies therefore stated that exclusive breastfeeding, taken in its literal meaning according to the WHO/UNICEF definition, does not seem to exist

Table 5 **Logistic regression analysis of factors affecting breastfeeding indicators**

Variable	Exclusive breastfeeding rate		Timely complementary feeding rate		Continued breastfeeding rate (1 year)		Continued breastfeeding rate (2 years)		Bottle-feeding rate		Ever breastfeeding rate		Time of first suckling rate	
	β	Exp(β)	β	Exp(β)	β	Exp(β)	β	Exp(β)	β	Exp(β)	β	Exp(β)	β	Exp(β)
Residence														
Rural	1.2	3.5*	–1.3	0.2*	1.7	5.8***	1.1	3.0	1.1	0.3***	0.5	1.6	1.3	3.7***
Urban (r)	–	1	–	1	–	1	–	1	–	1	–	1	–	1
Mother working														
No	2.4	11.5***	0.1	1.1	1.6	5.0*	0.3	0.7	–0.5	0.7	–	–	–	–
Yes (r)	–	1	–	1	–	1	–	1	–	1				
Mother's education														
Secondary	0.5	1.6	0.4	1.5	0.4	1.7	2.3	9.8*	–1.0	0.4**	0.3	1.3	–0.9	0.3**
Secondary and above (r)	–	1	–	1	–	1	–	1	–	1	–	1	–	1
Social standard														
Low	–0.8	0.4	–0.4	0.6	0.2	1.3	1.8	6.0**	–1.2	0.3**	0.4	1.5	–0.8	–0.4
Middle	–0.8	0.4	0.5	1.7	0.1	1.1	–1.1	0.3	–1.3	0.3***	0.4	1.6	–0.4	0.6
High (r)	–	1	–	1	–	1	–	1	–	1	–	1	–	1
Mother's age (years)														
< 20	–	–	–	–	–	–	–1.3	0.3	0.3	1.1	–	–	–	–
20–35	–	–	–	–	–	–	–0.2	0.8	–0.6	0.5	–	–	–	–
> 35 (r)	–	–	–	–	–	–	–	1	–	1	–	–	–	–
Parity														
Primipara	–	–	–	–	–0.5	0.8	–	–	–0.3	0.9	–0.2	0.8	–	–
2 and 3	–	–	–	–	1.4	3.5*	–	–	–0.2	0.6*	0.2	1.4	–	–
> 3 (r)	–	–	–	–	–	1	–	–	–	1	–	1	–	–
Interpregnancy interval[a]														
< 3 years	–2.5	0.08***	1.8	6.9***	–3.3	0.04***	–4.4	0.01***	0.1	1.1	–	–	–0.96	0.4***
3 years and more (r)	–	1	–	1	–	1	–	1	–	1	–	–	–	1

Table 5 **Logistic regression analysis of factors affecting breastfeeding indicators** *(concluded)*

Variable	Exclusive breastfeeding rate		Timely complementary feeding rate		Continued breastfeeding rate (1 year)		Continued breastfeeding rate (2 years)		Bottle-feeding rate		Ever breastfeeding rate		Time of first suckling rate	
	β	Exp(β)	β	Exp(β)	β	Exp(β)	β	Exp(β)	β	Exp(β)	β	Exp(β)	β	Exp(β)
Sex of infant														
Female	–	–	–	–	–0.6	0.6	–0.3	0.7	–	–	–	–	–	–
Male (r)	–	–	–	–	–	1	–	1	–	–	–	–	–	–
Constant		0.8		–0.7		–0.1		1.4		2.1		1.7		–0.2
–2 log likelihood		191.4		225.0		148.7		157.2		608.6		353.2		621.7
Model χ^2		53.5		37.4		79.3		71.8		122.0		15.1		75.3
Number		240		240		240		240		720		720		720

r = reference group.
[a]*Primiparae were excluded.*
**Significant at* $P \leq 0.05$, ***significant at* $P \leq 0.01$, ****significant at* $P \leq 0.001$.

in Egypt, especially as health workers consider some decoctions necessary.

It has been recommended that no food or drink be given to infants before complementary feeding is required at 4 to 6 months [*3,16*]. In the present work, 42.1% of infants less than 4 months of age were predominantly breastfed. This rate is higher than that reported for rural Dakahlia (37.1%) [*5*], Alexandria (24.1%) [*8*], Qena and Assiut (40.0%) [*13*] and overall Egypt (33.0%) [*6*]. However, UNICEF reported a higher rate of 56.1% for Egypt [*15*]. A much lower rate (2.0%) was reported for the Republic of Yemen.

Inadequate quantity or quality of complementary foods causes growth failure in developing countries [*17*]. The timely complementary feeding rate reported in this study is 44.2%. This rate is higher than the rate of 34.5% in rural Dakahlia [*5*], the rate of 35.7% reported by UNICEF for Egypt [*15*], as well as the rate of 27.3% and 31.3% reported for Aswan and Assiut respectively [*18*]. However, higher rates have been reported for Alexandria (62.3%) [*8*]; Dakahlia and North Sinai (46.7% and 54.2% respectively) [*18*]; and Qena and Assiut (49.0%) [*13*] by the EDHS in 1995 (77.0% among infants of 7–9 months of age) [*7*] as well as for the Republic of Yemen (57.4%) [*9*].

In the present study the continued breastfeeding rates at 1 and 2 years were 67.9% and 58.8% respectively. These rates are lower than the 96.1% and 89.9% reported for rural Dakahlia [*5*]. The corresponding rates were 64.4% and 33.9% for Alexandria [*8*], 80.8% and 49.0% for Assiut and Qena [*13*] and 60.9% and 36.4% for the Republic of Yemen [*9*]. EDHS 1995 reported that at 12–13 months of age,

79% of children are still being breastfed and more than half of children aged 18–19 months continue to be breastfed [*7*]. In Dakahlia, 20.0% and 53.3% of mothers stopped breastfeeding at 12–18 months and 18–24 months respectively [*18*]. Dandash et al. reported that only 20.4% and 4.6% of mothers breastfed their babies for more than 12 and 24 months respectively [*19*].

Mothers should be encouraged to use a cup and spoon for feeding rather than bottles because of the interference of bottles with optimal breastfeeding practices [*6,8*]. This study revealed that the bottle-feeding rate among infants less than 1 year was 35.7%. This is higher than the rate of 27% reported for rural Dakahlia [*5*], the rate of 25.6% reported by UNICEF for Egypt [*15*] and 25.1% for the Republic of Yemen [*9*]. EDHS 1992 reported that nearly one-fifth of breastfed infants less than 8 months of age were given the bottle with nipple [*6*]. However, higher bottle-feeding rates were reported by Kamel et al. for Alexandria (44.3%) [*8*] and by the Egyptian Maternal and Child Health Survey (EMCHS) for urban governorates (42%) [*20*].

Early suckling enhances lactation and encourages the psychological bonding between mother and baby [*21*]. In many countries there is a delay in initiation of breastfeeding until the second or third day after birth [*22*]. The present work revealed that 28.5% of infants less than 12 months of age started breastfeeding within an hour of birth. EDHS 1995 reported that 40% of children who were ever breastfed were put to the breast within an hour of delivery [*7*]. In the Republic of Yemen, none of the infants less than 12 months of age started suckling within the first hour of birth [*9*]. UNICEF in Egypt reported that in normal deliveries, 20.3% and 35.3% of infants breastfeed within one half and 1–2 hours of birth respectively [*15*]. In Dakahlia, 69.7% of infants started breastfeeding within 2 hours of birth [*23*]. Saker reported that 82% of Egyptian women believe that the best time for starting breastfeeding is on the third day after delivery [*24*]. Avoidance of breastfeeding in the first three days of birth was practised in Aswan (59.4%), Assiut (57.7%) and Dakahlia (56.2%) [*25*]. In many countries, it is believed that colostrum is unfit for the newborn. Therefore, mothers express it and throw it away until the "true" milk appears on the third day after birth [*26*].

In this work, the ever breastfeeding rate was 92.9% among infants less than 12 months of age. This means that 7.1% of the infants were never breastfed. This figure is comparable to the 5.7% to 7.3% rates reported for Dakahlia [*5,23,27*]. The frequency of never breastfeeding was 2.5% in rural Thailand [*10*], 6%–19% in Indonesia [*11*] and 7%–11% in the Philippines [*28*]. The causes of never breastfeeding were comparable to those reported from other studies [*5,27,28,29*].

The impact of different factors on breastfeeding indicators was studied. Factors found to have a significant effect on univariate analysis were entered into multivariate analysis. By logistic regression, it was found that rural mothers are 3.5 times more likely to breastfeed exclusively, 5.8 times more likely to continue breastfeeding for 1 year and 3.7 times more likely to start breastfeeding within one hour of delivery than urban mothers. On the other hand, they are 0.2 times less likely to give timely complementary feeding than urban mothers.

This study revealed that maternal work outside the home has a profound impact on the exclusive breastfeeding rate and the continued breastfeeding rate for 1 year. Non-working mothers are 11.5 times more likely to breastfeed exclusively and 5.0

times more likely to continue breastfeeding for 1 year. A meta-analysis of 30 Egyptian studies showed that working mothers tend to shift earlier than non-working mothers from exclusive breastfeeding to mixed (breast and formula) feeding. Earlier termination of breastfeeding was also more common among working mothers. This suggests that maternal work is not the key determinant of infant feeding practices, and that the local and temporal norms may be the main factors determining infant feeding practices. The reasons for successful breastfeeding are thought to be influenced by psychological, social and economic factors [*19,30,31*]. El-Masry reported that maternal work has insignificant effect on ever breastfeeding and continued breastfeeding for 1 and 2 years [*32*]. However, the exclusive breastfeeding rate was significantly lower, while the timely complementary feeding and bottle-feeding rates were significantly higher among working than non-working mothers. In Egypt, all working mothers receive only 3 months fully paid maternal leave [*19*].

Less-educated mothers are 9.8 times more likely to continue breastfeeding for 1 year, 0.4 times less likely to use bottle-feeding and 0.3 times less likely to start breastfeeding at the proper time.

Mothers of low socioeconomic standard are 6 times more likely to continue breastfeeding for 2 years than those of high socioeconomic standard. Also, mothers of low and middle standard are 0.3 times less likely to use the bottle for infant feeding than those of high standard. Mothers aged 20–35 years and those with 2 and 3 children are 0.3 times less likely to use bottle-feeding than older mothers and mothers with higher parity. Mothers of 2 and 3 para are 3.5 times more likely to continue breastfeeding for 1 year than mothers with higher parity. Early initiation of breastfeeding has been reported to be significantly more common among older mothers and mothers with 2 and 3 para [*23*].

Short interpregnancy interval has a negative impact on most of the breastfeeding indicators. Mothers with short spacing (interval less than 3 years) are 0.08 times less likely to breastfeed exclusively up to the age of 4 months, 0.04 and 0.01 times less likely to continue breastfeeding for 1 and 2 years, and 0.4 times less likely to start breastfeeding early than mothers with adequate birth spacing. On the other hand, non-spacers are about 7 times more likely to introduce complementary feeding at 6–9 months of age.

To promote breastfeeding in our society, it is recommended that efforts be directed towards the appropriate target groups, such as working mothers, urban mothers, non-spacers and more educated mothers. Religious quotations that favour and emphasize the importance of providing breast milk to infants should be used in education campaigns to counteract the incorrect beliefs that interfere with breastfeeding. The Quranic prescription to breastfeed for 2 years has been found to be greatly honoured by the majority of mothers [*18*]. Family planning with adequate pregnancy spacing will also have a positive impact on breastfeeding practices. Finally, work legislation that extends the duration of fully paid maternity leave needs to be considered.

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Influence of mothers' characteristics on their perceptions and use of the growth chart

N. Al-Nahedh[1] and E.A. Bamgboye[1]

تأثير طِباع الأمهات على استخدام لوحات النمو وتفهمها

نورا الناهض، إليجا أفولابي بامغبوي

الخلاصة: على الرغم من التوصية باستخدام لوحات النمو لمراقبة نمو الأطفال، فإن التقارير الحديثة تدلُّ على قلة استخدام الأمهات لها. وقد قمنا باستقصاء معارف الأمهات وتفهمهن للوحات النمو والتعرف على الطِّباع التي تؤثر على استخدامها. وقد أجرينا مقابلات في العيادات الخارجية لطب الأطفال في مستشفى الرياض، شملت 305 من الأمهات لديهن أطفال تقل أعمارهم عن 5 سنوات، باستخدام استبيان خلال شهري أيار/مايو وحزيران/يونيو 2001. وقد بلغ الوعي التام باستخدام لوحات النمو 35.8٪، في حين بلغ استخدامها كما اتَّفق 8.6٪. وقد ترافقت المعارف بشكل واضح بكلٍّ من التثقيف وعدد مرات الإنجاب وعدد الأطفال الأحياء. ومن بين الأمهات اللاتي استخدَمْنَ لوحات النمو كما اتَّفق (8.7٪) فإن 10٪ منهن فقط تلقَّين توصيات من الأطباء بتغيير الرعاية الصحية وفقاً لذلك؛ في حين كان أكثر الأمهات (71٪ منهن) يرغبن بمراقبة نمو أطفالهن، ورغم ذلك فإن 20٪ منهن لم يعرفن كيفية تحقيق ذلك. وهكذا فإن زيادة التثقيف الصحي في جميع نُظُم إيتاء الرعاية الصحية أمر مرغوب جداً.

ABSTRACT Although growth charts are recommended for monitoring children, recent reports indicate poor use by mothers. We investigated maternal knowledge and perceptions of growth charts and identified characteristics affecting use. At outpatient paediatric clinics of a Riyadh hospital, 305 mothers with children under age 5 were interviewed by questionnaire during May–June 2001. Overall awareness of growth charts was 35.8% and ever-use was 8.6%. Education, parity and number of living children were significantly associated with knowledge. Among mothers who ever used growth charts (8.7%), only 10% reported doctors recommended changes in health care because of them. Overall, 71% wanted to monitor their child's growth, but 20% did not know how. Increased health education in all health care delivery systems is needed.

Influence des caractéristiques des mères sur leurs perceptions et leur utilisation de la courbe de croissance

RESUME Bien que les courbes de croissance soient recommandées pour la surveillance des enfants, des rapports récents indiquent qu'elles sont peu utilisées par les mères. Nous avons examiné les connaissances des mères et leurs perceptions concernant les courbes de croissance et avons identifié les caractéristiques qui affectent l'utilisation. Aux consultations externes de pédiatrie d'un hôpital de Riyad, 305 mères ayant des enfants âgés de moins de 5 ans ont été interrogées par questionnaire durant mai et juin 2001. La connaissance globale des courbes de croissance était de 35,8 %, et 8,6 % des mères les avaient déjà utilisées. L'instruction, la parité et le nombre d'enfants vivants étaient significativement associés avec les connaissances. Parmi les mères qui avaient déjà utilisé les courbes de croissance (8,7 %), 10 % seulement avaient signalé au médecin les changements introduits dans les soins de santé de ce fait. Globalement, 71 % souhaitaient surveiller la croissance de leur enfant, mais 20% ne savaient pas comment faire. Il est nécessaire de renforcer l'éducation sanitaire dans tous les systèmes de soins de santé.

[1]*Department of Family and Community Medicine, College of Medicine, King Saud University, Riyadh, Saudi Arabia.*

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Introduction

Adverse changes in anthropometric measurements are indicators of childhood morbidity. Reference growth charts have therefore been assembled and the World Health Organization has recommended their use for the close monitoring of children's growth [*1*,*2*]. Studies of childhood growth have revealed that early detection of faltering growth is valuable as it facilitates quick intervention by mothers and doctors through better health care and appropriate nutritional changes [*2*].

The availability of this tool does not automatically translate to its use. Knowledge of its meaning and usefulness and its acceptance by the mothers who are directly in charge of childcare is necessary. Wide use of the growth chart suggests that mothers accept full responsibility for their children's care [*3*].

Many specific factors could be determinants of growth chart use. In Nigeria, for example, maternal age, education and parity were significantly influential factors in growth chart use [*4*].

Saudi Arabian health authorities are aware of the benefits of the successful implementation of a growth-monitoring programme. Accordingly, this concept was introduced in all primary health care (PHC) centres in the country in the last 10 years. Each child has a health booklet that is kept with the mother and a growth chart kept in the family's health folder in the PHC centre [*5*]. Recent reports, however, have indicated very poor use of the growth charts. The reasons for this are not fully understood and so remain a subject of interest to all maternal and child health workers [*6*].

Against this background our study was carried out with the main objectives of determining the level of knowledge and the perceptions of mothers about the growth charts and identifying maternal characteristics affecting use.

Methods

The study took place in the paediatric outpatient clinics of a teaching hospital in Riyadh, Saudi Arabia. For 6 weeks (May–June 2001) a structured questionnaire was completed for every third mother attending these clinics if her youngest child was aged less than 5 years. The items of information in the questionnaire included demographic characteristics of the mother, fertility history, anthropometric characteristics of the index child under 5 years, knowledge and awareness of growth charts, use of growth charts by mothers and doctors, effects of the use of growth charts on child care and the frequency of the child's admission to hospital. The questionnaire was pre-coded and trained research assistants conducted interviews with the mothers and recorded the information. Clarification of the term 'growth chart' was provided for those who needed it as 'child growth tables' (as they are called in Arabic) in which a doctor records a child's weight at each visit to see if the child is growing as he or she should.

Data was analysed with *SPSS* version 10 to produce frequency distributions of all variables. Descriptive statistics were used for qualitative and quantitative variables. Mothers' characteristics were cross-tabulated with maternal knowledge and perception of growth charts. Chi-squared test was used to investigate the significance of associations between any 2 categorical variables.

Results

Data collection was completed for 305 mothers during the study period. Table 1

Table 1 **Mothers' awareness, ever-use and perception of the usefulness of the growth chart by their demographic characteristics**

Maternal characteristics	No. of women	Growth chart Awareness (%)	Ever-use at home (%)	Perception of usefulness (%)
Age (years)				
15–19	3	0.0	0.0	100.0
20–24	22	27.3	17.4	90.9
25–29	73	34.2	5.5	88.7
30–34	89	36.0	5.5	92.0
35–39	66	42.4	15.2	85.1
40–44	45	35.6	6.7	88.9
Total	298	35.9	8.7	89.2
P-value		0.593	0.138	0.805
Education [a]				
Illiterate	35	11.4	11.4	77.1
Read and write	16	25.0	12.5	75.0
Primary school	45	20.0	4.4	95.6
Secondary	121	41.3	7.4	90.9
University	82	48.8	11.0	91.5
Total	299	35.8	8.7	89.2
P-value		0.0001	0.639	0.024
Occupation				
Full-time	23	56.5	4.3	91.3
Part-time	43	44.2	14.0	91.3
Homemaker	230	32.6	7.8	89.1
Total	296	36.1	8.4	89.2
P-value		0.037	0.307	0.911
Parity				
1	50	28.0	4.0	88.5
2–4	120	44.2	8.3	93.3
5–8	96	33.3	12.5	84.4
9+	29	20.7	3.4	89.7
Total	295	35.6	8.5	89.2
P-value		0.043	0.216	0.181
Number of living children				
1	55	27.3	5.5	88.7
2–4	119	44.5	7.6	93.3
5–8	98	33.7	12.2	84.7
9+	25	16.0	4.0	88.0
Total	297	35.4	8.4	89.2
P-value		0.017	0.319	0.216

[a] *Highest level completed.*

shows the demographic characteristics of these mothers by their awareness of the growth chart, their ever-use of it in the home and their perceptions of its usefulness. Table 1 shows that the response rate to the question on knowledge, or awareness, of the growth chart was 98% (7 mothers did not respond). Overall awareness and ever-use of the monitoring growth chart were generally poor (35.8%, 95% CI: 30.4%–41.2% and 8.6%, 95% CI: 5.4%–11.8% respectively).

Many mothers (76.5%) were aged between 25 and 39 years. Only 1.0% of mothers were younger than 20 years and 15.1% were older than 39 years. There were no statistically significant differences by age in the proportion of mothers with awareness, ever-use or good perceptions of the growth chart ($P > 0.1$).

Maternal education was statistically significant in association with awareness of the growth chart ($P < 0.05$). The proportion of mothers who were aware of the growth chart increased from 11.4% for illiterate mothers to 48.8% for mothers with more than secondary education.

Overall, the majority of mothers (89.2%) perceived the growth chart as a useful monitoring tool for child health and development. This perception increased significantly from 77.1% of illiterate mothers to more than 90% of those with at least primary education.

Only 8.7% reported ever using the growth chart and there was no statistically significant age differential. The trend of use was inconsistent across age groups; however, those aged between 35 and 39 years were more likely to use the growth chart than other mothers.

The mother's occupation was also statistically significant in association with the mother's knowledge of the growth chart ($P < 0.05$; Table 1). Mothers engaged in full-time work were more aware of the growth chart than those with part-time jobs or those who were not employed outside the home (56.5%, 44.2% and 32.6% respectively).

We examined total parity and total number of living children as maternal variables related to growth chart use and perceptions. Both variables were statistically significant in association with mother's knowledge of the growth chart ($P < 0.05$; Table 1). Multiparous women were less aware of the growth chart than were women with parity 2–4. A greater proportion of women with 2–4 living children were also more aware of the growth chart than women with either more or fewer children. Although only 25 women had 9 or more living children, these women were least likely to know of or to have ever used the growth chart. Neither parity nor number of living children was statistically significant in association with mothers' use of growth chart or perception of its usefulness.

The child's age, sex and recent illness were not statistically significant in association with the mother's awareness, ever-use or perception of the usefulness of the growth chart (Table 2). Mother's awareness and perception of the usefulness of the growth chart were not statistically associated with child's birth weight. However, a greater proportion of mothers of high-birth-weight babies reported use of the growth chart than did their counterparts with smaller birth-weight babies ($P < 0.05$). A significantly greater proportion of mothers of children who were not recently hospitalized were aware of the growth chart (39.5% versus 14.6%, $P < 0.01$).

Almost 80% of mothers reported doctor's use of the growth chart at least occasionally. In almost 67% of these cases, doctors did not interfere with nutrition or health care of the child based upon the information recorded in the growth chart. Among mothers who ever used the growth

Table 2 **Mother's awareness, ever-use and perception of the usefulness of the growth chart by her youngest child's characteristics**

Youngest child's characteristics	No. of children	Growth chart		
		Awareness (%)	Ever-use at home (%)	Perception of usefulness (%)
Age (months)				
1–6	98	35.7	9.2	89.8
7–12	78	44.9	10.3	94.9
13–24	73	31.5	9.6	83.6
25–36	13	38.5	7.7	92.3
37–60	7	42.9	0.0	71.4
Total	269	37.5	9.3	89.2
P-value		0.533	0.921	0.49
Sex				
Male	158	34.2	8.9	88.6
Female	138	37.9	8.7	89.9
Total	296	35.8	8.8	89.2
P-value		0.43	0.94	0.730
Birth weight (kg)				
< 2.5[a]	54	24.1	7.4	83.3
2.5–3.9	224	38.4	7.1	90.1
4.0+	20	45.0	25.0	90.0
Total	298	36.2	8.4	89.6
P-value		0.101	0.021	0.223
Recent illness				
Yes	98	31.6	12.2	86.7
No	199	38.2	7.0	90.9
Total	297	36.0	8.7	89.6
P-value		0.268	0.125	0.263
Recent hospitalization				
Yes	41	14.6	14.6	85.4
No	256	39.5	7.8	89.8
Total	297	36.0	8.7	89.2
P-value		0.002	0.144	0.406

[a]*Low birth weight.*

chart at home (8.7%), only 10% reported the doctor had recommended a change in health care based upon the reading of the growth chart. Overall 71% of mothers professed enthusiasm to take an active role in monitoring their child's growth with a growth chart, but 20% did not know how to do this.

Discussion

Overall knowledge of the growth chart as indicated by the level of awareness in our study was 35.8%, which is very low in comparison with nearly 80% in Al-Khobar, Saudi Arabia [*6*], and 54% in Ilorin, Nigeria

[*4*]. This suggests a need for related health education in PHC settings, maternity centres and other health care delivery systems in the country. Knowledge of the growth chart would encourage mothers to use it at home and to be completely in charge of monitoring their children's growth [*7*].

The significant influence of the mother's education, job, parity and number of living children on her awareness of the growth chart is consistent with a previous report [*4*]. This may not be surprising as education buys awareness and the more educated a mother is, the more likely she is to appreciate the need to monitor her children's growth. The educated mother understands the consequences of any faltering of growth in her children. Such knowledge also makes the mother an active participant in decisions regarding the diet, feeding and child health practices needed to achieve normal growth.

Because more than 70% of mothers expressed a desire to record their child's anthropometric measurements at home, an effort should be made to teach and actively involve mothers in this activity. Each PHC centre in the country should have a qualified health educator and the health education content of the growth chart should be reviewed regularly to ensure the mother's understanding [*8*].

The frequency of cases in which doctors made changes in childcare based upon the mother's report of her use of the growth chart was low. In some of these cases, the doctors may have chosen to wait and re-examine the child before making changes in care. That mothers were able to read the growth chart and sound a note of warning about the child's poor growth, however, is an achievement towards the objective of the growth monitoring system.

Maternal age influenced awareness and perception of the growth chart in previous studies but was not significant in this study. It was, however, indirectly involved in the effect of education, parity and number of living children. Future studies are expected to throw more light on the awareness and the perception of mothers about the use of the growth chart and whether or not proper use and modification of health care actually occurs based upon readings of it.

Physician compliance and its impact on mothers should not be underestimated and therefore should be encouraged.

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WHO Global Database on Child Growth and Malnutrition

The Global Database on Child Growth and Malnutrition is a dynamic catalogue of representative population-based nutrition data that are collected and assessed in a standardized manner. Its primary focus is undernutrition among infants and children under 5 years of age computed on the basis of weight-for-age (underweight), weight-for-height (wasting), and height-for-age (stunting), although information on the prevalence of overweight in children is also included. The database currently covers about 510 million children, or 95% of the total population of under-5-year-olds. These figures reflect only nationally representative surveys. Additional data are available for some countries from surveys conducted at regional, provincial, state, district, or local levels. The database also provides country trend analyses from 1980 onwards.

The Global Database on Child Growth and Malnutrition provides decision-makers and health workers alike with baseline information. This information takes the forms of maps, tables, graphs, and data in electronic formats, which are needed to plan, implement, and monitor and evaluate intervention programmes aimed at promoting healthy child growth, nutrition, and development. The database is available free on line at: http://www.who.int/nutgrowthdb/

Acute rheumatic fever in Jordanian children

I. Khriesat,[1] A. Najada,[2] F. Al-Hakim[1] and A. Abu-Haweleh[1]

الحمى الروماتيزمية الحادة في الأطفال الأردنيِّين

عماد خريسات، عبد الفتاح أبو حويلة، فخري الحكيم، عبد الحميد نجادة

الخلاصة: تعتبر الحمى الروماتيزمية مشكلة صحية هامة في الأردن، وقد استعرضنا بشكل استعادي الملفات الطبية لـ 28 فتى و22 فتاة، عمرهم الوسطي عند مراجعتهم الطبية 10.5 ± 2.6 سنوات، وكان التشخيص المؤكد مبنياً على المعايير المعدلة لجونز، وتمت الدراسة في معهد الملكة علياء للقلب في الفترة بين شباط/فبراير 1999 وشباط/فبراير 2002. وكان أكثر المظاهر التي دفعت المرضى لمراجعة المعهد هو التهاب المفاصل في 88٪ من الحالات، أو التهاب المفاصل المتنقّل في 68٪ من الحالات، في حين كان المظهر الثاني من حيث الشيوع هو التهاب القلب الذي لوحظ في 48٪ من الحالات وكان في 8٪ من الحالات صامتاً، ثم داء الرَقَص الذي لوحظ في 6٪ من الحالات. ولم تترافق أي حالة بعُقَيْدات تحت الجلد أو بحمامى هامشية. وكان أكثر صمامات القلب تأثراً هو الصمام المترالي (80٪) ثم إصابة مشتركة للصمامين المترالي والأبهري في 25٪ من الحالات، في حين شوهد التهاب التأمور في 12.5٪ من الحالات، وفشل القلب الاحتقاني في 4٪ من الحالات. وعلى هذا فإنه ينبغي على الأطباء الممارسين الانتباه إلى المظاهر السريرية الواسعة الاختلاف مع التأكيد على الالتزام الدقيق بالدلائل الإرشادية الوقائية.

ABSTRACT Rheumatic fever remains a significant health problem in Jordan. We retrospectively reviewed medical charts of 28 boys and 22 girls (mean age at presentation 10.5 ± 2.6 years) with confirmed diagnosis based on modified Jones criteria at Queen Alia Heart Institute from February 1999 to February 2002. Arthritis was the commonest major manifestation (88%; 68% migratory), carditis was second commonest (48%; 8% silent carditis) and chorea was seen in 6%. None had subcutaneous nodules or erythema marginatum. The mitral valve was most commonly affected (80%); both mitral and aortic valves were affected in 25%. Pericarditis was seen in 12.5% and acute congestive heart failure in 4%. Practitioners should be aware of diverse clinical presentations and emphasize strict adherence to prophylaxis guidelines.

Le rhumatisme articulaire aigu chez des enfants jordaniens

RESUME Le rhumatisme articulaire demeure un important problème de santé en Jordanie. Nous avons procédé à une étude rétrospective des dossiers médicaux de 28 garçons et 22 filles (âge moyen lors de la survenue 10,5 ± 2,6 ans), chez lesquels le diagnostic avait été confirmé sur la base des critères de Jones révisés, à l'Institut cardiologique de la reine Alia de février 1999 à février 2002. L'arthrite était la manifestation majeure la plus fréquente (88 % ; 68 % migratrice) suivie par la cardite (48 % ; 8 % cardite silencieuse) et la chorée était observée chez 6 % des patients. Aucun n'avait de nodules sous-cutanés ou d'érythème marginé. La valve mitrale était le plus fréquemment atteinte (80 %) ; les valves mitrales et aortiques étaient toutes deux atteintes chez 25 % des sujets. Une péricardite était observée chez 12,5 % et une insuffisance cardiaque congestive aiguë chez 4 % des sujets. Les praticiens devraient connaître les diverses présentations cliniques et souligner l'importance du respect strict des directives pour la prophylaxie.

[1]Queen Alia Heart Institute, Paediatric Cardiology Division, Amman, Jordan.
[2]Department of Paediatrics, King Hussein Medical Centre, Amman, Jordan.
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Introduction

Acute rheumatic fever is a common and serious public health problem in developing countries [*1,2*]. At the end of the 20th century, after an apparent decline, acute rheumatic fever constitutes a great challenge to industrialized and developing countries [*3–6*]. In the 1980s and early 1990s when many clinicians were hoping that it was a disease of the past, anxieties were renewed when outbreaks were reported in several areas around the United States [*7*].

Rheumatic valvular heart disease, an important sequel to rheumatic fever, is the most common acquired heart disease worldwide and is the major cause of cardiovascular death during the first 5 decades of life in developing countries [*2,8,9*].

Rheumatic valvular heart diseases are associated with severe, incapacitating haemodynamic disturbances in young adults and children [*1,10*]. Many patients are seen with established rheumatic heart disease at their first visit [*10*]. Acute rheumatic fever can mimic many other diseases and because the diagnosis is based on clinical criteria, it is still under-diagnosed or over-diagnosed in different settings [*3*]. Prevention of chronic rheumatic heart disease is feasible and cost effective if secondary prophylaxis is started and maintained regularly [*11,12*].

These facts emphasize the importance of accurate diagnosis, prompt treatment and secondary prophylaxis. In the present study we retrospectively describe the clinical profile of acute rheumatic fever in Jordanian children to increase the awareness of practitioners involved in the health care of young children.

Methods

Medical charts of children with acute rheumatic fever seen at Queen Alia Heart Institute between February 1999 and February 2002 were retrospectively reviewed. Data were obtained and where further information was needed the patient was clinically reviewed and/or echocardiography was performed. The age of the study population ranged from 6 to 15 years. Diagnosis of acute rheumatic fever was based on the 1992 update of the Jones criteria [*4*].

Data obtained included clinical profile and standard laboratory investigations including complete blood count, sedimentation rate, C reactive protein level, antistreptolysin O titre, throat swab culture, chest radiography and electrocardiography.

Cross-section echocardiography and colour Doppler evaluation were performed within 2–3 days of presentation and after 2–3 weeks. Multiple cross-section views were usually taken from parasternal apical and subcostal positions according to the recommendations of the American Society of Echocardiography. Criteria for pathological valvular regurgitation agreed upon by the operators included:

- colour jet seen in at least 2 planes
- mosaic colour jet
- length of the colour jet ≥ 1 cm.

Results

Of the 50 patients in the study, 28 were male and 22 were female (male to female ratio 1.3:1).

The mean age of the study population was 10.5 ± 2.6 years. Arthritis was the most common presenting feature (88% of total) and was migratory in 30 and monoarticular in 14 (68% and 32% respectively of those with arthritis). Carditis with both auscultatory and echo evidence was seen in 24 (48% of total) and silent carditis with no auscultatory findings was seen in 4 (8% of

total). Chorea was seen in 3 patients, with evidence of carditis in 2 patients (Table 1). Cardiac features at presentation and 2–3 weeks later are shown in Table 2.

Table 3 shows results of laboratory investigations. Throat swabs were requested for 20 patients and were positive for group A streptococcus in only 8%. Antistreptolysin O titres ranged from 350–1250 IU with mean (standard deviation) of 520 (320). Erythrocyte sedimentation rate was elevated in 74% with a range of 65–125 mm in the first hour and C reactive protein was positive in 75% with a titre range of 74–104 IU.

Discussion

Rheumatic fever continues to be a major health problem in developing and industrialized countries, especially since the recent outbreaks that emphasized the need for practitioners to remain vigilant and to maintain prevention efforts [*13*]. Although the criteria for diagnosis are well known, the clinical symptoms needed to diagnose do not always appear concurrently and the initial illness may be mild or short-lived and diagnosis may be missed.

The Jones criteria were introduced in 1944 as a set of clinical guidelines for the diagnosis of rheumatic fever [*4,14*]. The manifestations of rheumatic fever were divided into major and minor categories in the Jones criteria. Major manifestations were least likely to lead to an improper diagnosis and included carditis, joint symptoms, subcutaneous nodules and chorea. History of rheumatic fever or rheumatic heart disease was also a major manifestation. Minor manifestations were suggestive of rheumatic fever, but were not sufficient for diagnosis and included clinical signs such as fever and erythema marginatum and laboratory markers of inflammation. The presence of 2 major or 1 major and 2 minor manifestations provided reasonable evidence of rheumatic activity. However, because previous history of definite rheumatic fever or rheumatic heart disease was a major criterion, the presence of a minor manifestation was sufficient to establish the diagnosis of rheumatic fever recurrence.

To improve specificity, these guidelines have been periodically modified [*15–18*]. In the first modification [*17*], objectively identifiable arthritis replaced joint symptoms as a major manifestation and arthralgia was assigned to the category of minor manifestations. History of previous rheumatic fever or rheumatic heart disease was downgraded to the minor category, and therefore, documentation of a major manifestation became necessary for the diagnosis of recurrence of rheumatic fever. Meanwhile, erythema marginatum was recommended as a major criterion. Most importantly, the evidence of preceding

Table 1 **Clinical features of the 28 boys and 22 girls aged 6–15 years with diagnosed acute rheumatic fever**

Features	No.	%
Sex		
Male	28	56
Female	22	44
Arthritis	44	88
Migratory	30	68
Monoarthritis	14	32
Carditis	24	48
Chorea	3	6
Erythema marginatum	0	0
Subcutaneous nodules	0	0

Mean age ± standard deviation of the patients = 10.5 ± 2.6 years.

Table 2 **Clinical and echo-Doppler cardiac findings**

Cardiac findings	At presentation		After 2–3 weeks	
	Clinical	2D echo-Doppler	Clinical	2D echo-Doppler
Mitral	18 (75.0)	18 (75.0)	18 (75.0)	18 (75.0)
Mitral and/or aortic	3 (12.5)	5 (21.0)	4 (16.5)	5 (21.0)
Pericarditis	3 (12.5)	3 (12.5)	2 (8.0)	3 (12.5)
Congestive heart failure	1 (4.0)	1 (4.0)	0 (0)	0 (0)

Values given are No. (%) of patients.

group A streptococcal pharyngitis was added to the list of minor manifestations in the modified Jones criteria [*17*]. Evidence of a prior streptococcal infection was essential for the diagnosis of rheumatic fever in the 1965 revision of Jones criteria and it was suggested that exclusion of clinical syndromes of non-streptococcal origin would further increase the accuracy of the criteria [*15*]. The increased specificity adversely affected the sensitivity and 25% of the rheumatic fever cases diagnosed by modified criteria could not be diagnosed by revised Jones criteria [*15–17*]. Such cases usually presented in relatively late phases of the disease or with delayed manifestations of rheumatic fever, when anti-streptococcal antibody titres suggestive of preceding streptococcal infection had already normalized. Therefore, late manifestations of rheumatic fever were subsequently exempted from the requirement of elevated anti-streptococcal antibody titre [*18*].

In our study, all patients fulfilled the diagnostic modified Jones criteria [*4*]. Arthritis was the most frequent manifestation (88%) as has been reported in many studies [*13,19*]. Migratory arthritis typical of rheumatic arthritis was seen in 68% and monoarticular arthritis was seen in 32% of those with arthritis. The possibility of rheumatic fever should be considered for any patient with monoarticular arthritis; it is not necessary for arthritis to be migratory to consider this diagnostic possibility. Diagnosis of a primary episode of rheumatic cardi-

Table 3 **Laboratory investigations**

Laboratory test	No. (%)	Mean (s)	Range
Positive throat swab culture	2/20 (8)	NA	NA
Elevated antistreptolysin O titre (IU)	41/50 (82)	520 (320)	350–1250
Elevated erythrocyte sedimentation rate (mm/h)	37/50 (74)	55 (43.8)	65–125
Positive C reactive protein (IU)	30/40 (75)	39 (35.5)	74–104

s = *standard deviation.*
NA = not applicable.

tis is based on presence of significant apical systolic and/or basal diastolic murmurs, clinical presence of pericarditis or unexplained congestive heart failure. With suboptimal auscultation skills, an echo-Doppler study will quickly determine the presence or absence of a clinically detectable murmur [*20,21*].

Clinically manifest mitral or aortic regurgitation is still the diagnostic hallmark of acute rheumatic carditis [*5,22*]. Our findings confirm previous reports that echo-Doppler can detect significant valvular incompetence in the absence of auscultatory finding [*23,24*]. In our study, 4 patients had silent carditis (8% of total); 2 of the silent carditis cases were evident at presentation and 2 became clinically evident at 2–3 weeks follow-up. The incidence of subclinical carditis was low compared with previous reports in which silent carditis accounted for 30%–50% of cases. Patients may seek medical advice late in the course of the disease when clinical valvular involvement is evident. This agrees with a report from New Zealand where all patients with silent carditis developed an audible murmur within 2 weeks of onset [*23,24*].

There is a great disparity in the proportion of cases of acute rheumatic fever with chorea between different populations from many industrialized and developing countries [*5,25–27*]. Chorea manifested in only 6% of our patients, in agreement with reports from Africa, South and East Asia, the Pacific and the Arabian Peninsula, where chorea was reported in less than 15% of all cases of acute rheumatic fever [*26*]. In studies from the United States of America, Pakistan and Turkey, chorea manifested in higher proportions, i.e. up to 52% of cases [*27*].

Our patients had neither subcutaneous nodules nor erythema marginatum, similar to a report from Saudi Arabia where erythema marginatum and subcutaneous nodules were infrequent [*19*].

Sibling studies have suggested an inherited susceptibility to patterns of acute rheumatic fever [*28*]. Studies from the USA and the Caribbean have identified a B cell alloantigen (D8/17), present in high percentage of B cells from patients with acute rheumatic fever and their family members [*29*]. This however was not found among an Indian population with acute rheumatic fever [*30*]. This may give a clue to the pathogenesis of acute rheumatic fever and may explain how populations may differ in their immune responses to group A streptococcal infections and develop different rates of certain clinical manifestations of acute rheumatic fever.

Laboratory investigations are of great support to the diagnosis, including evidence of streptococcal infection. In our patients, antistreptolysin O titre was substantially higher, as has been reported in another study [*31*].

Acute phase reactants were significantly elevated in approximately three-quarters of patients with acute rheumatic fever [*32*].

Increased susceptibility to recurrences of rheumatic fever appears to last into adulthood, therefore, we must optimize the clinical diagnosis procedure and ensure long-term adherence to secondary prophylaxis [*33*].

Acute rheumatic fever continues to be a major public health problem in Jordan and results in economic burdens and serious health sequelae. Practitioners should be more aware of this health problem, should consider this diagnostic possibility when appropriate and should ensure strict and long-term adherence to secondary prophylaxis.

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Co-morbidity and treatment of attention deficit hyperactivity disorder in Saudi Arabia

F.A. Al-Haidar[1]

معالجة اضطراب نقص الانتباه وفرط الحركة والأمراض المصاحبة في المملكة العربية السعودية

فاطمة عبد الرحمن الحيدر

الخلاصة: لاستعراض الخبرات المستفادة في عيادة الطب النفسي للأطفال حول معالجة اضطراب نقص الانتباه وفرط الحركة والأمراض التي تصاحبه لدى الأطفال، أجريت دراسة استعادية على مرضى تقل أعمارهم عن 19 عاماً ممن راجعوا عيادة الطب النفسي للأطفال، وشُخِّصوا على أنهم مصابون باضطراب نقص الانتباه وفرط الحركة، لمعرفة خصائص المعالجة وخصائص الأمراض المصاحبة. ولوحظ أن هذا الاضطراب قد شُخِّص لدى 25.5٪ من المرضى، ومن هؤلاء كان 28.3٪ يعاني من اضطراب مُصاحب في التعبير اللغوي، في حين كان 38.7٪ منهم يعاني من تخلف عقلي طفيف. وقد وُصف لهم منبِّه نفسي (ميثيل فينيدات) في 23.6٪ من الحالات ومضاد اكتئاب (الإيميبرامين بشكل رئيسي) في 35.9٪ من الحالات. أما المعالجة السلوكية فكانت المعالجة الأكثر شيوعاً. لقد كان استخدام مضادات الاكتئاب أكثر من المنبِّهات النفسية واتضح أن الأدوية النفسانيَّة التوجُّه أكثر فائدة من المعالجة النفسية.

ABSTRACT To review the experience of a child psychiatric clinic regarding co-morbidity and treatment characteristics of children with attention deficit hyperactivity disorder (ADHD), a retrospective study was done on patients under 19 years who were attending the clinic and were diagnosed with ADHD. Co-morbidity and treatment characteristics were also studied. ADHD was diagnosed in 25.5% of the patients. Of these, 28.3% had coexistent expressive language disorder and 38.7% coexistent mild mental retardation. A psychostimulant (methylphenidate) was prescribed to 23.6% while antidepressants (primarily imipramine) were prescribed to 35.9%. Behavioural therapy was the most commonly offered psychotherapy. Antidepressants were used more than psychostimulants. Psychotropics had a more beneficial effect than psychotherapy.

Comorbidité et traitement du trouble d'hyperactivité avec déficit de l'attention en Arabie saoudite
RESUME Afin d'examiner l'expérience d'une clinique de pédopsychiatrie en ce qui concerne la comorbidité et les caractéristiques du traitement des enfants souffrant d'hyperactivité avec déficit de l'attention (HADA), une étude rétrospective a été réalisée auprès des patients de moins de 19 ans qui consultaient à la clinique et chez lesquels un diagnostic de HADA avait été posé. La comorbidité et les caractéristiques du traitement ont également été étudiées. Une hyperactivité avec déficit de l'attention a été diagnostiquée chez 25,5 % des patients. Parmi ces patients, 28,3 % avaient des troubles expressifs du langage coexistants et 38,7 % avaient une légère arriération mentale coexistante. Un psychostimulant (méthylphénidate) a été prescrit à 23,6 % des patients tandis que des antidépresseurs (principalement l'imipramine) ont été prescrits à 35,9 %. La thérapie comportementale était la psychothérapie la plus fréquemment offerte. Les antidépresseurs étaient davantage utilisés que les psychostimulants et les psychotropes ont montré un effet plus bénéfique que la psychothérapie.

[1]*Department of Psychiatry, King Khalid University Hospital, Riyadh, Saudi Arabia.*
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Introduction

Attention deficit hyperactivity disorder (ADHD) is a disorder of childhood and adolescence characterized by a pattern of extreme pervasive, persistent and debilitating inattention, overactivity and impulsivity [*1*]. It is believed to be one of the most common reasons for mental health referrals to family physicians, paediatricians, paediatric neurologists and child and adolescent psychiatrists [*2,3*].

Although originally thought to remit during childhood, the symptoms of ADHD have also been shown to persist in patients through adolescence and into adulthood [*4*]. The disorder is often chronic, with one third to one half of those affected retaining the condition into adulthood [*5–7*].

It interferes with many areas of normal development and functioning in a child's life [*2*]. Children with ADHD are more likely than their peers to experience educational underachievement, social isolation and antisocial behaviour during the school years [*8*] and to go on to have significant difficulties in the post-school years [*9,10*].

The aim of this study is to review the experience of a child psychiatric clinic regarding co-morbidity and treatment characteristics of children with ADHD. Evaluating our current clinical experience with ADHD and comparing it with others will allow us to offer better service to our patients in the future.

Methods

The case records of all patients (416) up to 18 years of age who attended the child psychiatric outpatient clinic at King Khalid University Hospital, Riyadh, Saudi Arabia over a period of 10 years (July 1990 to July 2000) were examined. Those who were diagnosed as having ADHD (106) were retrospectively reviewed with regard to co-morbidity, prescribed psychotropic medication and type of psychotherapy offered.

The diagnosis of ADHD and co-morbid disorders was based on the *Diagnostic statistical manual of mental disorders* [*1*].

The psychological tests used to determine the degree of mental retardation included the Wechsler Intelligence Scale for Children, the Stanford-Binet Intelligence Scale and the Vinland Adaptive Behavioral Scale.

Psychotherapy offered included behavioural therapy and family counselling. In behavioural therapy, parents were given strategies to modify their children's behaviour (e.g. point/token reward system and time-out). In family counselling, parents had the opportunity to establish a positive relationship within the family and relieve guilt feelings through an external attribution of the cause and difficulties.

Results

Case records of 416 patients were reviewed; 106 (25.5%) were diagnosed as having ADHD, either as the only diagnosis, 53 (12.7%), or in combination with other psychiatric disorders, 53 (12.7%).

Demographic data are shown in Table 1. Boys accounted for 77.4% and girls 22.6%, a ratio of 3.4 males to 1 female. Adolescents accounted for only 3.7% of the boys and none of the girls.

The majority (93.4%) of the group were Saudi Arabian nationals. Most of the patients had not attended school (63.2%), while 30.2% had had some sort of education that varied from kindergarten to high school, and 6.6% were attending a special school for children with mental disabilities.

Table 2 lists the co-morbid psychiatric disorders. Half of the sample (53.0%) did

Table 1 **Demographic data for patients in two age groups**

Variable	0–12 years (*n* = 103) No. (%)	13–18 years (*n* = 3) No. (%)	Total (*n* = 106) No. (%)
Sex			
Male	79 (76.7)	3 (100.0)	82 (77.4)
Female	24 (76.7)	0 (0.0)	24 (22.6)
Nationality			
Saudi Arabian	96 (93.2)	3 (100.0)	99 (93.4)
Non-Saudi Arabian	7 (6.8)	0 (0.0)	7 (6.6)
Education			
Not educated	67 (65.0)	0 (0.0)	67 (63.2)
Educated	29 (28.2)	3 (100.0)	32 (30.2)
School for children with mental disability	7 (6.8)	0 (0.0)	7 (6.6)

not show any co-morbid psychiatric disorder, the commonest associated disorder was expressive language disorder (28.3%) followed by nocturnal enuresis (10.4%).

A review of the co-morbidity of ADHD and mental retardation shows that nearly half of the sample (47.2%) did not show any degree of mental retardation while 38.7% had mild, 12.3% had moderate and 1.9% had severe mental retardation.

The prescribed psychotropic medications are listed in Table 3. Methylphenidate was the only psychostimulant given and was the most commonly prescribed drug. Imipramine was the most commonly prescribed antidepressant and the second most commonly prescribed psychotropic. Haloperidol was the most commonly prescribed antipsychotic and the third most commonly prescribed psychotropic. Only 6.6% of the group did not receive any form of medication.

The duration of medication use varied from 1 month to 60 months, with a mean of 17 months. Regular follow-ups were performed in 34.0% of patients, while 66.0% had irregular follow-ups. There was no significant report of side-effects that we could use for analysis.

Behavioural therapy was the most commonly offered type of psychotherapy (44 patients, 46.2%). Only 4 patients (3.8%) had family counselling, 9 patients (8.5%)

Table 2 **Attention deficit hyperactivity disorder and co-morbid psychiatric diagnosis**

Diagnosis	No. (*n* = 106)	%
None	53	50.0
Expressive language disorder (ELD)	30	28.3
Nocturnal enuresis (NE)	11	10.4
ELD + NE	5	4.7
ELD + NE + encopresis	4	3.8
NE + encopresis	2	1.9
Stuttering	1	0.9

Table 3 **Attention deficit hyperactivity disorder and prescribed psychotropic medications**

Type of drug	Drug	No. (*n* = 106)	%
Stimulants	Methylphenidate	25	23.6
Antidepressants	Imipramine	23	21.7
	Amitriptyline	4	3.8
	Fluoxetine	6	5.7
	Citalopram	4	3.8
	Paroxetine	1	0.9
Antipsychotics	Haloperidol	17	16.0
	Zuclopentixol	4	3.8
	Thioridazine	9	8.5
	Trifluperazine	2	1.9
	Risperidone	1	0.9
Anticonvulsants	Carbamazepine	2	1.9
	Sodium valproate	1	0.9
None	None	7	6.6

had both therapies and 44 (41.5%) did not receive any formal psychotherapy.

Table 4 shows a comparison of the outcome for those patients who received psychotropic drugs, psychotherapy or both (assessment of the outcome was based only on the reported information in the clinical records). All 106 patients received some sort of intervention; the majority (52.8%) received both, while 38.7% received drugs only and 8.5% received psychotherapy alone. Among those who showed improvement, predominantly this was only partial improvement. Patients who received drugs showed the greatest improvement, while those who received both drugs and psychotherapy mostly showed partial improvement. Those who received psychotherapy alone did not show much improvement.

Discussion

The common heterogeneous disorder ADHD is conservatively estimated to affect 3%–5% of school-age children [*11*]. When the diagnosis of ADHD is made with standardized structured interview to parents or teachers however, then the prevalence has been reported as reaching 19% in primary school age boys [*12*], with a much higher prevalence (30% to 50%) in those attending child and adolescent psychiatric outpatient clinics [*1,13*]. This study was conducted in an outpatient psychiatric clinic, so a prevalence of 25.5% is in agreement with the results of previous studies of samples from similar populations.

In one study conducted in the United States of America (USA) using DSM IV, 22%–40% of referred children were diag-

Table 4 **Outcome in relation to prescribed drugs and type of psychotherapy conducted**

Intervention	Outcome								
	Poor		Partial		Remarkable		Not known		Total (*n* = 106)
	No.	%	No.	%	No.	%	No.	%	%
Drugs (*n* = 41)	5	12.2	15	36.6	17	41.5	4	9.8	38.7
Psychotherapy (*n* = 9)	3	33.3	2	22.2	1	11.1	3	33.3	8.5
Both (*n* = 56)	11	17.9	22	39.3	12	21.4	11	19.6	52.8
Total (*n* = 106)	19	17.9	39	36.8	30	28.3	18	17.0	100.0

All patients received some intervention.

nosed as having ADHD [*10*], compared to 1.2% in the United Kingdom which used the International Classification of mental and behavioural disorders, tenth edition (ICD 10) [*14*]. So the findings of our study (25.5%) correspond with the USA studies, explained at least partially by the employment of the same diagnostic measures, DSM III-R or DSM IV.

Although community-based studies have found male to female sex ratio for ADHD as low as 2.1:1, male to female ratio in referred samples (similar to this study sample) ranged from 4:1 to 9:1 [*1,15*], comparable to the findings of this study (3.4:1).

There are several reasons for the greater vulnerability of boys. Adults are often more tolerant of hyperactivity in girls than in boys, at least before school age [*16*]. Also, compared with boys, girls with ADHD tend to have greater intellectual impairment and inattention, lower levels of hyperactivity and lower rates of conduct behaviour [*17–20*].

Attention deficit hyperactivity disorder is quite strongly associated with a range of abnormalities in psychological and motor development [*14*]. The typical abnormalities found are immature articulation and language delay [*21*].

Some of the sample (20.8%) were diagnosed to have enuresis and/or encopresis.This association may be related to delayed toilet training due to difficulty in learning because of inattention and hyperactivity, or related to associated mental retardation.

The association between ADHD and conduct disorder is so great that some reviewers consider that hyperactivity and conduct disorder are actually the same problem under different names [*22–24*]. However in this study, an association between ADHD and conduct disorder was not detected. Because conduct disorder is primarily a behavioural disturbance, the family and the community in general may perceive it as misbehaviour rather than a psychiatric disorder and may deal with it themselves, in which case children exhibiting this type of behaviour will not be referred to a psychiatric unit.

ADHD is associated with reduced verbal and performance intelligence [*24*]. In a study of mild mental retardation, ADHD accounted for 10%–14% of the whole group [*24*]. Some investigators have reported that as many as a quarter to one third of those with severe mental retardation manifest co-morbid hyperactivity

[*24,25*]. Other studies showed that as the mental retardation becomes more severe, the association with ADHD is more expected [*26*]. In this study, however, a greater association with mild mental retardation was found. This may be because the more severely retarded patients are dealt with by the institutes for the mentally retarded and rehabilitation centres, where they have their own psychologists and psychiatrists who rarely refer to other centres for psychiatric assessment or management.

A wide variety of treatments have been used for ADHD including, but not limited to, various psychotropic medications, psychosocial interventions, dietary management, training and educational programmes [*27*]. Psychostimulants such as methylphenidate, amphetamine, dextroamphetamine and pemoline are prescribed for about two thirds of children with ADHD [*28,29*], methylphenidate being the most often used [*27,30*]. Methylphenidate was the only psychostimulant prescribed in this study and was prescribed less (23.6%) compared to other studies [*30,31*].

The value of antidepressants in the treatment of ADHD, particularly imipramine, has been reported in several circumstances such as the coexistence of emotional disorders, failure to respond to psychostimulants and coexistence of tics [*2,25*]. Overall in this study, antidepressants (35.9%) were more often prescribed than psychostimulants (23.6%). This contrasts with the findings of other studies [*27,28*].

However, in accordance with the findings of other studies, haloperidol was the most commonly prescribed antipsychotic, and carbamazepine the most commonly prescribed mood stabilizer [*2*]. Haloperidol has been reported to be useful for those hyperactive children with Tourette's syndrome or tics [*2*]. Mood stabilizers, particularly carbamazepine and sodium valproate, do not seem to have a positive effect on core ADHD symptoms, however, they have been reported to be useful in controlling behaviour disturbance and aggression [*2*].

The finding of this study that behavioural therapy is used more than family counselling has been reported before [*25*]. However, both interventions have been found to be useful for many hyperactive children [*25,27*].

Comparing the beneficial effects of psychotropics and psychotherapy, the results of this study supported the superiority of psychotropics, a finding in agreement with previous reports [*27*]. In this study as well as others, combining psychotropics and behavioural therapy added little advantage overall over medication alone [*27*].

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Inpatient child and adolescent psychiatric referrals in Saudi Arabia: clinical profiles and treatment

F.A. Al-Haidar[1]

إحالة الأطفال والمراهقين من المرضى الداخليِّين إلى الطب النفسي في المملكة العربية السعودية: المرتسمات السريرية والمعالجة

فاطمة عبد الرحمن الحيدر

الخلاصة: أُجريت دراسة استعادية لسجلات الحالات من المرضى الداخليين الذين تمت إحالتُهم إلى استشارات نفسانيَّة في مستشفى جامعة الملك خالد في المملكة العربية السعودية، على مدى 6 سنوات، وشملت 109 مرضى دون الثامنة عشرة من العمر. وقد تمت دراسة كل من الأمراض الباطنية والجراحية المشخصة والاضطرابات النفسية وأساليب المعالجة التي اتبعها الأطباء النفسيون. وقد كان الاكتئاب والتلاؤم أكثر الأمراض النفسانيّة تشخيصاً، أما أكثر التشخيصات الطبية شيوعاً فكان الصرع، وفرط الجرعات الدوائية، والتباس الأعضاء التناسلية الظاهرة، والإصابات العظمية والمفصلية، والسكَّري وقد كان الشباب المصابون بهذه المشكلات الطبية بحاجة ماسة للتقييم وللتدخل. وتنبه هذه الورقة إلى الحاجة لتحسين إدراك أطباء الأطفال للجوانب النفسية في الأمراض الجسمية.

ABSTRACT A retrospective review was made of the case records of inpatients referred to the psychiatric consultation–liaison service of King Khalid University Hospital, Saudi Arabia over a 6-year period. For the 109 patients under 18 years old, the study noted both the medical or surgical diseases diagnosed as well as psychiatric disorders and the treatment approaches used by psychiatrists. Depressive and adjustment disorders were the most often diagnosed psychiatric illnesses. The most common medical diagnoses were epilepsy, drug overdose, ambiguous genitalia, orthopaedic injuries and diabetes mellitus. Young people with these medical problems are in real need of psychological assessment and intervention.

Orientation vers un service psychiatrique des enfants et des adolescents hospitalisés en Arabie saoudite : profils cliniques et traitement

RESUME On a procédé à une analyse rétrospective des dossiers de patients hospitalisés orientés vers le service de consultation-liaison psychiatrique de l'Hôpital universitaire King Khaled (Arabie saoudite) sur une période de six ans. Pour les 109 patients de moins de 18 ans, l'étude a relevé les maladies médicales ou chirurgicales diagnostiquées ainsi que les troubles psychiatriques et les approches thérapeutiques utilisées par les psychiatres. Les troubles dépressifs et les troubles de l'adaptation étaient les troubles psychiatriques les plus fréquemment diagnostiqués. Les diagnostics médicaux les plus fréquemment posés étaient l'épilepsie, la surdose, l'ambiguïté sexuelle, les traumatismes orthopédiques et le diabète sucré. Les jeunes touchés par ces problèmes médicaux ont réellement besoin d'une évaluation psychologique et d'une intervention.

[1]*Division of Psychiatry, King Khalid University Hospital, Riyadh, Saudi Arabia.*
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Introduction

Setting up a psychiatric consultation–liaison service in a hospital not only addresses the need for psychological input in medical wards but it may also improve the clinical course of many patients' illnesses by decreasing the length of their hospitalization. As a result, it may also be cost-effective [*1–3*].

For children, the indications for referral to the psychiatric consultation–liaison services include: obvious disturbances of behaviour and emotions; physical symptoms for which no organic explanation can be found; poor adjustment to chronic or recurrent ill-health; evidence of significant parental or family pathology; known, or suspected, abuse or neglect [*4,5*].

High psychological disturbance rates have been observed in children admitted to hospital paediatric wards [*1,6,7*]. This is not surprising when medical illnesses in childhood and adolescence, especially when chronic, are increasingly thought to contribute to psychiatric disturbances [*1,4*]. Although emotional problems frequently cause illness in childhood, and can complicate the management of organic diseases [*1,8–10*], paediatricians often fail to recognize psychiatric disorders [*11*].

The purpose of this paper was to record what medical diseases were associated with referral of young people to the child and adolescent consultation–liaison psychiatric team in a Saudi Arabian hospital, what psychiatric disorders were found and what treatment approaches were used by the psychiatrist.

Methods

A retrospective review was made of the case records of all inpatients aged under 18 years who had been referred to the child and adolescent psychiatric consultation–liaison team at King Khalid University Hospital. The review covered a period of 6 years between July 1992 and July 1998. King Khalid University Hospital is a teaching general hospital that primarily offers teaching to under- and postgraduate students in different branches of medicine as part of King Saud University. The hospital services cover Riyadh and the surrounding area and are available to all Saudi and non-Saudi Arabians provided they are teaching cases.

A note was made of any medical or surgical diseases diagnosed, psychiatric disorders diagnosed and the drugs and psychotherapeutic approaches used by the psychiatric team. Psychiatric disorders were classified according to the *Diagnostic and statistical manual of mental disorders, DSM3R* and later *DSM4* [*12,13*].

Results

A total of 2060 cases were referred to the psychiatric consultation–liaison team: 145 (7.0%) were below the age of 18 years. Data were not available for 36 patients. Thus 109 cases were included in this study: 46 (42.2%) children under 12 years old and 63 (57.8%) adolescents aged 12–18 years.

Table 1 shows the medical diagnoses recorded for this group of young people referred to the psychiatrist. The most commonly encountered diagnoses were epilepsy, drug overdose, ambiguous genitalia, orthopaedic injuries and diabetes mellitus. For about 18% of psychiatric referrals no diagnosed of a medical illness could be found.

Table 2 shows the psychiatric disorders among the referrals. About 29% of the sample had no psychiatric illness diagnosed. The most common diagnoses were

Table 1 **Medical profile of 109 inpatients aged under 18 years referred to the psychiatric consultation–liaison team**

Medical diagnosis	No.	%
None	20	18.4
Epilepsy	11	10.1
Drug overdose	11	10.1
Ambiguous external genitalia	8	7.3
Orthopaedic injuries	7	6.4
Diabetes mellitus	7	6.4
Non-specific abdominal pain	4	3.7
Non-specific headache	4	3.7
Gastritis	3	2.8
Systemic lupus erythromatosus	3	2.8
Leukaemia	3	2.8
Persistent vomiting	3	2.8
Others	25	22.9
Total	109	100.0

depressive disorder, adjustment disorder, deliberate self-harm and acute organic brain syndrome. A review of the possible psychosocial stressors faced by these patients showed that no stressors could be established for 77%, whereas 12% suffered family conflicts, 7% parental divorce or separation, 2% financial difficulties and 2% a physically abusive parent.

Table 2 shows the drugs prescribed by the psychiatrists. Over half the young people (56.0%) did not receive any psychotropic medication. The most commonly prescribed drugs were antidepressants (23.9%), followed by anticonvulsants (10.1%) and antipsychotics (8.3%). Amitriptyline was the most commonly prescribed antidepressant (46.0% of antidepressants), carbamazepine the most prescribed anticonvulsant (36.4% of anticonvulsants) and haloperidol the most prescribed antipsychotic (66.7% of antipsychotics). Methylphenidate was the only central nerrons system stimulant given.

Sixty young people (55.0%) did not receive any psychotherapy. The most commonly offered therapies were supportive therapy followed by family therapy and then behavioural therapy (Table 2).

Reviewing the records of outpatient follow-up in the child and adolescent psychiatry department showed that 67.0% of the sample did not have any psychiatric outpatient follow-up while 33.0% were seen there at least once after discharge from the hospital.

Table 2 **Psychiatric profile of 109 inpatients aged under 18 years referred to the psychiatric consultation–liaison team**

Diagnosis and treatment	No.	%
Psychiatric diagnosis		
None	32	29.4
Depressive disorder	26	23.9
Adjustment disorder	11	10.1
Deliberate self-harm	7	6.4
Acute organic brain syndrome	6	5.5
Conversion disorder	3	2.8
Attention deficit disorder	3	2.8
Others	21	19.3
Drugs prescribed by psychiatrist		
None	61	56.0
Antidepressant	26	23.9
Anticonvulsant	11	10.1
Antipsychotic	9	8.3
CNS stimulant	2	1.8
Psychotherapy received		
None	60	55.1
Supportive therapy	22	20.2
Family therapy	14	12.8
Behavioural therapy	13	11.9

CNS = central nervous system.

Discussion

Other studies have consistently noted high rates of psychopathology in children admitted to hospital. For example, Stocking et al. reported that almost two-thirds of children admitted to a paediatric ward would have benefited from consultation with a child psychiatrist [*4*].

Some studies have found that there is a strong relationship between neurological diseases, particularly epilepsy, and psychiatric disturbance [*14,15*]. In this study, epilepsy formed one-tenth of referrals to the child and adolescent psychiatry team.

Drug overdose for self-poisoning comprised another one-tenth of referrals in this study. An increasing trend of self-poisoning among young people has been recorded in other studies [*16,17*]. It has been estimated that there are at least 100 000 cases of self-poisoning in the United Kingdom each year; most patients were in their late teens and early twenties, and it was the most common cause of emergency admission to a medical ward for young women [*17*].

King Khalid University Hospital is a tertiary centre accepting cases of ambiguous genitalia from other hospitals for better medical, surgical and psychological intervention. So it is not surprising that 7.3% of the sample in this study were referred as cases of ambiguous genitalia. Relational and behavioural difficulties and depressive reactions have been noted in children with ambiguous genitalia who were admitted to hospital for reassignment of sex [*18*]. They need to be referred to psychiatry for intensive psychotherapy and parental counselling [*19*].

The next most common category of referral was the 6.4% of the sample referred to psychiatry from the orthopaedic ward with diagnoses of orthopaedic injuries. A study of children with orthopaedic injuries showed that 41% had behavioural disturbance and 35% of parents reported distress in the child that would indicate psychiatric referral [*20*].

There were also a number of patients with diabetes (6.4%) referred to the child and adolescent psychiatry team. An association between poor emotional adjustment and poor control of diabetes has long been noted [*14,21*]. The most common psychiatric diagnoses noted among diabetic young people were depression, anxiety and disruptive behaviour [*21*].

In this study, 3.7% of young people referred for psychiatry had recurrent abdominal pain and another 3.7% had non-specific headache. These findings are consistent with the findings of other studies. For example, Campo and Fritch found that medically unexplained physical symptoms are common, including headache, recurrent abdominal pain, limb pain, chest pain and fatigue [*22*]. Children with recurrent abdominal pain have significantly higher levels of anxiety and depression [*23*]. Significant association has been found between headache and depression and anxiety disorders [*24*].

No psychiatric disorders could be confirmed in 29.4% of children referred. This maybe because the presence of a medically unexplained physical complaint combined with the limited tolerance of paediatric staff to the behavioural problems of some children in an open ward may lead to unwarranted referrals for psychiatric evaluation.

The high rates of depressive disorder (23.9%) and adjustment disorder (10.1%) in this study are consistent with the findings of a study from Japan [*25*]. Nishioka et al. also reported acute organic brain syndrome among 4.9% of their referred sample, a percentage that is similar to our study (5.5%) [*25*].

No psychosocial stressors were established for over three-quarters of the children and adolescents referred. This probably reflects inadequate data in the records rather than representing reality. The most reported stressor in this review was family conflicts. However, a wide variety of psychosocial stressors for children have been identified in other studies, including marital conflict, separation or divorce of parents, parental illness or poverty [*5,26*].

More than half of the young people referred (56.0%) did not receive any psychotropic medication. This percentage is consistent with the fact that 29.4% of patients had no psychiatric disturbance diagnosed and the rest had received some sort of psychotherapy that may have satisfied the need of these patients. Antidepressants were the most commonly prescribed drugs, as the largest number of diagnoses were for depression or adjustment disorder.

The psychiatric team did not offer any psychotherapy for 55.1% of referrals. This is probably because the physical condition of some patients did not allow for immediate psychological intervention or because the paediatric ward was not suitable for conducting some programmes, so they may have been postponed until after discharge. Many of the admitted children (20.2%) required supportive psychotherapy for better adjustment to the hospital environment. Some of them had chronic illnesses that indicated further need for support. Behavioural therapy was given to 11.9% of children to modify behavioural disturbances observed in the ward. However, literature reviews show that psychotherapy is not enough and patient and family educational programmes are now regarded as the first stage in the treatment of many chronic or recurrent physical illnesses [*27*].

Two-thirds of referred patients did not attend a psychiatric outpatient clinic after discharge. This is partly because 29.4% has no psychiatric illness. In addition, it seems likely that some families are reluctant to bring their child to a psychiatric clinic as they think that their child's problems are medical rather than psychological. Furthermore, some physicians initiate a psychiatric consultation but then are not keen to follow it up.

The results of this study cannot be generalized widely as it is a retrospective study with a small number of patients and it was conducted in a single teaching hospital. However, we conclude that depression and adjustment disorder are commonly encountered in medically ill children and adolescents. Those who are admitted with epilepsy, self-poisoning, orthopaedic injuries and diabetes mellitus are in real need of psychological assessment and intervention. Improving the paediatrician's awareness of psychiatric disorders and the psychological aspects of medical diseases is important.

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Caring for children and adolescents with mental disorders: Setting WHO directions

Throughout the history of the WHO Mental Health Programme the attention dedicated to children and adolescents has not been commensurate with that dedicated to adults and the elderly. Yet, from both demographic and epidemiological perspectives – as well as from the burden of disease – mental disorders of children and adolescents represent a key area of concern. Hence WHO convened a meeting on Caring for Children and Adolescents with Mental Disorders: Setting WHO Directions from January 31 and February 1, 2002. The meeting brought together leaders in the care of children and adolescents with mental disorders from around the world. The focus of the meeting was on the care of children and adolescents with mental disorders with special emphasis on emerging issues impacting developing countries. *Caring for children and adolescents with mental disorders: Setting WHO directions* presents updated information useful for the formulation of a Child and Adolescent Mental Health Care Plan, based on findings which emerged during the above-mentioned meeting, as well as from other sources. The report can be obtained from Marketing and Dissemination, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel: +41 22 791 2476; fax: +41 22 791 4857; email: bookorders@who.int). It is also available free on line at: http://www.who.int/mental_health/media/en/785.pdf

Adolescent abuse in a community sample in Beni Suef, Egypt: prevalence and risk factors

Z.E.M. Afifi,[1] M.I. El-Lawindi,[1] S.A. Ahmed[2] and W.W. Basily[3]

انتهاك المراهقين في عينة من المجتمع في بني سويف، مصر: معدل الانتشار وعوامل الاختطار

زينب عفيفي، منى اللاوندي، سامية أحمد، وسيم باسيلي

الخلاصة: تمت دراسة انتهاك المراهقين في عينة مختارة بالاعتيان العشوائي المتعدد المراحل في بني سويف خلال عام 1998، وهي عينة تتألف من 555 من طلاب المدارس بعمر وسطي مقدارُه 15.6 ± 1.5 سنوات. وقد أجري لكل مراهق فحص طبي مع استكمال استبيان ذي روامز مُسْبَقَة التصميم للتعرف على محدِّدات الانتهاك. وقد بلغ معدل انتشار انتهاك المراهقين 36.6٪، وكان معدل انتشار الانتهاك العاطفي 12.3 والجسدي 7.6٪ والجنسي 7.0٪ والمشترك 9.7٪. أما المنبئات الهامة بالانتهاك الجنسي فكانت الطفل المفرط الحركة، الطفل العاجز، الأم اللامُبالية، تأخر ترتيب الطفل في قائمة أشقائه في الأسرة، والطفل المهزول. أما المنبئات الهامة بالانتهاك الجسدي فكانت عدم مبالاة الأم، ودرجة تعليم الأم، والإصابات. في حين كانت المنبئات الهامة بالانتهاك العاطفي هي الازدحام، والمرض وسوء المعاملة من قِبَل المعلم. وقد أبلغ عن سلوك يتَّسم بالعنف في أكثر من 20٪ من المراهقين الذين تعرضوا لانتهاك عاطفي أو جنسي. فعلى أرباب المهَن الطبية في البلدان النامية إعداد استراتيجية فعالة للتدخل في أمثال هذه الحالات.

ABSTRACT Adolescent abuse was studied in 555 school students (mean age 15.6 ± 1.5 years) selected by multistage random sampling in Beni Suef in 1998. Each student received a general physical examination and a pre-coded questionnaire to identify determinants of abuse. Prevalence of abuse was 36.6%. Emotional, physical, sexual and combined abuse prevalence was 12.3%, 7.6%, 7.0% and 9.7% respectively. Significant predictors of sexual abuse were hyperactive child, disabled child, disinterested mother, low birth order child or wasted child. For physical abuse, significant predictors were maternal disinterest, maternal education and injuries. Significant predictors of emotional abuse were overcrowding, disease and mistreatment by a teacher. Violent behaviour was reported for more than 20% of the emotionally and the sexually abused.

La maltraitance des adolescents dans un échantillon communautaire à Beni Suef (Egypte) : prévalence et facteurs de risque

RESUME La maltraitance des adolescents a été étudiée chez 555 lycéens (âge moyen 15,6 ± 1,5 ans) sélectionnés par échantillonnage aléatoire à plusieurs niveaux à Beni Suef durant l'année 1998. Chaque adolescent a subi un examen physique général et a reçu un questionnaire précodé pour identifier les déterminants de la maltraitance. La prévalence de la maltraitance des adolescents était de 36,6 %. La prévalence de la violence psychologique, physique, sexuelle et multiple était de 12,3 %, 7,6 %, 7,0 % et 9,7 % respectivement. Les facteurs prédictifs significatifs de la violence sexuelle étaient l'hyperactivité de l'enfant, le handicap de l'enfant, le désintérêt de la mère, le rang de naissance de l'enfant ou l'émaciation. Pour la violence physique, les facteurs prédictifs significatifs étaient le désintérêt de la mère, l'instruction de la mère et les traumatismes. Les facteurs prédictifs significatifs de la violence psychologique étaient la promiscuité, la maladie et les mauvais traitements infligés par un enseignant. Un comportement violent était signalé pour plus de 20 % des enfants ayant subi une violence psychologique et sexuelle.

[1]Department of Public Health; [2]Department of Psychiatry, Faculty of Medicine, Kasr El-Aini University, Cairo, Egypt.
[3]Ministry of Health and Population, Cairo, Egypt.
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Introduction

Children have been abused throughout human history, but only recently has child abuse come to be seen as a major social problem and as a primary cause of personal problems [*1*]. Child abuse has been defined as any maltreatment of a child or an adolescent by a guardian or caretaker [*2*]. More recently, it has also been defined as any injury, sexual abuse, malnutrition, physical or emotional suffering or even neglect of a child under 18 years of age inflicted by a person responsible for that child's welfare [*3*]. Abused children are prone to psychiatric problems, medical ailments, chronic fatigue, suicidal tendencies, delinquency and low IQ [*4–8*]. They may develop serious sequelae that can lead to permanent disability or even death [*9*].

Child abuse is a major paediatric problem in many countries. In 1993, approximately 3 million reports of child abuse and neglect were made to child protective services agencies in the United States of America; 35% of these cases were confirmed [*10*]. Incidence increased to 11.8/1000 in 1999 [*11*]. In a Canadian study of reported child abuse and neglect, the annual incidence rate was 21.52 investigations of child abuse and neglect per 1000 children; 45% of those were substantiated, 22% remained suspected but unconfirmed and 33% were unsubstantiated [*12*]. Further evidence was provided by a 1997 British survey in which it was estimated that each year at least 1 child per 1000 children under the age of 4 years suffered physical abuse [*13*].

In developing countries it is likely that most doctors working with children see cases of physical abuse and that these are just a small portion of the total. Studies from Nigeria, South Africa and the Caribbean island of Dominica indicate the extent of the problem [*14–16*].

In Egypt, few studies have investigated the problem of child abuse. In most of these studies, the cases were from emergency or clinical departments, social welfare or criminal records or autopsies [*8,9,17–20*]. In 1994 and 1999, child abuse among Egyptian primary-school children was studied, but no data were collected regarding the prevalence of abuse among older preparatory-school and secondary-school children [*21,22*]. Therefore, in our study, we investigated child abuse in an Egyptian rural community to identify underlying risk factors and to detect the physical and emotional consequences of child abuse.

Methods

During 1998, a sample of 555 adolescents from preparatory schools and secondary schools in Ihnasya El-Medina, Beni Suef Governorate, Egypt, were selected by random cluster sampling for our study. At that time, child abuse prevalence data were available only for primary-school children [*4,21*]. From these data we calculated the overall prevalence of abuse for primary-school children to be 30%. As the prevalence of abuse is lower among older children and decreases with age, we assumed that this figure would be halved among our older students [*11–13,23*]. Accordingly the size of the sample was calculated using *Epi-info* software, version 5, assuming 15% expected frequency with 95% confidence interval. The sampling fraction was 6% of the preparatory-school and secondary-school child population. Each of the 7 schools in Ihnasya—3 preparatory and 4 secondary (1 general, 1 industrial, 1 technical and 1 trade)—represented a cluster from which 1 or 2 classes were randomly selected according to the re-

quired number in proportion to the student population.

A pre-coded questionnaire was prepared in Arabic and tested on 50 students before its use in the survey. It included questions on the presence or absence of different types of abuse, personal data about the children and their parents, factors known to be associated with child abuse and possible outcomes of abuse. We collected child data that included age, sex, school performance, perceived hyperactivity, helplessness (i.e. weakness, incapability and unresponsiveness), presence of disease, disability, living away from the family, sharing the bed with others or having problems with parents. We also collected data about parental behaviours associated with abuse and related to rearing the child in health and to dealing with the other parental partner and about mistreatment by teachers. These included quarrelling, fighting, physical or psychological cruelty, rejection, terrorizing and disinterest. Familial relations, problems and sociodemographic factors such as income, item or property ownership, type of family, residence and degree of household crowding were also recorded.

In each of the selected classes we explained the rationale of the study and emphasized confidentiality in handling collected data. The questionnaires were then distributed for the students to answer. Student consent was taken and the adolescents were asked to inform their parents. No one refused to participate. Each student was examined generally including body systems, blood pressure, signs of malnutrition, weight and height and for signs of previous (scars or deformities) or recent physical abuse (bruises, burns or scalds). A male physician who was known in the community examined the children and was assisted by a female nurse or social worker when examining girls and by a male nurse or social worker when examining boys. Questionnaires were checked for completeness so that nothing was excluded. The data were analysed using *SPSS* software, version 9.0.

A student was considered emotionally abused if he or she reported 5 or more of these 10 items:

- feeling of low value;
- loneliness;
- rejection at home;
- perceptions that the family structure is wrong;
- parents do not respond to needs;
- no participation in decision-making;
- perceptions of being obliged to give up rights for a sibling;
- parental preferential prejudice towards sibling(s);
- hurt from improper treatment;
- neglected when sick.

Students were considered physically abused if they reported being beaten to the point of bruising, wounding, fractures or worse or burns inflicted by an adult caregiver. Their reports were confirmed by examination. Those reporting abuse in the absence of physical signs and those who had signs suggestive of abuse but who denied the event were not considered physically abused.

A student was considered sexually abused if his or her sex organs were touched by anyone of the other or same sex for reasons other than health or medical purposes.

For the purposes of our study, we did not distinguish between signs of abuse and symptoms that might be similar to clinical depression, mental illness or other problems. Degree or intensity of each item was also not distinguished. Our study also did

not distinguish between previous and recent episodes of abuse.

Descriptive statistics were calculated for all variables. The presence and significance of association between abuse (qualitative nominal variable indicating non-abuse and 4 categories of abuse—emotional, physical, sexual and combined) and the determining factors were assessed by chi-squared distribution or analysis of variance. The odds ratios (OR) and their significance were calculated for each of the independent variables with the 4 types of abuse versus no abuse. Significant variables were used as independent variables in subsequent analysis. A logistic regression model was fitted for each type of abuse and all independent variables together. We included 2 quantitative covariates, namely birth order and degree of household crowding. The best model that explained the relationship between the dependent and significant independent variables was determined by forward conditional stepwise selection.

Results

Sample characteristics

The age of the studied group was 12–18 years with a mean of 15.6 ± 1.5 years. The median birth order was 3. The male/female ratio was 1.7. More than 50% of the children felt accepted and loved by their families. Approximately one-quarter of students had learning difficulties, were perceived as hyperactive, had lived away from the family for some time, were sharing a bed with others or were maltreated by teachers. Blood pressure measurements were within normal ranges. The average systolic and diastolic blood pressures were 124.9 ± 8.9 and 63.0 ± 5.4 mmHg respectively.

According to the World Health Organization weight/age classification scheme, 95.9% were well nourished (–2 to +2 *Z*-scores), 2.9% were wasted (< –2 *Z*-scores) and 1.2% were overweight (> 2 *Z*-scores) [*24*]. The prevalence of stunting (height/age < –2 *Z*-scores) was 17.6%. Of all students, 16.5% reported having a chronic disease. On examination 10.5% of them showed positive respiratory, cardiac and gastrointestinal tract findings. Furthermore, 68 students had physical disabilities including partial paralysis (4), amputated limbs (4), epilepsy (3) and speech impairments (11), or visual (46) or hearing problems (10). Manifestations of past or recent physical abuse were obvious by examination for 14.6% and included burns (5.4%), bruises (3.6%), scratches (1.8%), bite marks (0.4%) and scars (3.4%). Somatic manifestations attributable to causes other than abuse were not included. The main criteria were the presence of signs confirmed by student report.

Six students who did not report abuse had physical signs suggestive of abuse. We re-questioned them, but they denied abuse and for the purposes of this study were considered non-abused.

The mean age of fathers and mothers was 47.9 ± 11.0 years and 38.9 ± 7.3 years respectively. Illiteracy and low levels of education (primary schooling or ability to read and write only) were prevalent among parents. The illiteracy rate was 30.1% for fathers and 63.3% for mothers. Low levels of education characterized 41.0% of fathers and 24.1% of mothers. Most fathers were labourers (60.5%) or employees (32.0%) while most mothers were housewives (91.4%). Most parents (83.2%) had a reward system for their children. Troubles existed between parents in 9.7% of cases. These included quarrels (4.5%), alienation (2.2%), divorce (1.6%), beating (0.9%) and other problems (0.5%). Conflicts existed between parents and children as well: 11% of the children reported having problems in their families and 8.4% had

parents who quarrelled with them. Students were asked only to report the presence or absence of conflict; intensity of conflict was not determined.

Most children (82.1%) belonged to nuclear families that lived in single-family homes. Few families changed their residences frequently (5%). Family size was large with a mean of 8.3 ± 2.7 persons. Family income was considered adequate or more than adequate by 66.5% of the students. The number of siblings was large with a mean value of 5.0 ± 2.1. The average number of unschooled siblings of school age or older was 2.5 ± 1.4. A family member who smoked was present in 67.3% of households and a family member who drank alcohol was present in 5%.

Table 1 **Distribution of cases according to the prevalence of the form of abuse**

Form of abuse	No. of students	%
Emotional abuse	68	12.3
Physical abuse	42	7.6
Sexual abuse	39	7.0
Emotional and physical abuse	26	4.7
Emotional and sexual abuse	21	3.8
Physical and sexual abuse	4	0.7
Physical, emotional and sexual abuse	3	0.5
No abuse	352	63.4
Total	555	100.0

Overall prevalence of child abuse

Table 1 shows the prevalence of abuse among the adolescents. The overall prevalence of abuse was 36.6%. Approximately one-quarter experienced only one form of abuse. Combined abuse (2 or 3 forms) was experienced by 9.7%. Emotional abuse was most prevalent (12.3%), followed by physical abuse (7.6%) and sexual abuse (7%). Common combinations were physical and emotional abuse (4.7%) and sexual and emotional abuse (3.8%). Emotional abuse alone or combined with other forms affected 21.3% of the students. Both physical and sexual abuse, either alone or combined with others affected 13.5% and 12.1% of the children respectively.

Risk factors

Analysis of variance showed no significant difference between the 5 groups of adolescents (emotional, physical, sexual, combined and no abuse) in any of the measured continuous variables (i.e. weight, height, age of child, birth order, age of parents, number of rooms, family size and number of siblings). Table 2 shows the ORs associated with each type of abuse compared with no abuse. Of the studied child factors, living away from the family increased the odds of all forms of abuse 2.7 times or more. Injury signs were more common in cases of physical, sexual and combined abuse. Maltreatment of the student by the teacher, on the other hand, was the most significant predictor of emotional abuse. Helplessness and having a disease or learning disabilities significantly increased the odds of all but sexual abuse.

Except for mother's work, all parental factors significantly affected the odds of one or more form of abuse. Predominance of the father and father's bad attitude towards the mother significantly affected only the odds of combined abuse. The presence of smoking in the family increased the odds of physical abuse ($P < 0.05$). All other familial factors increased significantly the odds of emotional and combined abuse. In our univariate analysis, no tested socioeconomic variables, e.g. residence, income and type of family, af-

Table 2 **Odds ratios of risk factors associated with each type of abuse**

Risk factors	Emotional	Physical	Sexual	Combined
Child factors				
Sex (male)	1.4	1.5	2.3*	1.2
Helplessness	3.3**	2.9*	2.4	3.8**
Hyperactivity	2.1*	1.4	3.1**	2.1*
Wasting	2.6	3.0	6.6**	0.01
Having disease	2.9**	2.9*	0.6	3.3**
Having disability	1.4	2.6*	1.5	1.6
Having learning difficulty	3.4**	2.4*	1.8	2.6**
Living away from family	2.7**	4.0**	3.0**	2.9**
Sharing bed with others	1.6	1.1	1.6	3.1**
Injury signs	1.6	145.4**	1.8*	29.5**
Mistreated by teacher	4.0**	1.3	1.4	3.3**
Parental factors				
Mother				
Education (high)	1.6	6.4*	0.0	2.0
Work	1.6	1.2	2.0	0.3
Disease	2.0	1.7	2.5*	6.9**
Cruelty	2.3	1.5	0.4	3.4**
Disinterest	3.0*	2.2	5.7**	5.3**
Father				
Education (middle)	0.8	2.3*	1.4	0.5
Disease	2.1*	2.2*	1.9	4.9**
Cruelty	1.5	1.2	0.5	0.5*
Disinterest	0.8	1.4	4.0**	2.0
Prison	2.6	1.3	4.8**	3.2*
Familial factors				
Predominance (father)	0.8	1.6	1.2	0.5*
Father has bad attitude towards mother	2.1	0.0	1.0	3.1*
Parents quarrel with child	3.3*	1.3	1.1	3.4**
Trouble between parents	3.3**	1.8	1.9	6.5**
Problems in the family	2.6**	1.8	1.4	2.3*
Smoking	1.3	2.7*	1.0	1.3
Reward system	0.2**	0.9	0.3	0.2**

*P < *0.05*, **P < *0.01*.

fected the occurrence of abuse significantly.

Table 3 shows the final logistic regression models fitted with all significant variables using a forward stepwise selection procedure. Conditioning on all other variables, the significant predictors of emotional abuse were crowding in the house, sickness of the child and teacher maltreatment; the estimated odds of abuse (Exp (β)

Table 3 **Conditional odds ratios associated with each type of abuse (forward conditional stepwise selection)**

Form of abuse (Item in model)	β	Significance	Exp (β)	95% CI for Exp (β)
Emotional abuse				
Crowding	0.5	0.028	1.7	1.1–2.7
Sickness	1.5	0.025	4.7	1.2–17.9
Teacher maltreatment	2.4	0.001	10.8	3.3–35.1
Physical abuse				
Disinterested mother	3.6	0.008	36.9	2.6–527.0
Education of mother	3.1	0.019	22.3	1.7–295.1
Injury signs	6.5	0.000	688.3	40.8–11 614.1
Sexual abuse				
Hyperactivity		0.009		
Perceived hyperactivity[a]	2.5	0.002	11.8	2.5–57.8
Unknown hyperactivity[b]	–1.3	0.199	0.3	0.0–2.0
Disability	2.2	0.011	9.1	1.6–50.6
Disinterested mother	3.9	0.000	48.6	6.5–363.9
Birth order	–0.5	0.013	0.6	0.4–0.9
Wasting	6.2	0.002	481.8	10.7–21 734.1
Combined abuse				
Parents quarrel with child	2.9	0.010	18.0	2.0–164.3
Sick father	3.4	0.021	30.6	1.7–558.6
Sick mother	4.3	0.006	71.6	3.3–1546.1
Predominance of father	–5.7	0.003	0.0	0.0–0.01
Cruel mother	4.9	0.053	135.8	0.9–19 760.9
Problems in family	4.0	0.004	53.7	3.6–791.5
Birth order	–1.6	0.012	0.2	0.1–0.7
Teacher maltreatment	3.7	0.012	40.3	2.3–713.5
Injury signs	4.9	0.002	136.2	5.8–3202.1

[a]*Perceived hyperactivity: children who reported that others perceived them as hyperactive.*
[b]*Unknown hyperactivity: children who did not know if others perceived them as hyperactive.*

associated with them were 10.8, 4.7 and 1.7 respectively. The best predictors of physical abuse were maternal disinterest, maternal education and the presence of injury signs on the student's body. The odds of physical abuse were more than 20 times higher in association with these 3 factors. The significant predictors of sexual abuse were hyperactive child, disabled child, disinterested mother, low birth order child or wasted child. Combined abuse had more parental predictors than any other form.

Outcome sequelae

Aggressive and abusive behaviour and the adoption of habits such as smoking and al-

cohol intake were more prevalent among abused children (Table 4). The observed overall difference was statistically significant ($P < 0.01$) for aggressive and abusive behaviour only. Violent behaviour was reported for more than 20% of the emotionally and sexually abused. Attention seeking behaviours were most common (59.3%) in the combined abuse group. Abusive behaviours were more common among those in the sexual abuse and combined abuse groups. More than 20% of the 2 groups reported touching or staring at the genitalia of the other or the same sex.

When the odds of such behaviour were calculated for each type of abuse versus no abuse, emotional abuse increased significantly the odds of violence and staring at the genitalia of the other or the same sex (ORs = 4.1, 3.3 and 6.7 respectively). Physical abuse did not significantly affect the odds of practising any of these behaviours. Sexual abuse significantly increased the odds of violence and all 4 abusive behaviours (ORs = 3.4, 6.5, 4.6, 4.4 and 20.3 respectively; Table 4). Combined abuse increased the odds of all behaviour patterns. The odds were significant in association with attempting to attract attention, all 4 abusive behaviours and drinking and smoking (ORs = 2.4, 4.8, 7.2, 5.4, 19.8 and 2.9 respectively).

Discussion

Abuse is widely prevalent among preparatory-school and secondary-school children in Ihnasya. Because the students in our study were selected randomly to represent the adolescent student mix, the results may be generalized to adolescent schoolchildren

Table 4 **Prevalence of outcome hazards among all 555 students according to type of abuse experienced**

Outcome hazard	Prevalence by type of abuse (%)				No abuse	Total outcome	
	Emotional	Physical	Sexual	Combined		No. of adolescents	%
*Aggressive behaviour***							
Destructive	2.9	4.8	2.6	7.4	2.6	18	3.2
Violent	23.5	16.7	20.5	13.0	7.1	63	11.4
Attention-seeking	33.8	31.0	38.5	59.3	33.0	199	35.9
*Abusive behaviour***							
Touching genitalia of other sex	10.4	4.8	23.1	22.2	4.6	46	8.4
Touching genitalia of same sex	3.0	9.5	12.8	18.5	3.2	32	5.8
Staring at genitalia of other sex	16.4	9.5	21.1	24.5	6.0	57	10.4
Staring at genitalia of same sex	9.0	2.4	23.1	22.6	1.7	34	6.2
Smoking/alcohol use	10.4	14.3	15.4	20.4	8.7	60	11.0

P < *0.01.*

in Upper Egypt and those living in similar conditions. Beni Suef is a district that is mostly rural, overcrowded and with service availability similar to many other areas in Egypt. The overall prevalence of abuse was 36.6%, which is higher than other reports of Egyptian preschool children and primary-school children [*18,21*]. Some differences can be attributed to the definition of abuse in each study and to under-reporting as the data in the other 2 studies were gathered by questionnaires completed by parents. Some parents might not perceive physical punishment triggered by the child's misconduct or belittling the child as abuse [*25,26*]. Moreover, parents might not be aware of the occurrence of sexual abuse or might refrain from mentioning it.

Abdel-Rahman reported a much lower overall incidence of abuse (5.7% of 13 689 reported cases) in Cairo, Giza and Qalyubiya areas [*20*]. The prevalence of abuse among reported crimes does not reflect the prevalence in a community, however, as they include sexual and physical but not emotional assaults. There is also the problem of under-reporting [*25*]. Sexual abuse is often hidden within families and may not be revealed until the victim speaks of it later in life [*27*].

Our observed rates were lower than those reported in Egypt and abroad by mothers having at least 1 child less than 18 years of age [*13,26,28*]. In the former, the study of abuse was based on the behaviour and perceptions of the mother rather than of the child, and abuse was defined differently. The child's love for, or fear of, the abuser might encourage acceptance of behaviours that the mother considers abusive rather than disciplinary. Some observed differences were attributed to stronger family ties, more stable relations, adherence to religious laws and lower alcoholism prevalent in a traditional community such as is found in Upper Egypt.

When we compare the rates for Egyptian preschool children, primary-school children and our students, it appears that sexual abuse may increase with age (0%, 2.3% and 7% respectively) while physical abuse may decrease with age (78.8%, 24.4% and 7.6% respectively) [*18,21*]. This observation has an important implication in that age should be considered in planning intervention against abuse. The occurrence of combined forms of abuse indicates interaction between the 3 types. When 1 form is encountered, it is advisable to look for others.

Risk factors in child abuse

Child abuse is a problem with deleterious effects that last into adulthood. In some nations the price tag for helping and protecting abused children is staggering. The cost in the United States of America is more than US$ 94 thousand million every year or US$ 258 million per day [*29*]. Preventive efforts should target specific risk factors that vary with geographical and cultural settings. In our Egyptian community, abuse was associated with many child, parental, familial, socioeconomic and school factors.

Child risk factors

Child factors that were associated with abuse in univariate analysis were sex, perception of a child as helpless or hyperactive, presence of sickness, disability, wasting or learning difficulty, living away from the family for some time and sharing a bed with others. The sex of the child was an important risk factor only for sexual abuse as males were more exposed than females. This contradicts studies from the United States and might be attributed to the relative freedom male children in Egyptian society enjoy in travelling, staying out and mixing with all sorts of people compared

with their female counterparts [*10,30*]. The susceptibility of males to abusive acts from strangers was observed in a study in the USA in which strangers were responsible for 60% of male rapes or physical assaults [*31*]. Another possibility is that females are less likely to disclose abuse, especially sexual abuse. They may be less likely to share information with a stranger conducting a survey or even with medical doctors handling their cases [*28*].

Other studies have reported that handicapped and chronically ill children were at a much higher risk of abuse [*23,32*]. Chronically ill and handicapped children may be vulnerable because their already frustrated parents cannot accept further misbehaviours. Hostility directed to such children is not uncommon [*32*]. Wasting and having learning difficulties can be both a cause and an effect of abuse. Victims manifest disturbed sleep, appetite and eating habits that lead to decreased rates of growth and lower educational attainment [*13,33*]. A child with learning disabilities may be punis hed corporally and insulted by his family members and his teachers in an attempt to force improved performance.

In agreement with our findings, living away from the family and sharing a bed with others have been reported as risk factors in child abuse [*16,34,35*]. The former deprives the child of parental care, supervision, protection and love and exposes children to persons who may try to take advantage of them. The increased risks that accompany sharing of a bed with others are probably due to accidental stimulation and crowding [*35*].

Multivariate analysis of our data showed that children's characteristics were the most significant in predicting sexual abuse. Accordingly, hyperactive, disabled and wasted children and their families should be targeted in efforts to control sexual abuse.

Parental risk factors

In Egypt and elsewhere parental characteristics that have been reported as risk factors for abuse include young age, low education, occupation and illness [*4,18, 26,36*]. Our results agreed regarding the effect of illness and occupation but not age or education. We found that the health status of parents had a significant effect on the occurrence of abuse. Maternal disease increased the odds of sexual and combined abuse significantly while paternal illness increased the odds of all but sexual abuse. This effect might be due to diminished care and supervision by the sick parent. Another possibility that has been suggested is that when a father has an unsatisfactory relationship with his ill wife, he might feel justified abusing his daughter [*37*].

Although occupation did not significantly affect overall abuse, children of mothers who work outside the home were at higher risk of emotional abuse than those of housewives. Usually, abused children of mothers who work outside the home were abused by someone other than the mother. In a South African study, 'mother employed and not as labourer' and 'violence at home not seldom' were 2 of 4 factors significantly increasing the likelihood of child sexual abuse [*15*].

Young and immature parents have been reported to be more abusive than older ones [*18,36*]. The primary factor in child maltreatment in one study was parental age less than 20 years [*36*]. In our study, the mean age of both parents at childbirth was above 25 years. Illiteracy and low education were not associated with higher odds for abuse; rather, the odds were higher among partly educated and highly educated parents. The level of education was linked

to patterns of teaching, guiding, stimulating and communicating with children [*38*].

In Egypt, child education is a concern for most families, especially for educated parents. Educated parents demand high educational achievement from their children so as to increase the child's chances of being admitted to university. Unintentionally, this might cause the parents to become pushy, impulsive and punitive. Conduct disorders are often reported in association with academic failure and reading disability [*39*].

In addition to education, occupation and disease, other parental characteristics such as cruelty (severity or hardness), disinterest and prison record significantly increased the odds of abuse among Ihnasya adolescents. This has been observed elsewhere [*16,21*]. The absence of the father, which was highly prevalent (21.1%) in the studied community, meant that less attention and supervision were paid to adolescents, rendering them victims of abuse. Furthermore, parental respect for children's needs, degree of parental care or negligence and parental attitude towards children's behaviour were predisposing factors for abusive behaviour and for the child to be a future abuser [*21*].

Familial risk factors

Among the fundamental risk factors for child abuse were disturbed family equilibrium, child–parent relationships and parents' marital relationships. The importance of the family setting as a protective factor for the wholesome development of the child has been reported and the loss of one or both parents, not living with both parents, not sharing social activities with them, parental addiction and alcoholism predisposes the child to abuse [*16*]. Other studies have emphasized the association with violence in the family, familial problems, separation and marital conflicts [*4,8,15*].

Abuse in our study was significantly associated with parents' quarrels with adolescents, the presence of problems in the family, troubles between parents and smoking. Violence between parents predicted a higher level of mother–child punitiveness [*40*]. When parents have problems or are the victims of violence, they are more likely to have difficulty being emotionally available for their children. Substance abuse has been reported to increase all forms of child maltreatment through its interaction with socioeconomic stress and family dynamics [*41*].

The results of our study suggest that a large percentage of families handle things improperly. Parental knowledge of the principles of childrearing, especially in handling children with special needs (e.g. hyperactivity, illness or learning difficulties), seems to be deficient. Proper parental education about handling children with challenges is of utmost importance for raising them properly and would reduce the stresses on both parents and children.

Socioeconomic factors

Many researchers have reported the significant effects on abuse of low income, not belonging to nuclear families, living in congested surroundings and having a caregiver with experience of unskilled work or unemployment [*26,42*]. Contrary to their findings, abuse in our study was not significantly associated with income, property ownership or type of family. It was not associated with reading newspapers or watching TV. In our study, 24.6% of fathers and 12.9% of mothers could read and write only. Multivariate analysis showed that crowding was important in predicting emotional abuse. With large numbers of children, a parent's ability to care may be lessened. Children in the largest families were physically neglected at 3 times the

rate of those who came from single-child families [*10*].

The observed discrepancies regarding risk factors between our study and others, namely education and socioeconomic factors, reflect to a great extent variability in geographic region, culture and childrearing practices. They capture what is expected from a child by the caregiver, how the latter responds to non-conformance and the perception of both to an encounter. For example, one Egyptian study used reluctance of the mother to consult the school when there had been a complaint about a child's academic progress to indicate educational negligence [*26*]. A parent might not be reluctant to contact the school but might also respond improperly through criticism, nervousness or threatening, which are emotionally abusive to the children [*22*].

School factors

Large proportions of the emotionally and combined abused children (49.3% and 44.2%) reported being maltreated by teachers. This maltreatment was significantly associated with the presence of educational difficulties and the perception of a child as helpless, having a disability or having a somatic disease. Unfortunately, instead of receiving more attention and care, children with learning difficulties, disabilities or somatic diseases were more susceptible to teacher maltreatment and abuse. Teachers are often responsible for abuse; they should be educated and supported to address the problem [*4*]. In a 1998 study, some professionals working with children, such as social workers and school physicians, were deficient in their knowledge of child abuse [*25*].

Sequelae

Because physical and sexual abuse are the most commonly reported types of abuse, their sequelae have been studied thoroughly. In a brief review of the literature concerning the impact of sexual abuse on the victim's psychological well-being, abused children suffered from depression, anger, hostility and self-destructive behaviours [*43*]. Children who experienced violence either as victims or as witnesses were at increased risk of becoming violent themselves [*44*]. Those findings were confirmed in our study in that abused children had higher odds for developing violent behaviours. Perhaps as a reaction to neglect, a large percentage (40%) of abused children in our study practised behaviours to attract the attention of parents including beating siblings, committing intentional mistakes in front of parents and embarrassing parents in front of others, or developed habits such as smoking or drinking alcohol (10%).

Another even graver sequel of abuse is the development of abusive behaviour [*21*]. In a 1999 study in Egypt, abused children exhibited deviant behaviour in the form of aggression or inappropriate sexual behaviour [*39*]. Our findings were similar in Ihnasya where the odds of sexual behaviours such as staring at or touching the genitalia of the same or other sex were significantly raised by abuse. Not only were children subject to such immediate sequelae but long-term effects have also been reported [*5–7*]. Sexual abuse during childhood correlated significantly with marital problems and disorders of adult personality and behaviour, especially disorders associated with sexual development and orientation [*43,45*]. Moreover, histories of abuse were positive in patients with neurotic, psychiatric or stress-related disorders and those with substance abuse [*46*].

Conclusions

The prevalence of abuse was higher among adolescents in our study than among younger children in two previous studies [*4,21*]. Many child, parental and socio-familial factors were involved. The significant predictors of emotional abuse were degree of crowding in the home, sickness and teacher maltreatment. Predictors of physical abuse were maternal disinterest, maternal education and signs of injury. Sexual abuse was significantly predicted by a child being hyperactive, disabled, having a disinterested mother, of low birth order or wasting. Abuse has serious outcomes in the form of violence, smoking and development of abusive behaviour. Our study indicated that perhaps neither parents nor schoolteachers knew how to deal with children with special needs. Accordingly we need to increase the awareness of parents, teachers, medical and paramedical personnel and the general public about the problem, its magnitude, manifestations, prevention and management. Family equilibrium and strong parent–child relationships are important for child safety. Accordingly, family-counselling services should be available and parents with problems should be encouraged to use them. The use of rewards rather than punishments should be encouraged among parents and others working with children. Children must be taught at school and through the media how to defend themselves and how to behave when faced with threats of abuse. Social and psychiatric services need support both in primary health care and school settings. The establishment of governmental and nongovernmental organizations and groups to combat abuse need to be encouraged. Electronic journals and networks developed by international organizations should be used.

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Child and Adolescent Mental Health Initiatives of the Department of Mental Health and Substance Abuse

For the past two years the Department has supported the development of a coordinated child and adolescent mental health programme. The programme has fostered a recognition throughout WHO and in the WHO Regions that child and adolescent mental health is a necessary priority for the healthy development of societies. WHO's Department of Mental Health and Substance Abuse has initiated three programmes which together form a coordinated effort to address global child and adolescent mental health problems. The programme at its very core appreciates the global interdependence of societies. The three programme elements include 1) a campaign on the stigma associated with mental illness among youth, 2) a global policy initiative that will equip ministries of health to develop coordinated, responsive programmes where child and adolescent mental health will be integrated into overall health care, and 3) a programme to assess the global treatment gap associated with mental illness. Further information can be obtained on line at: http://www.who.int/mental_health/prevention/childado/en/

Knowledge of and attitudes towards family planning by male teachers in the Islamic Republic of Iran

R. Tavakoli[1] and H. Rashidi-Jahan[1]

معلومات حول مواقف المعلمين الذكور من تنظيم الأسرة في جمهورية إيران الإسلامية

رضا توكّلي، حامد رشيدي جهان

الخلاصة: أُجريت دراسة عرضانية حول معارف ومواقف المعلمين الذكور في النظام التعليمي في طهران من تنظيم الأسرة، ووجد أن 65٪ من جمهور الدراسة لديهم معارف مقبولة عن الموضوع، وأن أكثر من 95٪ من المستجيبين قد أبلغوا عن مواقف محبِّذة لتنفيذ برامج تنظيم الأسرة وأن 90٪ منهم يعتقدون أن اتخاذ القرار حول استخدام مانعات الحمل ينبغي أن يكون عملية مشتركة بين الزوجين. ولتحسين التخطيط والإدارة في برامج تنظيم الأسرة فإن المتغيرات الرئيسية التي حددتها هذه الدراسة تحتاج لمزيد من الاستقصاءات في مختلف المجموعات السكانية. فالتوجُّه إلى الرجال في برامج تنظيم الأسرة قد يُحسن من فُرَص النجاح وقد يؤدي إلى تزايُد استخدام مانعات الحمل.

ABSTRACT A cross-sectional study was carried out on knowledge of and attitudes to family planning in male teachers working in the education system in Teheran. We found that 65% of the study population had acceptable knowledge regarding the issue. More than 95% of respondents reported having a favourable attitude towards the implementation of family planning programmes and about 90% believed that decision-making regarding use of contraceptives should be a joint process. To improve the planning and administration of family planning programmes, the main variables identified in this study should be further investigated in different population groups. Addressing men in family planning programmes may improve their success and lead to increased contraceptive use.

Connaissances et attitudes des enseignants de sexe masculin concernant la planification familiale en République islamique d'Iran

RESUME Une étude transversale a été réalisée sur les connaissances et attitudes à l'égard de la planification familiale des enseignants de sexe masculin travaillant dans le système éducatif à Téhéran. Nous avons constaté que 65 % de la population de l'étude avait des connaissances acceptables dans ce domaine. Plus de 95 % des répondants déclaraient avoir une attitude favorable à l'égard de la mise en œuvre des programmes de planification familiale et environ 90 % pensaient que les décisions concernant l'utilisation de contraceptifs devraient être prises en commun. Pour améliorer la planification et l'administration des programmes de planification familiale, les principales variables identifiées dans cette étude devraient faire l'objet d'une étude plus poussée dans différents groupes de population. La prise en compte des hommes dans les programmes de planification familiale peut améliorer le succès de ces programmes et permettre un plus grand recours à la contraception.

[1]*Health Education Department, Faculty of Health, Baghyatallah University of Medical Sciences, Tehran, Islamic Republic of Iran.*
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Introduction

The most important problem of human beings today is not infectious diseases but population. The world population now is higher than at any time in its history. The main problem is the rate of population increase. Statistics show that the population of the world was about 1 billion in 1850. Eighty years later, in 1930, the population had doubled (2 billion). Only 46 years after that, in 1976, it had doubled again [*1*]. Today, it is more than 6 billion. Increase in population has been deemed the most important socioeconomic and cultural phenomenon in recent decades.

The ramifications of population increase constitute a serious threat; a country with a population greater than its socioeconomic resources can support would be faced with many problems, both cultural and socioeconomic, which in turn would influence its independence.

Examining the population records of our country (Islamic Republic of Iran), it can be seen that over a period of about a century, from 1900 onward, the population increased 6-fold (from 10 million to 60 million). The last doubling of the population occurred over a period of only 20 years, 1979–1999 [*2*]. This increase in population affects many aspects of society, including living conditions, basic needs, employment status and the health system. Because of the great effect population size has on socioeconomic status, education and health planning, a full understanding of this phenomenon and the major factors governing it is essential.

The results of earlier studies have indicated that in order to have a successful programme in the domain of population control and family planning, beliefs, attitudes, behaviour and the viewpoints of the public regarding reproduction should be taken into account [*3*]. Practising family planning is influenced by various social, cultural, economic and political factors. Most research into family planning and reproductive health services targets women, particularly ever married women of reproductive age. Consequently, these services, as well as the research, have not addressed a large number of issues concerning men (S. Basnayak, S. Thapa, unpublished report, 1985).

It needs to be recognized that women, particularly in developing economies, are often economically and emotionally dependent on their male partners (G. Gordon, C. Kanstrup, unpublished report, 1995). The need to encourage and enable men to take responsibility for their sexual and reproductive behaviour and their social and family roles was also stressed during the International Conference on Population and Development (Cairo, Egypt, 1994) [*4*].

The behavioural and psychosocial aspects of reproductive health issues concerning men revolve around their involvement in contraceptive programmes, assuming a greater responsibility for and participation in all matters related to conjugal relations, and promoting a greater understanding of male sexual health problems and their management.

Very few studies have actually looked into men's attitudes about contraception, pregnancy and child rearing or into the possible ways of changing their possible resistance towards family planning, especially to the use of contraception (Population Council, unpublished data, 1994).

A study conducted in Sudan on male viewpoints on the issue of family planning indicated that there is a positive association between male involvement and the success of family planning programmes [*5*]. Our paper examines knowledge of and attitudes to family planning programmes by Iranian

male teachers. Their beliefs about decision-making regarding the use of contraceptives are also reported.

Methods

We carried out a cross-sectional study during May 1998 to investigate knowledge and attitudes of family planning by male teachers working in the different levels of the 19 regions of the education system in Tehran, a total population of 2615 teachers. The sample for the study population was calculated using the formula:

$$n = z^2pq/d^2$$

where n is the desired sample size, $z = 1.96$ at 95% significance level, p = is the prevalence of the dependent variable in the community, $q = (1–p)$, d = degree of accuracy.

The number of particpants was 365, randomly drawn from the selected population. The collected data were coded and analysed using *SPSS*. The chi-squared test was used for statistical analysis.

We designed a questionnaire to assess knowledge and attitude with regard to family planning. This was pre-tested for validity by administering to 20 teachers from the same population, following which 2 questions were removed. To determine the level of knowledge of the respondents, each question received 1 point. The results were then categorized, a score of ≤ 9 indicating little knowledge, 10–15 moderate knowledge and 16–20 good knowledge.

The attitude of the respondents with regard to family planning was assessed and analysed in a similar way, 1 point being given for each of the 28 questions. Attitude was categorized with a score of ≤ 17 graded as negative attitude, 18–23 moderately positive and 24–28 positive.

Results

Age distribution of the participants is shown in Table 1. The mean age was 33.3 years (standard deviation 7.3), 20% were ≤ 40 years. The results also showed that 44.4% of respondents had graduated from high school and 55.6% had higher education. Most of the information regarding contraceptives was received through television (65.8%) and radio (50.7%) (Table 2). Although 69.6% of participants were familiar with health centres, only 3.8% mentioned the health centre or physician as a source of information. The best age for marriage was considered to be between the ages of 25 and 29 years for males accord-

Table 1 **Distribution of the participants by age**

Age (years)	No. (*n* = 365)	%
20–29	136	37.3
30–39	156	42.7
40–49	64	17.5
≥ 50	9	2.5

Mean = 33.3 years, standard deviation = 7.25 years.

Table 2 **Distribution of the participants according to source of information regarding family planning**

Source	No. (*n* = 365)	%
Television	240	65.8
Radio	185	50.7
Book	126	34.5
Press	119	32.6
Formal education	67	18.4

ing to 68.1% of the respondents, whereas 57.0% considered the best age for marriage for women to be 20–24 years, with 37.1% believing < 19 years was the best age (Table 3).

The best age for pregnancy was considered to be 20–29 years by 95.9% of the respondents, < 19 years by 3.6% and 30+ years by 0.5%. For knowledge regarding family planning, 20.2% of the study sample had a low level of knowledge, while 64.7% and 15.1% respectively had scores indicating a moderate or good level of knowledge. A majority of the respondents, 71.0%, had a positive attitude towards family planning programmes, with 25.8% having a moderately positive attitude and only 3.3% having a negative attitude. The results also indicated that 88.8% of respondents believed that decision-making regarding family planning was a joint process. The proportion of respondents who considered that this should be solely a male or female decision was 10.1% and 1.1% respectively.

We found 97% of the 72 unmarried respondents stated that they agreed with the administration of family planning programmes and would practise contraception following marriage. Regarding preferred family size, only 17.8% of respondents believed that 3 children would be ideal (Table 4). Education status was also investigated in relation to actual family size of the respondents, which showed that 55.6% of the respondents with a high school diploma had 1 or 2 children and 39.4% had ≥ 3 children. The results for those with a higher level of education were 61.6% and 13.9% respectively (Figure 1).

More than 89% of the married respondents had married between the ages of 20 and 29 years (Table 5).

To determine the relationship between knowledge of family planning and marital status, a chi-squared test was applied (Ta-

Table 3 **Distribution of the 365 participants by beliefs about the best age for marriage for males and females**

Best age (years)	For males No.	%	For females No.	%
<19 years	9	2.5	136	37.3
20–24 years	108	29.6	208	57.0
25–29	248	68.1	21	5.8

Table 4 **Distribution of participants by ideal number of children per family**

Ideal number of children	No. (*n* = 365)	%
1	12	3.3
2	265	72.6
3	65	17.8
≥ 4	23	6.3

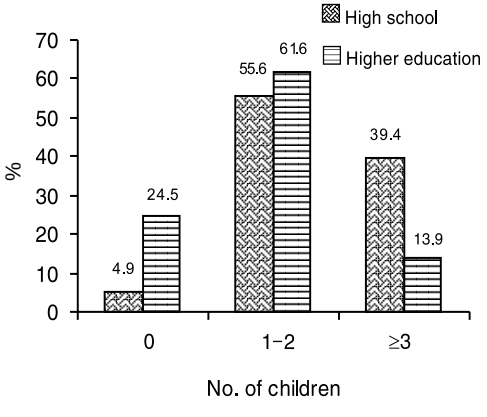

Figure 1 **Distribution of the married study population by educational status and number of children**

Table 5 **Distribution of married participants by age at marriage**

Age at marriage (years)	No. (*n* = 293)	%
<19	5	1.7
20–29	262	89.4
30–39	25	8.5
≥ 40	1	0.3

ble 6). The results show a statistically significant relationship between the 2 variables ($P < 0.001$).

A chi-squared test was used to determine the relationship between awareness of methods of contraception and the education status of the respondents. The results show a statistically significant positive relationship between the 2 variables (Table 7), i.e. higher education status corresponded with increased knowledge of contraceptive methods ($P < 0.05$).

Discussion

Analysis of the results showed that approximately 80% of respondents were familiar with family planning programmes. This knowledge was obtained through a variety of means, television being the main source of obtaining information among the study population (65.8%), followed by radio (50.7%) (Table 2). These results are comparable with those of a previous study which reported 45% and 39.7% for television and radio respectively, these being considered the 2 most important sources [*6*]. This indicates that, in the Islamic Republic of Iran, the mass media in general, and television and radio in particular, are the most important sources of information regarding health issues such as family planning. In contrast to our findings, in another Iranian study, the health centre was mentioned by a considerable portion of the respondents (41.5%) as their source of information. This was followed by physician (14%), friends (12%) and books (4.5%) [*7*]. In another study, the health centre as a source of obtaining information was reported by 33.6% [*8*].

Our study also shows that 69.6% of the study population were familiar with health centres and family planning clinics, i.e. about 30% of the teachers are not familiar with these centres. Therefore, in order to run a successful family planning programme in practical terms, we need to promote health centres more.

Table 6 **Distribution of the participants by knowledge of family planning and marital status**

Marital status	Knowledge of family planning					
	Little		Moderate		Good	
	No.	%	No.	%	No.	%
Unmarried (*n* = 72)	30	41.7	34	47.2	8	11.1
Married (*n* = 293)	44	15.0	202	68.9	47	16.0
Total	74	20.3	236	64.7	55	15.1

$\chi^2_2 = 25.36$, P < *0.001.*

Table 7 **Distribution of the study population by awareness of number contraceptive methods and educational status**

Education status	0 methods		1–3 methods		4–6 methods		7–8 methods	
	No.	%	No.	%	No.	%	No.	%
High school diploma (*n* = 162)	1	0.6	33	20.4	114	70.4	14	8.6
Higher education (*n* = 203)	3	1.5	34	16.7	129	63.5	37	18.2

$\chi^2_3 = 7.80$ P < *0.05.*

Approximately 15% of the respondents had a good knowledge regarding the issue of family planning. Familiarity with family planning programmes is reported by many other studies [*8,9*]. Rama Rao et al. for instance, reported that knowledge of family planning was widespread and that all the respondents in their study were aware of at least 1 method of contraception [*8*].

Almost all our participants had a favourable attitude towards family planning, which is similar to the study done by Rama Rao et al. who reported that the majority (80%) of their respondents were in favour of family planning [*8*]. Respondents who had favourable attitudes to family planning cited reasons such as health of the mother or the child, having fewer children and maintaining one's standard of living.

Most of our respondents (88.8%) indicated that decision-making regarding family planning and the use of contraceptives should be a joint process between husband and wife. The important point here is that the respondents did not believe that the decision should be made by the only man or only the woman. A male-based study done in Nigeria indicated that 88% of males and 78% of females believed that decision-making regarding family planning is more influenced by males (N. Orobaton, unpublished report, 1993). In another study done by Obionu in Nigeria most of the study population had positive attitudes regarding the use of contraceptives [*9*].

In our study, 76.9% of all the participants thought that 1–2 children was the ideal family size, which is similar to other studies [*10*]. Among the married participants, a statistically significant negative relationship was found between number of children and education status. Only 13.9% of respondents with a higher education had ≥ 3 children. The majority (61.6%) had 1–2 children. On the other hand, 39.4% of married respondents with high school diploma had ≥ 3 children. The difference between these 2 groups in having 0 children was also quite marked, 4.9% for those with a high school diploma as opposed to 24.5% for those with higher education. The results also show a significant correlation between level of education and having information regarding contraceptive methods.

As a result of these associations, one may conclude that formal education plays an important role in many issues related to family planning programmes, such as knowledge of contraception, age of mother at childbirth and number of children. Therefore, this should be taken into account in planning and running family planning programmes in the Islamic Republic of Iran.

To gain a better understanding of the factors influencing the planning and running of family planning programmes, more studies should be conducted in other population groups with the focus on the main variables identified in this study.

In general, the study reveals good knowledge and understanding of and favourable attitudes towards family planning by male teachers. We suggest that the inclusion of men in family planning programmes would result in an improvement in the success of those programmes and an increase in contraceptive use by married couples.

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Outcome of azithromycin treatment of active trachoma in Omani schoolchildren

R. Khandekar[1] and A.J. Mohammed[1]

حصيلة معالجة التراخوما النشيطة بالآزيثروميسين لدى الأطفال العُمانيين

راجيف خانديكار، علي جعفر محمد

الخلاصة: أُجريت دراسةٌ أترابيَّةٌ استباقية شملت 386 من تلامذة الصف الأول من المدارس الابتدائية في عُمان من المُصابين بالتراخوما النشيطة مع 386 من الشواهد الذين يماثلونهم في كل شيء إلا في الإصابة بالتراخوما. وقد تلقّى جميع الأطفال التثقيف اللازم حول الوقاية من التراخوما، ثم عولجت حالات التراخوما بجرعة وحيدة من الآزيثروميسين عن طريق الفم (20 مغ/كغ)، ثم أعيد تقييم وضع التراخوما بعد 6 أسابيع ثم بعد 6 أشهر ثم بعد 12 شهراً. وقد زالت الجريبات والعلامات الالتهابية للحثر النشيط بعد مضي 6 أسابيع أو أكثر على المعالجة بالآزيثروميسين. وقد حدثت أفضل مستويات الوقاية من دورات عدوى التراخومالية التالية بعد 6 أشهر (85.2٪ من الحالات و99.0٪ من الشواهد خالية من العدوى) ثم تناقصت بعد 12 شهراً (66.7٪ من الحالات و98.2٪ من الشواهد خالية من العدوى). وقد تبيَّن أن التقييم السريري يمثِّل وسيلة مفيدة لتقييم استجابة حالات التراخوما النشيطة للمعالجة بالآزيثروميسين في أطفال المدارس في البلدان ذات الموارد المحدودة.

ABSTRACT A prospective cohort study was made of 386 first-grade primary-school children in Oman with active trachoma and 386 matched controls without trachoma. All children were educated about trachoma prevention. In addition, trachoma cases were treated with a single dose of oral azithromycin (20 mg/kg). Trachoma status was evaluated after 6 weeks, 6 months and 12 months. The follicles and inflammatory signs of active trachoma resolved 6 weeks or more after azithromycin treatment. The protection against subsequent trachoma infection cycles was optimal at 6 months (85.2% of cases, 99.0% of controls infection-free) but declined at 12 months (66.7% of cases, 98.2% of controls infection-free). Clinical evaluation seems to be a useful tool to evaluate the response of azithromycin to active trachoma cases in schoolchildren in a country with limited resources.

Issue du traitement du trachome évolutif par l'azithromycine chez des écoliers omanais

RESUME Une étude de cohorte prospective a été réalisée à Oman chez 386 écoliers en première année de primaire présentant un trachome évolutif et 386 témoins appariés sans trachome. Tous les enfants avaient été sensibilisés à la prévention du trachome. En outre, les cas de trachome ont été traités avec une dose unique d'azithromycine orale (20 mg/kg). Une évaluation du trachome a été effectuée après six semaines, six mois et douze mois. Les follicules et les signes inflammatoires du trachome évolutif se sont résorbés six semaines ou plus après le traitement par l'azithromycine. La protection contre les cycles suivants d'infection trachomateuse était optimale à 6 mois (85,2 % de cas, 99,0 % des témoins sans infection) mais diminuait à 12 mois (66,7% des cas, 98,2 % des témoins sans infection). L'évaluation clinique semble être un instrument utile pour évaluer la réponse à l'azithromycine des cas de trachome évolutif chez les écoliers dans un pays dont les ressources sont limitées.

[1]Ministry of Health, Muscat, Oman.
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Introduction

Trachoma is still a leading infectious cause of blindness and ocular morbidity in the world [*1*]. In the policy document *Vision 2020—the right for sight* the World Health Organization has recommended that trachoma should be prioritized in national programmes [*2*]. The goal of elimination of blinding trachoma by 2020 could be achieved by adopting the SAFE trachoma control strategy (S: surgery for trichiasis, A: antibiotic treatment of active trachoma, F: facial cleanliness and E: environmental improvement) [*3*]. The global estimates in 2002 by the WHO suggest that nearly 84 million active trachoma cases need antibiotic treatment, 7.6 million trichiasis cases should be managed surgically and around 3 million cases of blindness are due to complications of trachoma. The Eastern Mediterranean Region has 11% of the active trachoma global pool and 22% of the trichiasis global pool [*4*]. A community-based study in Oman in 1996–97 showed that the population prevalence of active trachoma across all ages was 2.2% and that 1% of the population was suffering from trachomatous trichiasis [*5*].

Ocular infection with *Chlamydia trachomatis* can be effectively treated with oral azithromycin, which reaches therapeutic concentrations in ocular tissue at a dose of 20 mg/kg body weight [*6*]. Oral azithromycin also seems to have prophylactic properties. The 90% minimal inhibitory concentration for *C. trachomitis* can be detected in conjunctival tissues 14 days after administration of azithromycin. Hence, during this period, a child remaining at risk is likely to be protected from a second infection cycle [*7*]. The Nepal study showed that both targeted and mass treatment strategies using azithromycin significantly reduced the levels of trachoma in children 6 months after treatment [*8*].

The World Health Organization through the Global Alliance for Trachoma Control Initiative has provided this drug to many developing countries [*9*]. Both clinical and laboratory studies have shown that oral azithromycin treatment produces a high a clinical response, has minimal side-effects and achieves good compliance [*10–15*]. In 1999 the national eye health care programme at the Ministry of Health in the Sultanate of Oman introduced azithromycin for the treatment of active trachoma cases among first-grade primary children in all Omani schools. However, prior to the introduction of azithromycin treatment, no information was available on the clinical response to this regimen among the Omani population.

The present study was undertaken to evaluate the effect of single-dose azithromycin treatment on Omani schoolchildren with trachoma after 6 weeks, 6 months and 12 months compared with a randomly selected and matched control group of healthy children without treatment. It was hoped that the findings of the study would enable a review of the trachoma control initiatives in Oman.

Methods

Sample

The study was a prospective cohort analytical clinical study. All first-grade primary pupils in all the government schools in Oman (out of an annual school population of nearly 42 000 pupils) were screened during 2000–01. All children with active trachoma were entered in the study; 5% were lost to follow-up, leaving 386 cases. To control for trends in the disease over time, a pupil of the same age, sex and school class but without active trachoma was matched to each case using random

numbers and enrolled in a control group who received no treatment.

Investigators

The field staff and the supervisors of the eye health care programme were qualified medical graduates related to the school health programme; all were trained in standard eye examination. The average experience of the school health doctors was 42 months. The supervisors had more than 10 years of experience. Supervision of each phase of the study at regional and central level was carried out by the investigators.

Data collection

The field investigators visited all schools of their allotted area. They explained the purpose of screening and the revised regimen for active trachoma to the school authorities. Verbal consent of the school principal was obtained to undertake the screening and treatment. All first-grade primary pupils were listed and eye examination was performed in the classroom.

Standard tools for clinical examination and reporting were used. A focusing torch and 2.5 × ophthalmic loupe were used to examine the eye for trachoma. A swab stick was used to evert the eyelid. Spirit swabs were used to clean the fingertips of the examiner to avoid cross-infection.

The trachoma grades used in this study were those recommended by the World Health Organization [*16*] and specified in the 10th revision of the *International classification of diseases* [*17*]. More than 5 follicles of > 0.5 mm in size on the tarsal conjunctiva in either eye was classified as trachomatous inflammation, follicular (TF). Pronounced inflammatory thickening of the tarsal conjunctiva that obscured more than half of the normal deep tarsal vessels was considered as trachomatous inflammation, intense (TI). If one eye had TI and the other eye had TF, the child was classified as having TI. Presence of scarring in the tarsal conjunctiva was defined as trachomatous conjunctival scarring (TS). Absence of TF and TI grades or presence of TS at the time of follow-up was considered as successful outcome of the treatment. Presence of TF or TI on follow-up after 6 weeks and 6 months was considered as non-response to the treatment. Presence of TF and TI after 1 year was considered as either non-response to the treatment or re-infection.

A standard pre-tested form was used to record personal details and trachoma status. Children with active trachoma were weighed using a standard calibrated weighing machine. The quantity of azithromycin was calculated using 20 mg/kg body weight. To ensure that child was not allergic to routine medicines, the school health records were consulted. After the child's breakfast, an azithromycin suspension was prepared and given orally in the required dose. Any side-effects within 24 to 48 hours were recorded and these children were referred to the primary health centre.

During the follow-up visits at 6 weeks, 6 months and 12 months, a detailed eye examination to note trachoma status was performed by eye health care supervisors who were blind to the treatment status of the children. Information on each follow-up visit was collected on a standard form. New cases of active trachoma found during follow-up in cases or controls were treated with oral azithromycin.

Both cases and controls were exposed to health education about facial cleanliness and environmental improvement.

Data analysis

The data was computed using *Epi-Info,* version 6. The data was cleaned and checked for consistency. Analysis of the

study data was carried out using *SPSS*, version 9. The frequencies and their percentage proportions along with the 95% confidence intervals (CI), odds ratio (OR) and relative OR were calculated for validation.

Ethical considerations

As per the Helsinki Declaration for *International guidelines for biomedical research involving human subjects* issued in 1992, the following issues were addressed in this study. The consent of administrators in the Ministry of Health and schools were obtained. The children with eye problems detected during the study were provided with free treatment. The results of this study were used for the improvement of eye care of the study subjects and the national programme. The confidentiality of the study results was maintained.

Results

A total of 386 active trachoma cases detected in school screening in Oman and 386 randomly selected pupils without active trachoma at the time of screening were entered in the study.

The distribution of the cases by sex and region is given in Table 1: 207 (53.6%) were girls, 179 (46.4%) boys. The percentage of the cases in each region were: 47.7% in Dhakhiliyah, 27.7% in North Sharqiyah, 5.4% in South Sharqiyah, 10.1% in North Batinah and 9.1% in South Batinah.

At the start of the study, 375 (97.2%) of the cases were classified as TF and 9 (2.3%) as TI. Two children had less than 5 follicles of more than 0.5 mm size in the tarsal conjunctiva (TF_o).

Table 2 shows the trachoma status of cases at 6 weeks, 6 months and 12 months after azithromycin treatment compared with controls. Peak response to the azithromycin regimen was observed at 6 months (85.2% of cases with no active trachoma) and had declined by 12 months (66.6% of cases with no trachoma).

The trachoma status by sex is given in Table 3. Response to azithromycin treatment was significantly higher among girls than boys, especially at 6-months follow-

Table 1 **Distribution of the trachoma cases in 6-year-old schoolchildren by sex and region of Oman**

Region	Males		Females	
	No.	%	No.	%
Dhakhiliyah	77	43.0	107	51.7
North Sharqiyah	51	28.5	56	27.1
South Sharqiyah	10	5.6	11	5.3
North Batinah	18	10.1	21	10.1
South Batinah	23	12.8	12	5.8
Total	179	100.0	207	100.0

Table 2 **Active trachoma status of cases and control children at different follow-up times after azithromycin treatment**

Follow-up interval	Active trachoma No.	No active trachoma No.	%	95% CI
Cases (*n* = 386)				
6 weeks	151	235	60.9	54.7–67.1
6 months	57	329	85.2	81.4–89.0
12 months	129	257	66.6	60.9–72.5
Controls (*n* = 386)				
6 weeks	4	382	99.0	98.0–100.0
6 months	2	384	99.5	98.8–100.0
12 months	4	382	99.0	98.0–100.0

n = *total number of children.*

up (91.8% of girls with no active trachoma compared with 77.0% of boys).

Discussion

More than 95% of the active trachoma cases among first-grade Omani primary schoolchildren were enrolled in this study. In Oman, primary schooling is free and compulsory. Therefore, the study population is likely to be representative of the population of 6-year-old Omani children with and without active trachoma. The cases and the controls were from the same school class, age and sex and thus all factors except the presence of active trachoma and its standard treatment are likely to be similar in both groups. The investigators were experienced in trachoma grading and eye examination, which minimized the chances of misclassification, and use of the WHO trachoma grading reduced the risk of misclassification bias. Regional comparisons were not made because the samples in some regions were small and the overall prevalence of active trachoma was only around 1%.

There were some limitations to the study. Success and failure of treatment was assessed by clinical evaluation and not by laboratory tests and thus the outcomes might differ from studies that measure cure rate by laboratory tests. Due to the large number of staff involved in the screening, individual variation in the interpretation of trachoma cannot be ruled out, despite efforts for standardization. Children in the control group found to have active trachoma during follow-up were given treatment and this might have caused a slight underestimation of active trachoma rates in the control group during subsequent examinations.

The active trachoma status at follow-up was used to determine the clinical cure rate of azithromycin. Other factors such as improved health education in schools, focusing on face washing practices and sanitation habits, could also have contributed to the reduction of active trachoma

Table 3 **Active trachoma status of cases and control children by sex at different follow-up times**

Follow-up interval	No active trachoma				OR	95% CI	Relative OR
	Male (*n* = 179)		Female (*n* = 207)				
	No.	%	No.	%			
Cases							
6 weeks	98	54.7	137	66.2	1.62	1.05–2.49	1.0
6 months[a]	138	77.0	190	91.8	3.22	1.69–6.19	2.0
12 months[b]	94	52.6	155	75.0	2.70	1.72–4.24	1.7
Controls							
6 weeks, 6 months and 12 months	177	98.9	205	99.0	1.16	0.12–11.61	NA

n = *total number of children.*
[a]*Follow-up information on sex was missing for 1 child.*
[b]*Follow-up information on sex was missing for 8 children.*
NA = not applicable.

rates. However, in a short span of 1 year these other factors are unlikely to have made a substantial impact. Therefore, the reduced active trachoma rate on follow-up is most likely the result of the therapeutic/prophylactic effect of azithromycin treatment. The presence of less than 1% active trachoma cases among controls at follow-up suggests that trachoma infection cycles are repeated in the community.

The large numbers of TF cases (97.2%) and only 2.3% of cases with TI grade suggest that the communicable stages of trachoma among 6-year-old Omani children are of mild intensity. The presence of some cases with less than 5 follicles in a trachoma endemic area favours inclusion of the TF$_s$ stage in the trachoma grading system. It could help the primary care staff in monitoring azithromycin distribution and evaluating the treatment outcome.

In the present study, around 40% of children still had signs of active trachoma (mainly follicles) after 6 weeks of treatment. A study in Gambia showed a clinical cure rate of 78% after 6 weeks [*10*] and 85% after 6 months. In other studies, where confirmation was based on clinical as well as laboratory tests, azithromycin was confirmed to have high rates of clinical cure as well infection reduction. The cure rate was reported to be 100% by 6 months in Saudi Arabia [*11,18*]. The infection rate was 5% after 2 months and 9% after 1 year through the immunofluorescence staining method. In Gambia, the cure rate was 65.4% measured using Giemsa staining and direct immunofluorescence staining [*10*]. The reduction in clinical activity was observed in 82% of the sample. Cases were tested by the lignase chain reaction method in Egypt [*12*], Gambia [*10*] and Tanzania [*13*]. Thus, the observation of rising clinical cure rate in the present study matches that of other studies. However, the low rate of clinical cure after 6 weeks does not match with high cure rates reported in other studies. This could be due to late resolution of trachoma follicles among the Omani children. A positive association of human leukocyte antigens (HLA) with susceptibility to blinding trachoma has been found in Omanis [*19*]. Genetic difference and the presence of different serologically typed *Chlamydia* spp. organisms could be the reason for the difference in trachoma severity and drug response in Oman.

The study of Egyptian children [*13*] had shown a clinical cure rate of 35% after 2 months of azithromycin treatment. However, using laboratory tests (immunofluorescence), the infection rate was found to decline from a pre-treatment rate of 33% to 5% at 2 months and 9% at the end of 12 months. Although in the present study the follow-up based on clinical examination after 6 weeks of treatment showed a high number of active trachoma cases, these may have the potential to infect others and may resolve clinically with time. A separate study to determine the cure rate of azithromycin treatment in Oman using laboratory testing for *C. trachomatis* should be undertaken.

As the tissue concentration of the drug gradually declines, the prophylactic role of azithromycin treatment declines with time [*15*]. Thus, at 12 months after treatment, in the absence of immunity against trachoma organisms, a person is at-risk for re-infection. The presence of TF and TI after 12 months observed in this study may be due to non-response to azithromycin or could be evidence of subsequent infection cycles.

Due to its affordability, repeatability and easy implementation, clinical evaluation seems to be the most practical method of evaluating the response to trachoma treatment at the primary care level. Clinical evaluation as used in this study could be a

monitoring tool to evaluate the impact of the 'A' antibiotic component of the 'SAFE' strategy for trachoma control in developing countries. However, the study findings suggest that clinical response to azithromycin should be evaluated after 6 months rather than after 6 weeks. Thus, annual school screening to identify and treat children with active trachoma should include follow-up of these positive cases after 6 months to evaluate their trachoma status and give a second dose of oral azithromycin if required.

The clinical cure rates in girls were significantly higher than in boys on follow-up at 6 weeks, 6 months and 12 months, especially at 6 months. In Oman, although active trachoma rates in both male and female children were reported to be equal, the blinding trachoma rate was significantly higher in females than males (unpublished report to WHO). Sex-related factors might influence the inflammatory response to trachoma infection in the Omani population.

The active trachoma rate of around 1% in first-grade Omani children suggests that, despite the high trachoma rates in the past, the infection pool in children might be declining and the country may be in an epidemiological transition phase. Although the active trachoma cases in Oman clinically fit the standard trachoma grading, the role of *C. trachomatis* in inflammatory conjunctival response might be different to other trachoma-endemic countries. A detailed pathological and microbiological study would enable scientists to understand the pathogenesis of trachoma in Oman and other countries with a similar trend of rapid decline of trachoma.

Conclusions

This study found a high clinical cure rate of a single-dose oral azithromycin for active trachoma among first-grade Omani schoolchildren both at short- and long-term follow-up. The active trachoma cases detected among control children during follow-up at 6 months and 1 year suggests active disease among contacts. Trachoma follicles resolve late after oral azithromycin treatment in Omani children. Clinical evaluation after 6 months seems to be a reliable tool for monitoring the impact of the 'A' (antibiotic) component of 'SAFE' trachoma control initiatives.

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Tuberculin reactivity among health care workers at King Abdulaziz University Hospital, Saudi Arabia

E.A. Koshak[1] and R.Z. Tawfeeq [2]

تفاعلية التوبركلين بين العاملين الصحيين في جامعة الملك عبد العزيز في المملكة العربية السعودية

عماد كوشك، رزاز توفيق

الخلاصة: يُعَدُّ السل عدوى مهنية وعدوى مستشفَوِيَّة في الوقت نفسه وقد تم استقصاء معدل انتشار إيجابية التفاعلات الجلدية للتوبركلين في جامعة الملك عبد العزيز في المملكة العربية السعودية بإجراء اختبار التوبركلين في 298 من العاملين الصحيين. وقد استخدم الاختبار الجلدي التقليدي بالتوبركلين بإعطاء 0.1 ميلي لتر من المشتق البروتيني المنقى حقناً تحت الجلد، وبعد 48 – 72 ساعة تم تسجيل مساحة الارتشاح، وكان معدل انتشار الاختبارات الإيجابية (أي التي يزيد فيها قطر الارتشاح عن 10 ميلي متر) 78.9٪ بشكل عام و60٪ بين السعوديين و81.8٪ في غير السعوديين (وبمعادل دقة P<0.01). وكان وسطي القطر 8.9 ± 7 ميلي متر بالنسبة للسعوديين وهو أقل بشكل واضح مما عليه لدى غير السعوديين (13.9 ± 7 ميلي متر) وبمعادل دقة P<0.001. ولذلك كان لابد لتعزيز صحة العاملين الصحيين والمرضى المقبولين في المستشفيات، من إيلاء الاهتمام باتخاذ تدابير وقائية فعَّالة وإجراء اختبار التوبركلين كل سنة.

ABSTRACT Tuberculosis is both a nosocomial and an occupational infection. The prevalence of positive tuberculin skin reactions at King Abdulaziz University Hospital, Saudi Arabia, was investigated by testing 298 health care workers. Conventional tuberculin skin testing was performed using 0.1 mL of purified protein derivative injected intracutaneously. After 48–72 hours, induration size was recorded. The prevalence of positive tests (induration ≥ 10 mm) was 78.9% overall, 60.0% for Saudi Arabians compared with 81.8% for non-Saudi Arabians ($P < 0.01$). The mean response size (8.9 ± 7.1 mm) for Saudis was also significantly lower than for non-Saudis (13.9 ± 7.1 mm, $P < 0.001$). To enhance the protection of both health care workers and hospitalized patients, effective preventive measures and annual tuberculin testing of health care workers should be considered.

La réactivité à la tuberculine chez les agents de soins de santé à l'Hôpital universitaire King Abdulaziz (Arabie saoudite)

RESUME La tuberculose est à la fois une infection nosocomiale et professionnelle. La prévalence des intradermo-réactions à la tuberculine positives à l'Hôpital universitaire King Abdulaziz en Arabie saoudite a été examinée en testant 298 agents de soins de santé. Le test cutané à la tuberculine conventionnel a été réalisé en utilisant 0,1 mL de tuberculine purifiée injectée par voie intradermique. Après 48-72 heures, la taille de l'induration a été relevée. La prévalence des tests positifs (induration ≥ 10 mm) était de 78,9 % de manière générale, elle était de 60,0 % pour les Saoudiens contre 81,8 % pour les non-Saoudiens ($p < 0,01$). La taille moyenne de l'induration (8,9 ± 7 mm) pour les Saoudiens était significativement moindre que pour les non-Saoudiens (13,9 ± 7 mm, $p < 0,001$). Des mesures de prévention efficaces et un test à la tuberculine annuel pour les agents de soins de santé devraient être envisagés afin de renforcer la protection des agents de soins de santé et des patients hospitalisés.

[1]Department of Internal Medicine; [2]Department of Family Medicine, King Abdulaziz University Hospital, Jeddah, Saudi Arabia.
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Introduction

Tuberculosis (TB) is a common communicable disease and may be considered both a nosocomial and an occupational infection [*1*,*2*]. In the United States of America (USA), the annual number of reported cases of TB increased by 14% from 1985 to 1993 [*3*]. Consequently, concerns about this disease have increased and more attention is now being given to control measures. This has led to a decrease in the prevalence rate of TB to 7.4 cases per 100 000 general USA population in 1997 [*4*]. Yet a number of groups, including health care workers, continue to show rising rates of TB infection [*4*,*5*].

Health care workers are exposed to a variety of infections, including TB, as they perform their job responsibilities [*2*]. Transmission of *Mycobacterium tuberculosis* is a recognized risk in health care facilities. It is most likely to occur from patients who have unrecognized pulmonary or laryngeal TB, who are not on effective anti-TB therapy and who are not placed in isolation [*6*]. The incidence of *M. tuberculosis* infection in health care workers varies widely, depending on such factors as practice location, patient population and local prevalence of TB. The baseline prevalence of past TB infection in health care workers has been reported to range from 1% to 28% [*7*]. In 1997, the Occupation Safety and Health Administration (OSHA) estimated that more than 5 million US workers were exposed to TB in the course of their work: in hospitals, homeless shelters, nursing homes and other work settings [*8*]. Unfortunately, prevalence rates of TB among health care workers in Saudi Arabia are not available, even though it is considered one of the most common chronic infectious diseases in the country.

The tuberculin skin test is the recommended instrument for TB screening of health care workers [*5*]. In several reports, from 4% to 79% of health care workers exposed to *M. tuberculosis* develop a positive tuberculin skin test [*9*]. Without known exposure, the yearly conversion rate of tuberculin for health care workers averages 0.1%–5.0% [*7*].

The Centers for Disease Control and Prevention (CDC) recommends that all health care workers should be screened with yearly tuberculin tests and the results should be interpreted without regard to previous BCG (bacille Calmette-Guérin) vaccine [*5*]. This recommendation represents a change from past practice, which suggested no skin testing after the receipt of BCG vaccine. Concomitantly, OSHA guidelines mandate the use of testing for TB in all new employees at risk for *M. tuberculosis* exposure who have not had a tuberculin skin test in the past year [*10*]. Positive tests indicate past TB exposure or infection and thus require further evaluation. Health care workers whose tuberculin tests have recently become positive should be evaluated for chemoprophylaxis after a chest radiograph is obtained to rule out active disease.

King Abdulaziz University Hospital (KAUH) has 400 beds and is a secondary–tertiary medical centre in Jeddah. It covers referrals from a wide area of the western region of Saudi Arabia. Conducting tuberculin tests for health care workers at KAUH provided an opportunity to record the prevalence of positive tuberculin tests in order to better understand the risk of exposure to TB, its spread and its role in health care occupations.

Methods

This study was performed in the staff health clinics of KAUH, Jeddah, Saudi Arabia. The outpatient and emergency room committee of KAU approved this work.

Participants in the present study were health care workers from all departments of KAUH. Between October 2000 and February 2001 they were invited to the staff health clinics for their tuberculin screening tests by letter sent through the heads of departments. Staff who responded were included (300 out of 400, 75%). The medical records of the participants were reviewed by the clinic doctors and participants were interviewed about chronic medical illness and drug history. Participants were not suffering from any chronic illnesses (most of them are contract workers who can only obtain a work permit if they are medically fit) or taking regular medication (including steroids or immunosuppressants), and had no previous active TB infection. All participants had received BCG vaccination, since this is a compulsory vaccine in the country and all workers, both Saudi Arabian and non-Saudi Arabian, must provide a certificate of vaccination.

Screening was conducted using the Mantoux test (intracutaneous tuberculin units manufactured by Aventis Pasteur, France). Purified protein derivative supplies were provided by the pharmacy of KAUH. A nurse sterilized the forearm skin of the candidate with propylalcohol and, using a 26 gauge needle, introduced 0.1 mL of a commercially available purified protein derivative tuberculin intracutaneously (equivalent to 5 tuberculin units), raising a wheal 6–10 mm in diameter. The delayed skin test reactions were read by a physician after 48–72 hours, as convenient for the participants. The diameter of the erythematous induration was measured in mm and recorded. A positive tuberculin test was diagnosed if the wheal reaction was 10 mm or over. The conduct and interpretation of tuberculin skin tests were based on current guidelines of the CDC Committee on Latent Tuberculosis Infection [*5,11*].

The data were entered into a personal computer. Frequency tables and determination of significant differences among variables were performed by the chi-squared test and Student *t*-test using *SPSS*, version 10.

Results

Of the 300 health care workers recruited, 2 did not attend at the appropriate time for the test reading, leaving 298 participants in the study. Their ages ranged between 21 and 59 years with a mean ± standard deviation of 37.8 ± 7.9 years. Women were predominant, comprising 80.5% of the studied group. There were 60 participants from the laboratories (20.1%), 26 from the neonatal intensive care unit (8.7%), 24 from the paediatric medical ward (8.1%) and 188 (63.1%) from other departments.

The prevalence of a positive skin test (induration ≥ 10 mm) in participants at KAUH was high, with 235 cases (78.9% of the studied group). The most common sizes of skin test indurations were 20 mm (positive) for 47 participants (15.8%), 10 mm (positive) for 46 (15.4%) and 0 mm (negative) for 27 (9.1%) (Figure 1). The mean values were 15.9 ± 5.5 mm for positive reactions and 3.2 ± 3.1 mm for negative reactions. Only a few participants, in particular those who had large tuberculin reactions, complained of local discomfort.

The non-Saudi Arabians were predominantly of Philippine (150 cases, 50.3%) and Indian nationalities (36 cases, 12.1%) (Table 1). The overall size of skin test reactions was significantly lower among Saudi Arabian participants than among non-Saudi Arabians (mean 8.9 ± 7.1 mm versus 13.9 ± 7.1 mm) ($t = 4.1$, $P < 0.001$).

The distribution of positive skin test reactions among the different nationalities of

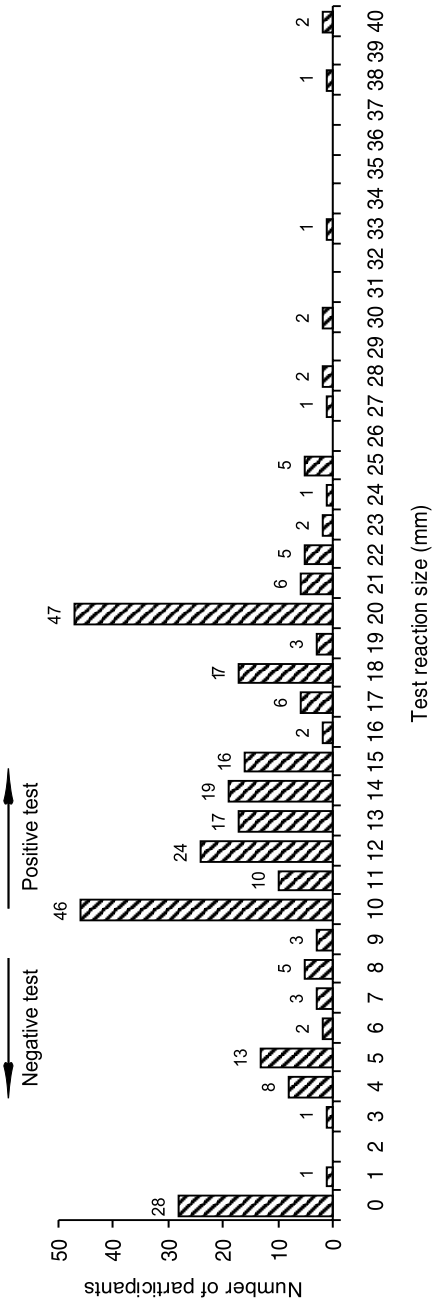

Figure 1 **Distribution of positive and negative tuberculin skin test reactions for health care workers (*n* = 298)**

participants was assessed. The prevalence of positive reactions was highest for Nigerian (87.5%) and Philippine participants (83.3%). Among the Saudi Arabians, positive reactions were found in 24 cases of 40 (60.0%), significantly fewer than among non-Saudi Arabian nationalities (81.8%) ($\chi^2 = 9.9$, $P < 0.01$). Additionally, significantly fewer Saudi Arabians had positive reactions than non-Saudi Arabians (mean 13.6 ± 4.5 mm versus 16.2 ± 5.5 mm) ($t = 2.2$, $P < 0.05$) (Table 2). The small number of participants for some of the nationality groups was not suitable for further analysis.

Discussion

The number of reported cases of TB is on the rise, concern about the disease has increased and more attention is being given to control measures. Therefore, this trial explored the prevalence of positive tuberculin tests among health care workers at KAUH.

Although the tuberculin skin test is the only available method for detecting *M. tuberculosis* infection, the test is neither 100% sensitive nor 100% specific [*5*]. In populations with a high prevalence of infection with non-tuberculous mycobacteria or vaccination with BCG, the specificity of the tuberculin test will be low. The positive predictive value of the tuberculin test is also variable. As the prevalence of TB infection in the population decreases, the positive predictive value of the tuberculin test also decreases. Appropriate interpretation of skin test results requires knowledge of: the antigen used (tuberculin); the immunological basis for the reaction to it; the technique of administering and reading the test; and the results of epidemiological and clinical experience with the test [*11,12*].

The prevalence of positive tuberculin tests among the studied health care work-

Table 1 **Distribution of overall tuberculin skin test reactions among the different nationalities of health care workers**

Nationality	Total		Test reaction size (mm)	
	No.	%	Range	Mean ± *s*
Saudi Arabian	40	13.4	0–25	8.9 ± 7.1[a]
Non-Saudi Arabian	258	86.6	0–40	13.9 ± 7.1
Philippine	150	50.3	0–40	13.8 ± 6.7
Indian	36	12.1	0–30	13.8 ± 7.2
Pakistani	31	10.4	0–40	14.5 ± 9.8
Nigerian	24	8.1	0–28	15.3 ± 6.6
Other	17	5.7	0–20	13.3 ± 5.4
Total	298	100.0	0–40	13.3 ± 7.3

[a]t = *4.1,* P < *0.001 Saudi versus non-Saudi participants.*
s = *standard deviation.*

ers at KAUH was high (79%). In comparison to other studies, similar high prevalences of positive tuberculin tests (79% and 70%) were found among medical service workers in Cote d'Ivoire and in a Mexican hospital [*13,14*].

Interestingly, although positive tuberculin tests among health care workers holding Saudi Arabian nationality were elevated (60%), they were significantly lower in prevalence and reaction size than among non-Saudi Arabian nationalities. These differences could be attributed to variable socioeconomical factors and hygiene habits. However, the overall high prevalence of positive tuberculin tests among health care workers at KAUH may reflect the increased

Table 2 **Distribution of positive tuberculin skin test reactions among the different nationalities of health care workers**

Nationality	Total	Positive reaction		Test reaction size (mm)	
	No.	No.	%	Range	Mean ± *s*
Saudi Arabian	40	24	60.0[a]	10–25	13.6 ± 4.5[b]
Non-Saudi Arabian	258	211	81.8	10–40	16.2 ± 5.5
Philippine	150	125	83.3	10–40	15.9 ± 5.2
Indian	36	27	75.0	10–30	16.1 ± 5.9
Pakistani	31	23	74.2	10–40	18.8 ± 7.1
Nigerian	24	21	87.5	10–28	16.9 ± 5.1
Other	17	15	88.2	10–20	14.5 ± 4.1
Total	298	235	78.9	10–40	15.9 ± 5.5

[a]χ^2 = *9.9,* P < *0.01 Saudi versus non-Saudi participants.*
[b]t = *2.2,* P < *0.05 Saudi versus non-Saudi participants.*
s = *standard deviation.*

prevalence of TB cases not only in most of the developing countries but also in the Saudi Arabian community. In the general population of south-western Saudi Arabia, for example, positive tuberculin tests were reported for 4% of those aged 5–14 years and was even higher for those aged 45–64 years at up to 52% [*15*]. Positive tuberculin test rates have reached up to 20% among children from the Western provinces and Jeddah [*16*]. It is important to note that approximately 50% of the patients of KAUH are of non-Saudi Arabian nationality and that every year Jeddah receives over a million foreign pilgrims [*16*]. These factors and the lack of preventive programmes may be contributing issues in the increased risk of TB in Saudi Arabia.

Correlations between tuberculin test results and the different departments of these health care workers were investigated. Some authors found that the risk of positive tuberculin tests was higher for those who perform bronchoscopy [*9*]. Others found relatively lower conversion rates among emergency health care workers [*17*]. Unfortunately, such analysis was not feasible in the present study because of the small number of cases in some departments of KAUH and the frequent interchange of health care workers across the different departments.

In order to protect health care workers and to reduce the risk of TB exposure, the CDC Advisory Council for the Elimination of Tuberculosis recommends that health care facilities conduct a risk assessment and perform tuberculin skin testing at least annually and develop isolation procedures for potentially infectious TB patients in hospitals and in some outpatient settings [*4,5*]. Those whose tuberculin tests have recently become positive should be evaluated for chemo-prophylaxis, e.g. isoniazid, after a chest radiograph is obtained to exclude active disease. Prophylactic therapy should be considered because these patients are at high risk for TB. In recent times, multiple drug resistant strains of *M. tuberculosis* have become an increasing occupational concern among health care workers. If a health care worker exposed to a drug-resistant strain of *M. tuberculosis* has a skin test conversion, the prophylactic regimen may need to be modified or supplemented with drugs to which the infecting organism is susceptible.

Even when properly placed and interpreted, the tuberculin test may be associated with false positive or false negative results [*5*]. Causes of false positive tuberculin tests include error in administration, cross-reaction with non-tuberculous mycobacterial antigens, previous BCG vaccination and the booster phenomenon. The CDC recommends that, irrespective of their BCG vaccine status, health care workers should be screened with a yearly tuberculin test. Skin test reactions related to BCG vaccine typically decline in severity with time and the vaccine is not completely effective in preventing infection. If a tuberculin test response increases in size during yearly surveillance, a new infection is likely, rather than a reaction to previous BCG vaccination.

Some of the studied cases, particularly those with large tuberculin reactions, complained of discomfort, and refused such testing in the future. Generally, apart from local pain or discomfort, the tuberculin test is safe and valid even throughout pregnancy and has no known teratogenic effects [*6*]. There is no evidence that pregnancy affects the accuracy of tuberculin testing. The skin test is contraindicated if the worker has experienced a large necrotic reaction to past tuberculin testing.

OSHA guidelines recommend the use of 2-stage testing for TB in all new employees

at risk for TB exposure who have not had a tuberculin test in the past year [*10*]. This 2-stage procedure given 1 to 3 weeks after the first test is used to detect a possible 'boosting' effect that can occur when the first falsely negative tuberculin test leads to a 'recall' of the immune response. A positive second test constitutes a true positive, indicates past TB exposure or infection and thus requires further evaluation. Boosting can occur in 2%–10% of the general population [*18,19*]. The overall incidence of boosting in health care workers is not known. The CDC guidelines allow decisions about the use of 2-stage testing to be based on institutional data concerning the incidence of boosting in the facility. In this study, the 2-step test was not performed because of the high prevalence of positive tuberculin results.

Knowledge of the transmission of TB and infection control measures for TB among health care workers has been found to be incomplete [*20*]. Health administrators and infection control departments in hospitals are responsible for ensuring the implementation of an effective TB control programme. This requires education, risk assessment, early identification, isolation, complete treatment of infectious TB patients, effective engineering controls, an appropriate respiratory protection programme, counselling, screening and evaluation for health care workers.

A high prevalence of positive tuberculin tests was found among a subset of health care workers at KAUH. This might indicate a high risk for future acquisition of TB infection for the health care workers and subsequent spreading of disease. In order to enhance the protection of both health care workers and hospitalized patients, effective control and preventive measures for TB, including yearly tuberculin testing of health care workers, should be considered.

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Epidemiology of malaria in Al-Tameem province, Iraq, 1991–2000

M.A.A. Kadir,[1] A.K.M. Ismail[2] and S.S. Tahir[3]

وبائيات الملاريا في محافظة التميم في العراق 1991–2000

محمد عبد العزيز القادر، عبد الكريم إسماعيل، سهيلة طاهر

الخلاصة: لتحديد معدلات العدوى بالملاريا في مناطق مختلفة من محافظة التميم، أجريت دراسة مستعرضة في الفترة 1991–2000 فوجدنا 0.76٪ من مجمل معدل العدوى بالمتصورات النشيطة *P. vivax*. وكان أعلى معدلات العدوى في قضاء دبس (1.12٪) يتلوها العدوى من خارج المحافظة (0.93٪) وفي قضاء الحويجة (0.89٪) وفي كركوك (0.62٪) ودكوك (0.17٪). وتختلف معدلات العدوى باختلاف السنوات مع أخفض معدل لها في عام 1991 (0.02٪) وأعلى معدل لها عام 1995 (1.84٪). وقد كان لجميع الأعمار نصيب من التمثيل، مع أعلى معدلات العدوى بين من تتراوح أعمارهم بين 21–30 عاماً. ومعدل العدوى بين الذكور (0.78٪) أعلى بقليل مما هو عليه لدى الإناث (0.73٪).

ABSTRACT To determine the rates of malarial infection in different areas of Al-Tameem province, we conducted a cross-sectional study from 1991 to 2000. We found an overall infection rate of 0.76% by *Plasmodium vivax*. Infection rates were highest in Dibis district (1.12%), followed by infections from outside the province (0.93%) and in Hawija district (0.89%), Kirkuk (0.62%) and Dakok (0.17%). Rates of infection varied by year with the lowest rate in 1991 (0.02%) and the highest rate in 1996 (1.84%). All ages were represented, with the highest rate of infection among 21–30-year-olds. Males had a slightly higher rate of infection (0.78%) than females (0.73%).

Epidémiologie du paludisme dans la province d'Al-Tamim (Iraq), 1991-2000

RESUME Afin de déterminer les taux d'infection paludéenne dans différentes zones de la province d'Al-Tamim, une étude transversale a été réalisée de 1991 à 2000. On a trouvé un taux global d'infection par l'espèce *Plasmodium vivax* de 0,76 %. Le taux d'infection était le plus élevé dans le district de Dibis (1,12 %) suivi par les infections provenant de l'extérieur de la province (0,93 %) et dans les districts de Hawija (0,89 %), de Kirkouk (0,62 %) et de Dakok (0,17 %). Les taux d'infection variaient selon l'année, avec le taux le plus faible en 1991 (0,02 %) et le taux le plus élevé en 1996 (1,84 %). Tous les âges étaient représentés, le taux d'infection le plus élevé se trouvant dans le groupe d'âge des 21-30 ans. Les hommes avaient un taux d'infection légèrement plus élevé (0,78 %) que les femmes (0,73 %).

[1]*College of Medicine, Tikrit, Iraq.*
[2]*Public Health Laboratory, Al-Tameem, Iraq.*
[3]*Directorate of Health, Al-Tameem, Iraq.*
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Introduction

Malaria is a disease caused by the *Plasmodium* genus of protozoa (mainly *P. falciparum*, *P. vivax*, *P. ovale* and *P. malariae*). The protozoa have a life-cycle divided between a human host and an insect vector, i.e. the *Anopheles* spp. mosquito. Of 380 species of *Anopheles* genus mosquito, the females of 60 species are able to transmit malaria [*1*]. The mosquito thrives in warm, humid climates where pools of water provide perfect breeding grounds. It proliferates where awareness is low and where health care systems are inadequately developed [*2*].

The global outlook for malarial infection is worsening. Currently 40% of the world's population reside in malaria-prone areas, i.e. over 2200 million people. Each year, of an estimated 300–500 million clinical cases, there are in excess of 1 million deaths, the majority of whom are young children [*3*].

Malaria is endemic in Iraq. From 1929 to 1956 the mortality rate from malaria was 9.7%. The total infection rate during that period was 12.7% [*4*]. To combat the disease, a universal eradication programme was begun in 1957. By the beginning of the sixth year of eradication (1962), 4.4 million of the 4.5 million Iraqis considered at risk of malaria had entered the consolidation phase with only 0.4 million people in the river tracts and valleys of the mountainous northern part of the country requiring residual insecticidal protection [*5*]. The total number of positive malaria cases from 1961 to 1967 was 47 834 [*5,6*]. From 1970 to 1975, there were 47 395 cases, of which 45 928 were due to *P. vivax* and 1467 to *P. falciparum* [*7*]. Between 1977 and 1982, malaria prevalence varied between 5069 cases and 2422 cases per year with approximately 99% due to *P. vivax* [*8,9*]. During those years, 3899 cases were imported from abroad; of them, 3668 were *P. vivax*, 200 were *P. falciparum*, 16 were *P. malariae* and 15 were mixed infections [*10*].

In Al-Tameem province during 1980–1990, the highest rate of malarial infection was in 1988 and the lowest in 1985 (Figure 1). The overall rate of infection was 2.02% (1.29% were males and 0.73% were females) in 19 641 blood smears examined from different locations in the province [*11*]. All were due to *P. vivax* infection.

The present study examined the distribution of malaria infection in Al-Tameem

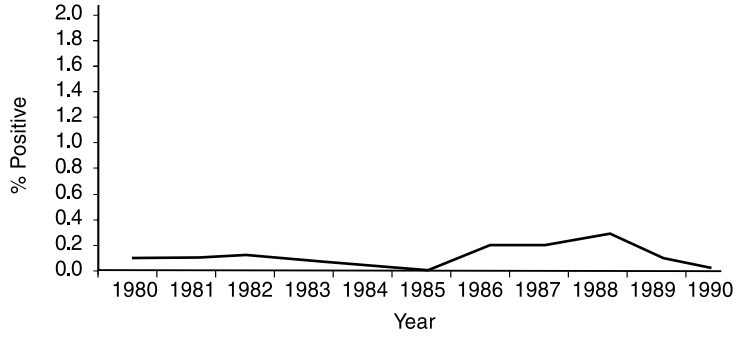

Figure 1 **Distribution of malaria in Al-Tameem province, Iraq, 1980–90**

province and the sex and age distribution of infected individuals in different locations of the province with the aim of supporting eradication efforts in the area.

Methods

This cross-sectional study was conducted in Al-Tameem province, Iraq, during 1991–2000. Al-Tameem is in northern Iraq, bordered by the provinces of Arbil, Sulaimaniya, Nineveh, Salahaddin and Diyala. The study was conducted among populations in the different districts of the province, i.e. Kirkuk, Hawija, Dibis and Dakok, as well as populations from other provinces including Salahaddin, Nineveh, Sulaimaniya, Arbil, Diyala, Najaf and Baghdad.

Samples were collected by the authors by non-randomized technique from cases attending the Central Public Health Laboratory in Kirkuk city and the primary health care centres in nearby districts and during a survey in cooperation with the malaria team of the Directory of Health, Al-Tameem province.

Both thin and thick blood smears were collected from 261 763 individuals (165 721 males and 96 042 females; age range: < 1–60 years). Blood smears were examined after staining with Giemsa stain [*12*] in the Central Public Health Laboratory, Kirkuk.

Results

Of 261 763 blood smears examined, 2003 (0.76%) were positive for *P. vivax* (Table 1). The positive cases were from the Al-Tameem districts of Kirkuk (654), Hawija (537), Dibis (694) and Dakok (46). In addition, 72 positive cases were from individuals attending the Central Public Health Laboratory and primary health centres but originating in the provinces of Salahaddin, Nineveh, Sulaimaniya, Arbil, Diyala, Najaf and Baghdad. The infection rate was lowest in 1991 (0.02%), increased to 0.23% in 1992, peaked in 1996 (1.84%), and then declined from 1997 (0.45%) to 2000 (0.12%) (Figure 2).

Table 2 shows the sex and age distribution of malarial infection. The rate of infection in males (0.78%) was slightly higher than in females (0.73%). The highest rate of infection was among the 21–30-year-old age group, followed by 31–40 years, 11–20 years, ≥ 40 years and ≤ 10 years respectively.

Discussion

Our study indicates that *P. vivax* infection is still endemic in Al-Tameem province. The overall rate of infection (0.76%) was lower than reported in 1996 (2.24%) and in 2001 (2.02%) in different areas of Al-Tameem, but higher than reported in 1966 and in 1978 (0.001% and 0.05% respectively) [*5,9,11,13,14*].

The increase in the rate of infection during 1994–96 may be related to the economic sanctions imposed on Iraq that resulted in a lack of suitable drugs, difficulties of transportation to endemic areas and a lack of effective insecticides.

The decline in the rate of infection from 1997 to 2000 may be attributed to the efforts of the Al-Tameem Health Authority in controlling the rate of infection and the increased availability of drugs and insecticides from the United Nations oil-for-food programme.

The distribution of malaria infection in Al-Tameem is province-wide. This may be due to people from the city centres travelling to rural areas for farm work or by vis-

Table 1 **Distribution of malaria infection by year and sector**

Year	Kirkuk		Hawija		Dibis		Dakok		Other provinces[a]		Total		Positive
	Examined	+ ve	Examined	+ ve	Examined	+ ve	Examined	+ ve	Examined	+ ve	Examined	+ ve	%
1991	4 011	2	5 116	0	1 071	0	1 329	0	25	0	11 552	2	0.02
1992	18 220	45	15 100	19	4 220	27	3 000	1	2001	5	42 541	97	0.23
1993	21 423	135	12 120	94	10 188	47	11 012	5	3111	12	57 854	293	0.51
1994	10 012	139	10 325	281	8 998	114	647	3	164	7	30 146	544	1.80
1995	9 986	167	7 773	109	11 918	273	1 436	14	114	7	31 227	570	1.82
1996	8 745	127	2 317	21	4 112	161	3 064	19	918	25	19 156	53	1.84
1997	7 912	18	1 818	8	4 515	28	917	4	959	14	16 121	72	0.45
1998	8 012	12	2 317	2	5 423	12	1 734	0	233	0	17 719	26	0.15
1999	6 788	7	2 002	2	4 127	10	2 303	0	98	2	15 318	21	0.14
2000	10 517	2	1 512	1	7 257	22	716	0	127	0	20 129	25	0.12
Total	105 626	654	60 400	537	61 829	694	26 158	46	7750	72	261 763	2003	
Positive (%)		0.62		0.89		1.12		0.17		0.93		0.76	

+ ve = positive for Plasmodium vivax.
[a]*Other provinces = infections that originated outside of Al-Tameem province.*

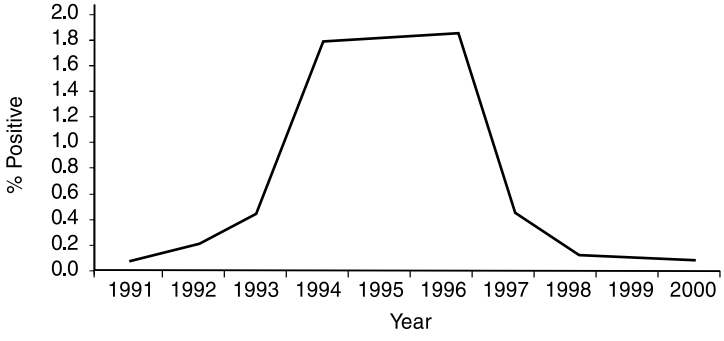

Figure 2 **Distribution of malaria in Al-Tameem province, Iraq, 1991–2000**

itors travelling from neighbouring provinces such as Sulaimaniya, Arbil and Mosul where malaria is also endemic [*13*].

The higher rate of infection among males may due to greater exposure to the vectors of malaria because of the greater number of males than females working in the agriculture sector, especially in the evening when irrigation tasks are performed. Our observed male–female infection trend was similar to a 1996 epidemiological study in Al-Tameem [*13*]. However, our results differed from a 1983 study that reported a higher rate of infection among females in Al-Najaf province [*15*].

Malaria infection was distributed across all age groups, with the highest rate among those aged 21–30 years. This might have been because a large number of men in this age group work in the agricultural sector or because young men might have been less

Table 2 **Distribution of malaria infection in Al-Tameem province by age group and sex**

Age group	Males			Females			Total		
(years)	Examined	+ ve	%	Examined	+ ve	%	Examined	+ ve	%
< 1–10	6 040	7	0.11	4 600	5	0.11	10 640	12	0.11
11–20	32 300	242	0.75	10 250	78	0.64	44 550	320	0.72
21–30	76 381	722	0.94	44 400	405	0.91	120 781	1127	0.93
31–40	42 100	312	0.74	28 536	203	0.71	70 636	515	0.73
41+	8 900	18	0.20	6 256	11	0.17	15 156	29	0.19
Total	165 721	1300	0.78	96 042	703	0.73	261 763	2003	0.76

+ *ve* = *positive for* Plasmodium vivax.

likely to cover themselves adequately during the most at-risk times of day. This finding was similar to other reports from Al-Tameem province and from Thailand [*11,13,16*].

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Malaria and intestinal parasitosis among children presenting to the Paediatric Centre in Sana'a, Yemen

A.A. Azazy[1] and Y.A. Raja'a[2]

الملاريا والطفيليات المعوية في الأطفال الذين يراجعون مستشفى الأطفال المركزي في صنعاء، اليمن

أحمد عبد الولي عزعزي، يحيى أحمد رجاء

الخلاصة: تصف هذه الدراسة مُرْتَسَم الملاريا والطفيليات المعوية في الأطفال الذين يراجعون مستشفى الأطفال المركزي في صنعاء في اليمن خلال الفترة من كانون الثاني/يناير 1998 إلى كانون الأول ديسمبر 2000. وقد كان أكثر الطفيليات شيوعاً لدى دراسة عينات برازية جمعت من 9014 طفلاً هي الأسكاريس الخراطيني، والمتحولة الزحارية، والجيارديةاللمبلية، والمسلَّكة الدقيقة الذيل. وقد كانت العدوى بالطفيليات ذات دورة الحياة المباشرة متساوية بين الجنسين، أما العدوى بداء البلهارسيات فقد كانت أعلى بشكل واضح لدى الذكور منه لدى الإناث، في حين كان الإناث أكثر إصابة بالعدوى بديدان الأسكاريس. وقد كان النوع الوحيد من طفيليات الملاريا الذي كشف في عينات الدم المأخوذة من 753 من الأطفال الذين اشتبه بإصابتهم بالملاريا هو المتصورة المنجلية، وأعلى معدلات الكشف كانت في أشهر نيسان/أبريل، وأيار/مايو، وحزيران/يونيو. وقد كانت معظم الحالات من الأطفال اليمنيين، إلا أن 10.8٪ من تلك الحالات كانت لدى أطفال من السودان أو أثيوبيا.

ABSTRACT We studied the profile of malaria and intestinal parasitosis among children presenting to the Paediatric Health Centre in Sana'a from January 1998 to December 2000. In stool samples from 9014 children, *Ascaris lumbricoides, Entamoeba histolytica*, *Giardia lamblia* and *Trichuris trichiura* were the most common. Infection with parasites of direct life-cycle were similar in boys and girls. Schistosome infection was significantly higher in boys than girls, but girls were more infected with ascariasis. The only species of malaria parasite found in blood samples from 753 children with suspected malaria was *Plasmodium falciparum,* with the highest rates in April–June. The majority of positive cases were Yemeni children, but 10.8% were Sudanese or Ethiopian.

Le paludisme et la parasitose intestinale chez les enfants consultant au centre pédiatrique de Sanaa (République du Yémen)

RESUME Nous avons étudié le profil du paludisme et de la parasitose intestinale chez des enfants amenés en consultation au centre pédiatrique de Sanaa de janvier 1998 à décembre 2000. *Ascaris lumbricoides, Entamoeba histolytica*, *Giardia lamblia* et *Trichuris trichiura* étaient les parasites les plus courants. L'infestation par des parasites qui ont un cycle de vie direct était similaire chez les garçons et les filles. L'infestation par des schistosomes était significativement plus élevée chez les garçons que chez les filles, tandis que les filles étaient davantage touchées par l'ascaridiase. *Plasmodium falciparum* était la seule espèce de parasite du paludisme trouvée dans les échantillons sanguins de 753 enfants suspects de paludisme, les taux les plus élevés entre avril et juin. La majorité des cas positifs étaient des enfants yéménites, mais 10,8 % étaient des Soudanais ou des Ethiopiens.

[1]Department of Parasitology; [2]Department of Community Medicine, Faculty of Medicine and Health Sciences, Sana'a, Yemen.

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Introduction

The highest rates of protozoa and helminth infections worldwide occur in the tropics. The distribution of these infections depends on conditions such as a suitable climate and human activities such as population movements and poor sanitation.

Malaria is the major public health problem in Yemen [*1*], and has the typical afrotropical pattern in which the predominant species is *Plasmodium falciparum* [*2,3*]. A previous study found that the incidence of *P. falciparum* infection among Yemeni returnees in Al-Hodeidah governorate was 13.9%, with some seasonal variations [*3*].

Transmission of ascariasis and trichuriasis takes place throughout the year in regions with a temperate climate. The soil-transmitted parasites, mainly *Ascaris lumbricoides* and *Trichuris trichiura,* are usually more prevalent where there is favourable soil, warmth and moisture together with poor sanitation. Studies in different parts of Yemen have reported prevalence rates of ascariasis ranging from 16%–68% [*4–6*]. Meanwhile, trichuriasis was reported, mostly from the same areas, in 1%–21% of the population [*6,7*].

Parasites with a direct life-cycle spread more easily among children and within the household. Various studies in Yemen have been conducted on the different parasites with a direct life-cycle. For example, the prevalence of *Entamoeba histolytica* has been reported to range from 1.7%–36% [*4,7*], while for *Giardia lamblia* it was 9.0%–20.5% and for *Hymenolepis nana* 2%–8.3% [*6,8*]. The lowest prevalence was 0%-2% for *Enterobius vermicularis* [*4,6*].

The most prevalent water-borne parasite in Yemen is the schistosome. Schistosomiasis is second to malaria in the list of major public health problems in the country [*1*] and intestinal schistosomiasis has been reported in a number of different surveys [*6–12*]. Very low rates of infection have been reported for *Fasciola hepatica,* from 0.5%–2.0% [*4,7*]. Low prevalence rates of 0.1%–0.3% were reported for *Taenia* spp. [*4,7*].

With the exception of Farag's study in 1985 [*4*], all other published works from Yemen have focused on schoolchildren and children in the community. None of the studies focused on children at the hospital level and none has investigated malaria transmission in Sana'a, the city capital of the country. The current study therefore aimed to determine the profile of malaria and intestinal parasitic infections among children attending the Paediatric Health Centre in Sana'a.

Methods

The Paediatric Health Centre in Sana'a provides services to the community through outpatient clinics and admissions. The centre receives patients from Sana'a city, surrounding areas and sometimes from other governorates, as well as referred cases from private clinics. Children with suspected infections are referred to the laboratory unit for investigation. In a record-based descriptive study, we reviewed the results of 9014 stool samples from Yemeni children and 753 blood samples from Yemeni and other nationality children who had been referred to the laboratory unit during the period January 1998 to December 2000. For malaria, additional questions about residence, nationality and travel history to known endemic areas were investigated and recorded in the laboratory notes. All stool and blood samples were examined in the centre's laboratory.

Children being investigated for intestinal protozoa or helminth infections provided a stool sample. A normal saline sedimentation technique was adopted for stool examination. Formal ethyl acetate sedimentation or direct smear methods were also used when necessary. For children who complained of pruritis ani or nocturnal enuresis, transparent adhesive tape was used to take anal swabs.

Children suffering febrile illnesses and suspected of having malaria were asked to give a blood sample. Thick and a thin blood films were prepared for each case. Thin films were fixed with absolute methanol and stained with 3% Giemsa diluted in pH 7.2 buffered water for 30 minutes. Thick films were stained unfixed.

The data were analysed using *Epi-Info*, version 6.

Results

The age of the children ranged from 2 months to 14 years.

Malaria

Of 753 children examined for suspected malaria (484 boys and 269 girls), 130 (17.3%) were positive for malaria. The only species of malaria parasite identified was *P. falciparum.* The distribution of infection among the cases by age group, sex and nationality is shown in Table 1. Twice as many boys (66.9%) as girls (33.1%) were infected. The highest rate of infection was in the age group 6–10 years. The majority of children testing positive (89.2%) were Yemeni, but 8.5% were Sudanese and 2.3% were Ethiopian. Most of the positive cases lived in Hezyaz, 25 km south of Sana'a, but some came from Arrowdhah on the opposite side of the city; some positive cases had never been out of the Sana'a area.

Table1 **Sex, age and nationality distribution of 130 children with a diagnosis of *Plasmodium falciparum* infection**

Variable	Children infected (*n* = 130) No.	%
Sex		
Male	87	66.9
Female	43	33.1
Age (years)		
0–5	15	11.5
6–10	89	68.5
11–14	26	20.0
Nationality		
Yemeni	116	89.2
Sudanese	11	8.5
Ethiopian	3	2.3

n = *total number of infected children.*

The highest seasonal rates of infection were recorded in the months June, May and April respectively (Figure 1).

Intestinal parasites

Of 9014 children examined, 2477 (27.5%) positive tests for intestinal parasites were found. The intestinal parasites detected among infected children are shown in Table 2. With the exception of *Schistosoma mansoni* and *Taenia saginata*, most of the intestinal parasites were those with a feco–oral route of transmission. Four different parasites, *A. lumbricoides*, *E. histolytica*, *G. lamblia* and *T. trichiura*, had the highest rates.

Overall, the infection rate was significantly higher among girls (1192, 31.5%) than boys (1285, 24.6%) ($P < 0.001$). Parasites with a direct life-cycle showed a similar sex distribution. However, the rate of *A. lumbricoides* infection among girls was significantly higher than that among boys. In contrast, the infection rate with *E. histolytica* was significantly higher among boys than that among girls ($P < 0.001$).

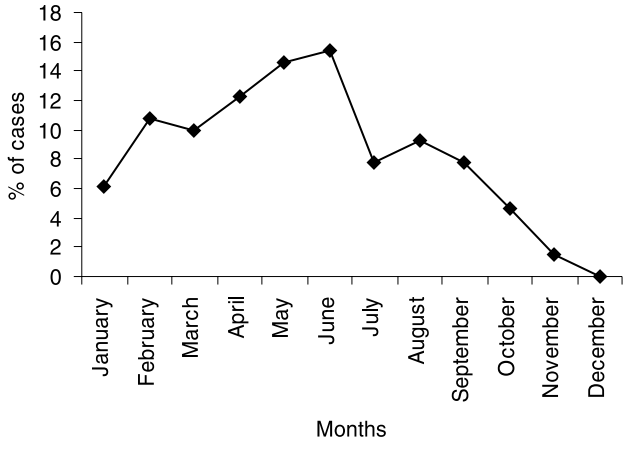

Figure 1 **Monthly distribution of cases among 130 children diagnosed with *Plasmodium falciparum* infection**

Discussion

Our study revealed a parasite infection rate of 17.3% among children tested for malaria. The species of malaria found was exclusively *P. falciparum*. This is consistent with the documented pattern of malaria in Yemen, which is classified as afro-tropical with *P. falciparum* as the predominant species. Previous studies in Yemen have found that *P. falciparum* constitutes 90%–95% of all diagnosed malaria cases [*2,3*]. The infection rates were highest in June, May and April respectively. This finding indicates that malaria in Sana'a city may have its own pattern of seasonality that is different from Al-Hodiedah governorate.

The present study revealed that 10.8% of the malaria cases were children from Sudan and Ethiopia who may be either immigrants or indiginous. Interestingly, some positive cases in our study had never been out of the Sana'a area, which is supposed to be a non-malarial area due to its high altitude (2400 m above sea level). Most of the positive cases were children living in an area called Hezyaz, about 25 km to the south of Sana'a, which lies on the road that connects the capital with two endemic areas, Taiz and Hodeidah cities. The main activity of the population in Hezyaz, beside agriculture, is serving food for travellers. Therefore, it can be hypothesized that infected mosquitoes hidden in vehicles are responsible for transmission of the disease. Another possibility is that transmission of malaria is taking place in Sana'a city itself. This is backed up by the fact that some cases also came from another area on the opposite side of the city called Arrowdhah.

With the exception of *S. mansoni* and *Taenia saginata*, the intestinal parasites diagnosed in the current study are those with a feco–oral route of transmission. It was expected that the infection rate with intestinal parasites would be similar among boys and girls. Surprisingly, however, the infection rate among girls was greater than that among boys. Parasites with a direct lifecycle were found to have a similar sex distribution. This was not the case with *S. mansoni*, where the rate among boys was higher than that among girls. This can be

Table 2 **Pattern of intestinal parasites detected in 9014 tests for parasitic infections among children**

Parasite	Positive test						χ^2	*P*-value
	Boys (*n* = 1285)		Girls (*n* = 1192)		Total (*n* = 2477)			
	No.	%	No.	%	No.	%		
Ascaris lumbricoides	235	18.3	286	23.9	521	21.0	42.0	< 0.001
Entamoeba coli	258	20.0	248	20.8	506	20.4	0.83	0.36
Giardia lamblia	226	17.6	188	15.8	414	16.7	5.14	0.023
Trichuris trichiura	201	15.6	180	15.0	381	15.4	0.68	0.44
Entamoeba histolytica	160	12.5	129	10.8	289	11.7	6.15	0.013
Hymenolepis nana	149	11.6	123	10.3	272	11.0	3.84	0.05
Schistosoma mansoni	37	2.9	16	1.3	53	2.1	26.1	< 0.001
Enterobius vermicularis	13	1.2	20	1.7	33	1.3	3.78	0.052
Fasciola hepatica	4	0.3	2	0.2	6	0.2	1.95	0.16
Taenia saginata	2	0.2	0	0	2	0.1	NA	NA
Total	1285	24.6	1192	31.5	2477	27.5	52.5	< 0.001

n = *total number of tests.*
NA = not applicable.

attributed to boys having more activities involving contact with water than girls through swimming and ablutions. As for ascariasis, the rate of infection was higher among girls than that among boys. This can be explained by girls being involved more with food preparation than boys, exposing them to raw foods contaminated with larvated eggs.

Conclusions

High rates of infection with protozoa and helminth parasites denote high levels of pollution in the environment of the study area. More efforts are needed to improve environmental sanitation in Sana'a in order to reduce the rate of infection with intestinal parasites. To our knowledge, this is the first report that shows some evidence that malaria is being transmitted in Sana'a city. A special study to confirm or refute the suggestion that the vector for malaria is breeding in Sana'a is urgently needed.

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Selected epidemiological features of human brucellosis in Yazd, Islamic Republic of Iran: 1993–1998

M.H. Salari,[1] M.B. Khalili[2] and G.R. Hassanpour[1]

ملامح وبائية منتقاة لداء البروسيلات البشرية في يزد، جمهورية إيران الإسلامية: 1993–1998

محمد حسين سلاري، محمد باقر خليلي، غلامرضا حسنبور

الخلاصة: يظلُّ داء البروسيلات من المشكلات الصحية الهامة في البلدان التي تكون فيها مكافحة الأمراض الحيوانية المصدر غير كافية. فخلال الفترة بين 1993–1998 تم تحليل المصول وإجراء الزروع من 792 من المرضى الذين يشتبه في إصابتهم بداء البروسيلات ولديهم سوابق من الحمى والنوافض والتعرق الليلي بالإضافة إلى ضعف ووعكة وصداع ممن راجعوا مستشفى للإحالة في يزد في جمهورية إيران الإسلامية. وقد استُقصيت الحالات باختبار التراص في الأنبوب واختبار 2 — مركابتوإيثانول واستُكملت استمارة لكل حالة. وقد وصل عيار اختبار التراص في الأنبوب إلى ما يساوي أو يزيد على 160:1 لدى 745 مريضاً (94.1٪) في حين كان اختبار المركابتوإيثانول إيجابياً لدى 42 حالة (5.3٪). ومن بين الحالات الـ 745 المثبتة كان هناك 460 حالة تعود للفترة 1996–1997، وكان أعلى معدل للانتشار في الصيف 39.5٪، وكان أكثر شيوعاً لدى الذكور من الإناث. وكان أعلى معدل للانتشار بين من تتراوح أعمارهم 10–19 عاماً (27.7٪) وكان لدى معظم المرضى سوابق تناول جبن أو لبن أو مشتقات لبن حاملة للعدوى (98٪).

ABSTRACT Brucellosis is a significant health problem in countries where control of zoonoses is inadequate. During 1993–98, we analysed sera and cultures from 792 suspected brucellosis patients who presented with histories of fever, chills, night sweating, weakness, malaise and headache to the referral hospital in Yazd. Cases were investigated by tube agglutination test (TAT) and 2-mercaptoethanol test (2-MET) and a questionnaire was completed for each. TAT titre was ≥ 1:160 for 745 patients (94.1%) and 2-MET was positive for 42 (5.3%). Of 745 confirmed cases, 460 were from 1996–1997. Prevalence was highest in summer (39.5%) and more common males than among females. Prevalence was highest among those aged 10–19 years (27.7%). Most patients had a history of infected cheese, milk and milk product consumption (98%).

Quelques caractéristiques épidémiologiques de la brucellose humaine à Yazd (République islamique d'Iran) : 1993-1998

RESUME La brucellose demeure un important problème de santé dans les pays où les mesures de lutte contre les zoonoses sont insuffisantes. Pendant la période 1993-1998, nous avons analysé les sérums et les cultures de 792 patients suspects de brucellose qui se sont présentés à l'hôpital de recours à Yazd avec des antécédents de fièvre, de frissons, de sueurs nocturnes, de faiblesse, de malaises et de céphalées. Les cas ont été examinés en réalisant l'épreuve d'agglutination en tube et l'épreuve d'agglutination en présence de mercapto-2 éthanol ; un questionnaire a été rempli pour chacun des patients. Le titre pour l'épreuve d'agglutination en tube était supérieur ou égal à 1:160 pour 745 patients (94,1 %) et l'examen au mercaptoéthanol était positif pour 42 patients (5,3 %). Sur les 745 cas confirmés, 460 remontaient à 1996-1997. La prévalence était la plus élevée pendant l'été (39,5 %) et la fréquence était plus importante chez les hommes que chez les femmes. La prévalence était plus forte chez les sujets âgés de 10 à 19 ans (27,7 %). La plupart des patients avaient consommé des fromages, du lait et des produits laitiers infectés (98 %).

[1]*Department of Pathobiology, School of Public Health and Institute of Public Health Research, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran.*
[2]*Department of Microbiology, Shahid Sadoughi University of Medical Sciences, Yazd, Islamic Republic of Iran.*
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Introduction

Brucellosis is a major health and economic problem in many areas of the world [*1,2*]. It is mainly a contagious disease of domestic animals such as sheep, goats, cows, camels and dogs. Humans are commonly infected through ingestion of raw milk, cheese and meat or through direct contact with infected animals [*2*–6]. The disease is transmitted from animals to humans by three routes: direct contact of infected tissues, blood or lymph with conjunctive or broken skin; ingestion of contaminated meat or dairy products; and inhalation of infectious aerosols. Brucellosis occurs on all continents and affects about 500 000 individuals annually worldwide [*6,7*].

Diagnosis of human brucellosis relies on serological tests, such as the tube agglutination test (TAT), Coombs test, and enzyme-linked immunosorbent assay (ELISA). A single titre of 1:160 or greater for TAT is considered significant. In a modification of assay, the use of 2-mercaptoethanol (2-MET) in the assay disulfide bonds in IgM allow measurement of only IgG. IgG antibody typically appears within weeks of infection and, in the absence of infection, usually persists. After cure, IgG may be present for as long as 1 year. In the chronic stage of the disease, *Brucella* spp. antibodies persist for many years after infection; in most cases only 2-MET sensitive agglutinins persist [*8–11*].

This study had 2 main aims: first, to obtain data about epidemiological features of human brucellosis in Yazd, Islamic Republic of Iran; second, to describe the characteristics and exposure to risk factors for brucellosis among cases.

Methods

The city of Yazd in central Islamic Republic of Iran has an estimated population of approximately 388 171 (201 194 males and 186 977 females). During the study period (1993–1998), all untreated suspected brucellosis patients (792 cases) with history of fever, chills, night sweating, weakness, malaise and headache were referred to Nicopour hospital, the Yazd referral hospital, by Yazd health centres and physicians. A questionnaire was used to collect information about patients and also exposure to risk factors, and a blood sample was collected from each case.

For isolation and identification of *Brucella* spp., biphasic blood culture medium (Hemolin, Biomerieux, France), incubated in an atmosphere of 5%–10% carbon dioxide for 30 days, was used [*12*].

Serum specimens were analysed in 2 phases, using suspension of *B. abortus* and *B. melitensis* (Wellcome Laboratories, UK). In the first phase, all specimens were analysed by the TAT. A titre of 1:160 or greater was taken as an index of seropositivity [*8,10*]. In the second phase, *Brucella* spp. antibody of patients (IgG) was investigated by 2-MET. The serum dilutions were prepard in 0.85% NaCl containing 0.05 mol/L MET. Then agglutination reactions was read after 48 h incubation at 37 ºC [*11,13*].

The collected data and the results of laboratory tests were analysed by *SPSS*, version 6 and chi-squared test to determine variables that were significantly associated with seropositivity to *Brucella* spp.

Results

Brucellosis was more common among men than among women (Table 1). There were no significant differences between sexes ($\chi^2_1 = 1.7$, $P < 0.1$). The average annual rate of human brucellosis (TAT positive) was 124 cases (Table 2). The highest average annual rate of brucellosis was among age

Table 1 **Frequency distribution of patients with brucellosis by sex**

Sex	1993		1994		1995		1996		1997		1998		Total		Average annual rate	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Male	69	62.2	24	51.1	38	56.7	124	55.9	137	57.6	37	61.7	429	57.6	71	57.3
Female	42	37.8	23	48.9	29	43.2	98	44.1	101	42.4	23	38.3	316	42.4	53	42.7
Total	111		47		67		222		238		60		745		124	

Table 2 **Frequency distribution of patients with brucellosis by age group**

Age group (years)	1993		1994		1995		1996		1997		1998		Total		Average annual rate	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<10	15	13.5	6	12.8	2	3.0	24	10.8	20	8.4	9	15.0	76	10.2	13	10.5
10–19	31	27.9	12	25.5	22	32.8	77	34.7	52	21.8	12	20.0	206	27.7	34	27.4
20–29	21	18.9	9	19.1	14	20.9	38	17.1	47	19.7	9	15.0	138	18.5	23	18.5
30–39	21	18.9	8	17.0	8	11.9	32	14.4	37	15.5	16	26.7	122	16.4	20	16.1
40–49	10	9.0	5	10.6	7	10.4	19	8.6	42	17.6	6	10.0	89	11.9	15	12.1
> 50	13	11.7	7	14.9	14	20.9	32	14.4	40	16.8	8	13.3	114	15.3	19	15.3
Total	111		47		67		222		238		60		745		124	

group 10–19 years (27.4%) and the lowest was among those under 10 years (10.5%). Results of statistical analysis showed significant differences between age groups of patients (χ^2_5= 13.28, $P < 0.01$).

The number of TAT positive cases (antibody titre ≥ 1/160) and TAT negative cases (antibody titre < 1/160) were 745 (429 males and 316 females) and 47 respectively (Table 3). Of the total TAT positive cases, 42 were 2-MET positive. The average annual number of individuals with a titre ≥ 1:160 was 124 cases (Table 3).

Consumption of cheese, milk and milk products was reported by 730 brucellosis patients (98%) and unknown risk factors or contact with animal were reported by 15 cases (2%) (Figure 1). The average annual rate of brucellosis was lowest in winter (16.1%) and peaked in summer (39.5%) (Table 4).

The most common presenting symptoms and physical findings with active brucellosis were fever (89%), chills (63%), weakness and malaise (57%), sweating (61%), headache (51%), backache (47%), lymphadenopathy (19%), splenomegaly (28%) and arthritis (18%). Mild anaemia, leucopoenia and relative lymphocytosis were common. This information was collected from questionnaires, medical records and clinical examinations. The percentage of patients with brucellosis on the basis of their occupation was 9% farmer, 25.5% housewife, 10.1% worker, 6.8% employee, 30.5% student and 18.1% others.

Discussion

Brucellosis is diagnosed by culture method, serological tests and clinical findings. In the presence of appropriate signs and symptoms, a presumptive diagnosis of

Table 3 **Frequency distribution of patients with brucellosis by *Brucella* spp. antibody titre**

TAT titre	1993		1994		1995		1996		1997		1998		Total		Average annual rate	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1/160	24	21.6	7	14.9	16	23.9	46	20.7	53	22.3	16	26.7	162	21.7	27	21.8
1/320	34	30.6	14	29.8	19	28.4	56	25.2	66	27.7	23	38.3	212	28.5	35	28.2
1/640	37	33.3	18	38.3	17	25.4	67	30.1	55	23.1	9	15.0	203	27.2	34	27.4
1/1280	15	13.5	7	14.9	13	19.4	50	22.5	54	22.7	11	18.3	150	20.1	25	20.2
1/2560	1	0.9	1	2.1	2	3.0	3	1.4	10	4.2	1	1.7	18	2.4	3	2.4
Total	111		47		67		222		238		60		745		124	

TAT = tube agglutination test.

brucellosis is usually defined serologically as a TAT of 1:160 or greater [*8,13*]. Of the 745 TAT positive cases, 42 cases were 2-MET positive.

Brucellosis has been brought under control in the industrialized countries through rigorous diagnostic and control procedures at the animal production level, and through elimination of *Brucella* spp. in livestock and proper pasteurization of milk. Therefore, there are very few reports of indigenously acquired human cases of brucellosis; nonetheless acute imported human infections still occur, generally linked to the consumption of unpasteurized cheese or milk [*14–17*]. Data from developing countries of the Mediterranean, particularly the Middle East, report prevalence ranging from 8% in Jordan [*18*], to 12% in Lebanon and Kuwait [*19,20*]. Even higher seroprevalence rates have been reported in sub-Saharan countries, such as 18% in

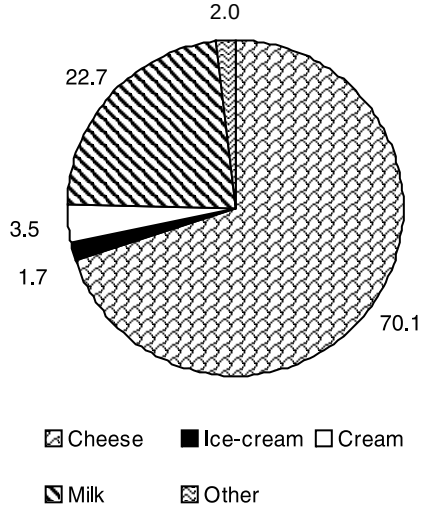

Figure 1 **Distribution of patients with brucellosis by self-reported cheese, milk and milk product consumption and other risk factors (%)**

Table 4 **Frequency distribution of patients with brucellosis by season of the year**

Season	1993		1994		1995		1996		1997		1998		Total		Average annual rate	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spring	32	28.8	8	17.0	14	20.9	15	6.8	66	27.7	18	30.0	153	20.5	25	20.2
Summer	34	30.6	20	42.6	22	32.8	87	39.2	103	43.3	25	41.7	291	39.1	49	39.5
Autumn	32	28.8	10	21.3	23	34.3	55	24.8	52	21.8	8	13.3	180	24.2	30	24.2
Winter	13	11.7	9	19.1	8	11.9	65	29.3	17	7.1	9	15.0	121	16.2	20	16.1
Total	111		47		67		222		238		60		745		124	

Uganda [*21*] and 13% in Nigeria [*22*]. According to the results of this study most patients had a history of infected cheese and milk consumption. Prevalence of brucellosis in the Yazd population was much lower than in the above-mentioned reports (31.9 cases per 100 000 population every year; 35.3/100 000 males and 28.3/100 000 females). The prevalence of brucellosis increases with age; this has been observed in the Islamic Republic of Iran, Jordan, Lebanon, and Kuwait [*18*,*19*,*23*–*25*]. Our findings show that the highest prevalence of the disease was in 1997, particularly among ages 10–19 years (21.8 %). Consumption of infected milk, milk products and contact with imported animals with brucellosis were the most important sources of infection.

In an analysis of 104 cases of brucellosis in Saudi Arabia and 1288 cases in United States, the most common symptoms and physical findings reported were fever, chills, weakness, malaise, sweating, backache, headache, lymphadenopathy, splenomegaly and arthritis [*26*,*27*]. These results are comparable to those for our subjects.

The prevalence of brucellosis was least in winter (16.2%) and peaked in summer (39.5%) in our study. In Kuwait and some other countries, however, most cases occurred during the spring and early summer [*24*,*28*].

Control of brucellosis requires elimination of infected animals and vaccination of healthy ones in order to reduce the risk for those in regular contact with animals and to have brucellosis-free animal products. Human brucellosis acquired from milk is preventable, and requires making pasteurization of milk and dairy products obligatory. Nevertheless, public health education is important in preventing the transmission of brucellosis from animals to humans.

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Epidemiology of acute renal failure in hospitalized patients: experience from southern Saudi Arabia

M. Al-Homrany[1]

وبائيات الفشل الكلوي الحاد في مرضى المستشفيات؛ خبرة المنطقة الجنوبية للمملكة العربية السعودية

محمد الحمراني

الخلاصة: على الرغم مـمَّا تحقَّق من تقدُّم في الرعاية الصحية فإن المراضة والوفيات المرتبطة بالفشل الكلوي الحاد لاتزال مرتفعة. وتحدِّد هذه الدراسة تواتر وسببيات الفشل الكلوي الحاد في مرضى المستشفيات في المملكة العربية السعودية على مدى سنتين. ومن بين الحالات المئة والخمسين من الفشل الكلوي الحاد كانت 38.0٪ منها مكتسبة من المجتمع في حين كانت 62.0٪ منها مكتسبة من المستشفيات. وكان السبب الرئيسي للفشل الكلوي هو النخر النُّبَيْبي الحاد في 93 مريضاً، ولاسيَّما ذلك الناجم عن الإنتان (24.7٪) ثم ذلك الناجم عن الإقفار (12.7٪) وعن انحلال العضلات المخططة ولاسيَّما ذلك الناجم عن حوادث المرور (10.7٪)، وعن الأدوية (7.3٪) وعن الملاريا وعن لدغات الأفاعي (4.6٪). وقد مات من مجمل المرضى 40٪ وشُفي 48٪ آخرون شفاءً تاماً، فيما أصبح مريض واحد (0.7٪) معتمداً على الديال. وتمثَّلت العوامل المرافقة لسوء المآل في تقدُّم العمر فوق ستين عاماً، وكون الفشل الكلوي الحاد مكتسباً من المجتمع، وزيادة قمة آزوت اليوريا في الدم على 160 مغ/دل، وامتداد فترة الفشل الكلوي الحاد لأكثر من أسبوع، والحاجة للديال ووجود مرض كبدي مرافق.

ABSTRACT Despite advances in health care, morbidity and mortality associated with acute renal failure (ARF) remain high. This study determined the frequency and etiology of ARF in hospitalized patients in Saudi Arabia over 2 years. Of the 150 cases of ARF, 38.0% were community-acquired and 62.0% hospital-acquired. The main cause was acute tubular necrosis (ATN) in 93 patients, due to sepsis (24.7%), ischaemia (12.7%), rhabdomyolysis (mainly from road traffic accidents) (10.7%), drugs (7.3%) and malaria and snake-bites (4.6%). Overall, 40% died, 48% made a full recovery and 1 patient (0.7%) became dialysis-dependant. Factors associated with poor prognosis were: age 60+ years, community-acquired ARF, peak blood urea nitrogen > 160 mg/dL, duration of ARF > 1 week, need for dialysis and associated chronic liver disease.

Epidémiologie de l'insuffisance rénale aiguë chez des patients hospitalisés : expérience en Arabie saoudite méridionale

RESUME Malgré les progrès réalisés dans les soins de santé, la mortalité et la morbidité associées à l'insuffisance rénale aiguë demeurent élevées. Cette étude a permis de déterminer la fréquence et l'étiologie de l'insuffisance rénale aiguë chez des patients hospitalisés en Arabie saoudite sur une période de 2 ans. Parmi les 150 cas d'insuffisance rénale aiguë, 38,0 % étaient des cas communautaires et 62,0 % des cas nosocomiaux. La principale cause était la nécrose tubulaire aiguë chez 93 patients, due à la septicémie (24,7 %), suivie par l'ischémie (12,7 %), la rhabdomyolyse (principalement due aux accidents de la route) (10,7 %), les médicaments (7,3 %) ainsi que le paludisme et les morsures de serpent (4,6 %). Globalement, 40 % des sujets sont décédés, 48 % ont guéri complètement et seul un patient (0,7 %) est devenu dépendant de la dialyse. Les facteurs associés à un mauvais pronostic étaient l'âge avancé (plus de 60 ans), l'origine communautaire du cas d'insuffisance rénale aiguë, un pic élevé d'azote uréique dans le sang (> 160mg/dL), une insuffisance rénale aiguë de longue durée (> 1 semaine), la nécessité d'une dialyse et une maladie hépatique chronique associée.

[1]*Department of Medicine, College of Medicine and Medical Sciences, King Khalid University, Abha, Saudi Arabia.*

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Introduction

Acute renal failure (ARF) is a frequent complication in hospitalized patents. Despite substantial advances in renal replacement therapy and health care delivery, morbidity and mortality rates associated with ARF have remained high [*1–3*]. Although reliable statistics on the prevalence of ARF among different tropical countries are not available, statistics based on referrals to dialysis units suggest that the condition is more common in the tropics. Earlier reports from the Middle East have indicated that the incidence of ARF is several times higher in the region than elsewhere [*4–6*].

Snakebite, malaria, liver diseases and road traffic accidents are common health problems in Saudi Arabia [*7–9*], and the contribution of these conditions to the development of ARF have not been studied before. This report was undertaken to study the pattern of ARF in hospitalized patients in southern Saudi Arabia.

Methods

A prospective study was made of all adult patients (15 years and over) with ARF during a 2-year period (January 1999 to December 2000) attending Asir Central Hospital, southern Saudi Arabia. Children were not included.

The diagnosis of ARF was based on history, physical examination, laboratory data and clinical course. To select cases for the study, ARF was defined as a sudden deterioration in renal function presenting either as oliguria (urine volume ≤ 400 mL/day) for at least 48 hours or as a rise in serum creatinine level of more than 50% and ≥ 2 mg/dL. To ensure accurate diagnosis all cases were evaluated and followed up by a nephrologist until their renal functions normalized, they were discharged from the hospital or they died (average period 3 weeks). Consent was obtained from patients who required kidney biopsy.

Cases were divided into community-acquired ARF, defined as renal failure developing outside the hospital, and hospital-acquired ARF, defined as renal failure that developed during hospitalization for non-renal-related problems in patients whose serum creatinine level on admission was normal.

The data were studied and coded. Analysis was carried out using *SPSS*, version 10. The chi-squared test, Student *t*-test and Fisher exact test were used as tests of significance at the 5% level of significance. Multivariate logistic regression analysis was carried out to study potential factors that might affect survival of acute renal failure. Age, peak blood urea nitrogen (BUN), acquiring ARF during hospitalization, duration of renal failure and having concomitant liver disease were included in the logistic regression model. Serum plasma urea was tested using enzymatic methods and serum creatinine using spectrophotometry.

Results

There were 150 patients with ARF in this study: 58.7% males and 41.3% females. The mean age of patients was 58.9 ± 22.5 years and 57.3% were 60 years or over (Table 1). Total admissions to the hospital during the study period were 26 000 patients, giving an incidence of ARF among hospitalized patients of 0.6%.

The mean duration of ARF was 10.7 ± 9.2 days (range 1–46 days). One-fifth of patients (21.3%) required dialysis while 78.7% did not require dialysis intervention. The mean duration of dialysis treatment was 6.1 ± 6.9 days (range 1–40 days).

Table 1 **Distribution of acute renal failure cases by age and sex**

Age group (years)	Male No.	Male %	Female No.	Female %	Total No.	Total %
< 20	5	5.7	1	1.6	6	4.0
20–44	26	29.5	13	21.0	39	26.0
45–59	12	13.6	7	11.3	19	12.7
60+	45	51.1	41	66.1	86	57.3
Total	88	58.7	62	41.3	150	100.0

A majority of patients (93, 62.0%) acquired ARF in hospital after admission for other reasons, while the other 57 patients (38.0%) were admitted primarily due to ARF (Table 2). Associated medical diseases were cardiac problems in 16.0% of patients, diabetes in 15.3% and hepatic problems in 10.7% (Table 2).

The commonest cause of ARF was acute tubular necrosis (ATN) in 93 (62.5%) of the patients (Table 2). Sepsis was the leading cause of ATN (37/93 cases), followed by ischaemia (19/93) and rhabdomyolysis of different etiologies (16/93); 10 of the rhabdomyolysis cases were traumatic following road traffic accidents. ARF was drug-induced in 11 cases due to aminoglycoside antibacterials. Snakebite and malaria comprised 7 cases.

The outcome of renal failure is seen in Table 3. Overall, 60 (40.0%) ARF patients died, 72 (48.0%) achieved full recovery and only 1 patient (0.7%) became dialysis-dependant. Uncontrolled sepsis and multi-organ failure was the leading cause of death (39/60 cases); other major causes of death were hepatic failure (6/60) and myocardial infarction (6/60). All patients with chronic liver diseases who developed ARF during hospitalization died.

Table 2 **Profile of acute renal failure (ARF) cases by associated medical diseases, place of initiation and primary cause**

Variable	No. of cases	% (*n* = 150)
Associated disease		
None	87	58.0
Cardiac	24	16.0
Diabetes	23	15.3
Hepatic	16	10.7
Place of initiation		
Hospital	93	62.0
Medical ward	(40)	(26.7)
Surgical ward	(26)	(17.3)
Intensive care unit	(23)	(15.3)
Burns unit	(4)	(2.7)
Community	57	38.0
Primary cause of ARF		
Acute tubular necrosis	93	62.5
Sepsis	(37)	(24.7)
Ischaemia	(19)	(12.7)
Rhabdomyolysis	(16)	(10.7)
Drugs (aminoglycosides)	(11)	(7.3)
Malaria	(5)	(3.3)
Snakebite	(2)	(1.3)
Other	(3)	(2.0)
Pre-renal failure	36	23.3
Glomerulonephritis	10	6.7
Obstructive uropathy	4	2.7
Interstitial nephritis	5	3.4
Vascular lesions	2	1.4
Total	150	100.0

n = *total number of cases.*

Table 4 shows a comparison of hospital- and community-acquired ARF cases. Mortality was significantly more frequent in hospital-acquired ARF than community-acquired ARF. On the other hand, full recovery was significantly more frequent in community-acquired ARF than hospital-acquired ARF.

Table 3 **Outcome of acute renal failure**

Outcome	No. of cases	% (*n* = 150)
Full recovery	72	48.0
Partial recovery	17	11.3
Dialysis-dependent	1	0.7
Death	60	40.0
Sepsis and multi-organ failure	(39)	(26.0)
Myocardial infarction	(6)	(4.0)
Hepatic failure	(6)	(4.0)
Gastrointestinal bleeding	(4)	(2.7)
Cerebral haemorrhage	(3)	(2.0)
Arrhythmia	(2)	(1.3)
Total	150	100.0

n = *total number of cases.*

Factors that determined the survival of our study population are shown in Table 5. Age less than 60 years, low peak BUN, hospital-acquired ARF, short duration of ARF, no concomitant liver disease and no intervention with dialysis were good prognostic factors for better patient survival.

Discussion

In recent years, improvements in socioeconomic conditions, rapid industrialization, expanding medical facilities and developments in prevention have led to a near eradication of ARF due to infection and obstetric accident. ARF in industrialized societies is now largely a consequence of road traffic and industrial accidents, cardiovascular surgery, drugs, multi-organ failure and renal transplant rejection [*10*]. The patterns of ARF encountered in the tropics have shown changes similar to those in the industrialized countries, although at a slower pace [*11*]. Among the medical causes of ARF, etiological factors leading to ARF in tropical countries are different from those seen in the industrialized world. Diarrhoeal diseases, intravascular haemolysis due to glucose-6-phosphate de-

Table 4 **Distribution of cases: comparison of hospital- and community-acquired acute renal failure (ARF)**

Factor	Hospital-acquired ARF (*n* = 93)	Community-acquired ARF (*n* = 57)	*P*-value
Primary cause	Acute tubular necrosis	Glomerulo-nephritis	
Mortality (%)	51.6	21.1	< 0.05
Need for dialysis (%)	19.4	24.6	NS
Full recovery (%)	37.6	64.9	< 0.05
Mean age ± s (years)	61.25 ± 22.18	55.1 ± 22.78	NS
Male (%)	55.9	63.2	NS
Female (%)	44.1	36.8	NS

s = *standard deviation.*
n = *total number of cases.*
NS = not significant.

Table 5 **Multivariate logistic regression model: adjusted adds ratio (OR) and 95% confidence intervals (CI) of potential determinants of survival in cases of acute renal failure**

Factor	Adjusted OR	95% CI	*P*-value
Age < 60 years	3.2	1.3–8.2	0.014
Peak BUN (< 160 mg/dL)	3.1	1.2–8.2	0.018
Hospital-acquired renal failure	5.0	1.9–12.5	0.001
No liver disease	5.1	1.2–21.3	0.025
Duration of renal failure (< 1 week)	3.9	1.5–11.1	0.004
No dialysis	10.7	3.0–37.5	0.000

BUN = blood urea nitrogen.

hydrogenase (G6PD) deficiency, copper sulphate poisoning, snakebite and insect stings together constitute over 40% of all cases of ARF in India, problems that are rarely encountered in western Europe and the USA [*12,13*].

The incidence of ARF among our hospitalized patients was 0.6%. This is in agreement with reports from the Middle East and industrialized countries where the incidence of ARF was reported to be between 0.1%–1.5% [*14–16*]. Although the spectrum of the different etiological factors for ARF was not different from previous reports from the region, there were, however, 2 new factors contributing to the cause of ARF in this study, namely snakebite and malaria. Although these 2 tropical problems contributed only to 4.6% of the causes of ARF, they have not been reported previously in other studies. Snakebite and malaria are common health problems in southern Arabia [*7,9*] and ARF is a common complication of these conditions. The overall prevalence of ARF in *Plasmodium falciparum* malaria can reach up to 60% of inpatients with heavy parasitaemia [*17,18*]. The incidence of ARF following snakebite is reported to be 13%–32% in India and snakebite contributes to 3% of the causes of ARF [*12*]. Although it is a common health problem, particularly in southern Arabia, the true incidence of ARF following snakebite is not known and few case reports have been published [*19,20*].

ATN was the commonest reason for ARF seen in our hospitalized patients. Sepsis and ischaemic causes were the commonest causes of ATN in this study, and this is similar to other reports [*3–5*]. Rhabdomyolysis of different etiologies contributed to 10.7% of ARF cases in our study. This finding is also unique to our study and has not been seen in previous reports from neighbouring countries [*4–6,10*]. Rhabdomyolysis is defined as injury to skeletal muscle cell of such severity that their contents are released into the circulation. Myoglobinuria is a consequence of rhabdomyolysis. Rhabdomyolysis is caused by either traumatic or non-traumatic factors. In the tropics, the common causes of non-traumatic rhabdomyolysis leading to myoglobinuric ARF include: eclampsia, prolonged labour, poisoning with mercuric chloride or zinc phosphide, status epilepticus, viral myositis, burns and electrical injury [*21*]. The incidence of post-traumatic ARF has been reported to be 3%–12% [*22,23*]. Two-thirds of rhabdomyolysis cases in our study were the result of road traffic accidents. Based on this study it is difficult to estimate the risk of ARF following road traffic accidents and further studies are needed.

Nephrotoxicity from drugs remains an important cause of ARF, both in nephrology units and intensive care units as well as in general surgical and medical wards. Drug-induced ARF comprised 7.3% of

cases in our study. In a North American general hospital the incidence of drug-induced ARF was estimated to be 20% [*24*]. Different studies from the Middle East have reported higher incidences of drug-induced ARF, up to 24% reported from Kuwait [*4*]. Our data showed a lower incidence than previously reported [*4,24*].

The mortality rate in this study was 40.0%. This is in agreement with the general impression that, despite impressive advances in the management of patients with ARF, there has been little improvement in survival rates [*25*]. The main causes of death in our population were uncontrolled sepsis and multi-organ failure in 39 cases (26.0%). All patients with chronic liver disease who developed ARF during hospitalization died. ARF complicating chronic liver diseases is not infrequent in this region where there is high prevalence of chronic carrier state for viral hepatitis [*8*]. In one study from Saudi Arabia 4 out of 18 deaths in ARF were caused by hepatic failure [*21*]. In our study, hepatic failure was the main cause of death in 4.0% of cases.

Patients who developed ARF in hospital show a higher mortality rate and less chance of their renal function recovering to normal. This can be explained by the fact that those patients who acquired renal failure during hospitalization are already ill and have concomitant medical problems such as chronic liver disease. A better survival rate was observed in younger patients, low peak BUN, short duration of ARF (< 1 week) and in those patients who did not require dialysis treatment.

In summary, ARF remains one of the major medical problems that require special attention in hospitalized patients. Despite the developments in diagnostic techniques and the availability of dialysis in most referral hospitals, the morbidity and mortality associated with ARF remains high. Appropriate treatment and avoidance of toxic agents in hospitalized patients may help to reduce the mortality in those at high risk.

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Microbiology of wound infection after caesarean section in a Jordanian hospital

N.M. Kaplan,[1] A.A. Smadi,[2] M.I. Al-Taani[3] and M.A. El-Qudah[3]

دراسة الجراثيم في التهابات الجروح التالية للقيصرية في مستشفى أردني

ناصر قبلان، أمل الصمدي، محمد الطعاني، محمد القدة

الخلاصة: لدراسة الجراثيم في التهابات الجروح التالية للقيصرية، ولتقييم استخدام ملوّن غرام في التنبؤ بنتائج زرع الجراثيم التي تتلو ذلك، تمت متابعة 1319 جرحاً جراحياً، بتحضير لطاخات ملوّنة بطريقة غرام وزرع المفرزات التي تنضح من الجروح المفتوحة والرُّشافات المأخوذة من تجمع السوائل في الجروح. وقد لوحظ أن معدل حدوث التهابات الجروح التالية للقيصرية كان 8.1٪ وقد كان الزرع إيجابياً في 93 من مجمل 107 من الجروح الملتهبة (86.9٪) وأظهر أن العنقوديات الذهبية هي أكثر الجراثيم مصادفة (42٪). وقد أظهرت الجراثيم التي فحصت بطريقة غرام حساسيةً نسبتُها 96.6٪، ونوعيةً نسبتُها 88.9٪، وقيمة تنبؤية إيجابية نسبتُها 97.7٪، وقيمة تنبؤية سلبية نسبتُها 84.2٪، وذلك عند استخدام التلوين بملوّن غرام للتنبؤ بنتائج الزرع الإيجابية للجراثيم في الجروح الملتهبة.

ABSTRACT To determine the microbiology of wound infection following caesarean section and to evaluate the use of Gram stain for the predicton of subsequent microbiological culture results, 1319 surgical wounds were followed up. We did Gram stains and cultures on exudates from open wounds and on aspirates if the wounds had demonstrable fluid collection. Incidence of post-caesarean wound infection was 8.1%. Ninety-three (86.9%) of 107 infected wounds were culture positive, with *Staphylococcus aureus* the most frequently found organism (42%). Organisms seen by Gram stain yielded a sensitivity of 96.6%, specificity of 88.9%, positive predictive value of 97.7% and negative predictive value of 84.2% when used to predict positive culture results for bacterial wound infection.

Microbiologie de l'infection de la plaie après césarienne dans un hôpital jordanien

RESUME Afin de déterminer la microbiologie de l'infection de la plaie après une césarienne et d'évaluer l'utilisation de la coloration de Gram pour prévoir les résultats des cultures microbiologiques ultérieures, 1319 plaies chirurgicales ont fait l'objet d'un suivi. Nous avons procédé à une coloration de Gram et à des cultures sur des exsudats de plaies ouvertes et des échantillons prélevés par aspiration si la plaie avait une accumulation de fluides manifeste. L'incidence de l'infection de la plaie après césarienne s'élevait à 8,1 %. Quatre-vingt-treize (86,9 %) des 107 plaies infectées avaient des cultures positives, *Staphylococcus aureus* étant le micro-organisme le plus fréquemment trouvé (42 %). Les micro-organismes mis en évidence par coloration de Gram ont donné une sensibilité de 96,6 %, une spécificité de 88,9 %, une valeur prédictive positive de 97,7 % et une valeur prédictive négative de 84,2 % lorsqu'ils étaient utilisés pour prévoir les résultats de culture positifs pour les infections bactériennes des plaies.

[1]Department of Pathology, [2]Department of Radiology; [3]Department of Gynaecology and Obstetrics, Queen Alia Military Hospital, Amman, Jordan.
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Introduction

Wound infection after caesarean delivery occurs in 2%–16% of patients, depending on factors such as antibiotic prophylaxis, length of labour, duration of rupture of membranes, duration of internal monitoring, and number of vaginal examinations [*1,2*]. In one case–control study conducted in a university hospital population, it was reported that 89% of 57 post-caesarean wound infections were culture-positive [*3*].

The Gram stain has been found to be highly specific but less sensitive in the prediction of post-caesarean endomyometritis [*4*] and in the early detection of significant burn wound microbial growth [*5*]. In these studies, infection was defined as microbiologic recovery of pathogenic organisms by culture.

The isolation of genital mycoplasmas from post-caesarean wound infections has also been reported, however pathogenicity in this setting was not precisely known. The Gram stain findings consistently showed predominantly white blood cells and no organisms [*6,7*].

We conducted this study to define the prevalence of pathogenic organisms in post-caesarean wound infection in our hospital and to evaluate the use of Gram stain to predict subsequent microbiological culture results. Cultures were not done for *Mycoplasma hominis* or *Ureaplasma urealyticum* (no special facilities available). The literature was also reviewed for the predisposing factors and preventive measures of wound infection following caesarean section.

Methods

We followed prospectively a total of 1319 women who underwent caesarean section at the Department of Obstetrics and Gynaecology, Queen Alia Military Hospita in the period between 1 October 1998 and 31 January 2002. The hospital has a fully-equipped, central sterile supply department and a regularly updated disinfection policy. The basic universal management of caesarean section was followed and all patients received 1 g of cephalothin sodium (Keflin) intravenously as prophylaxis at the time of umbilical cord clamping. A wound infection was identified by the presence of purulent discharge from the incision with erythematous cellulitis, induration or pain, and demonstrable fluid collection noted on ultrasound. Women with stitch abscesses, haematomas and seromas, or those developing infection after hospital discharge, were not included in this study.

Purulent exudates were obtained from the open discharging wounds with a sterile cotton swab. Aspirates were obtained by preparing the wound area with alcohol, inserting a sterile needle through the healing incision and aspirating fluid into a sterile syringe. Culturing was done within 1 hour using standard bacteriological inoculation techniques. Blood, chocolate (Diagnolab, Barcelona, Spain) and MacConkey (MAST Diagnostics, Merseyside, United Kingdom) agars were used to isolate Gram-positive and Gram-negative aerobic microorganisms. Schaedler agar (BBL Microbiology Systems, Cockeysville, Maryland, United States of America) was used for the isolation of anaerobes. The aerobic plates were read within 24–48 hours and the anaerobic plates at 48 and 72 hours. The anaerobic plates were kept 1 week before a final negative result was confirmed. Quantitative bacteriology was not performed. Any growth was subsequently identified by standard microbiological methods. Gram stains were also performed and recorded at the time of culturing. Primary culturing and

Gram staining of specimens were done by Medical Laboratory Scientific Officer Grade 1. Microscopic examination of Gram-stained slides and subsequent identification of bacterial isolates were done by an experienced senior microbiologist. The Gram stain results were defined as follows: a positive Gram stain requires that organisms with or without appreciable numbers of white blood cells were seen under oil immersion light microscopy; a negative Gram stain requires that no organisms were seen under oil immersion light microscopy.

The Gram stain results were studied in comparison with isolation of viable organisms in cultures. Sensitivity, specificity, and predictive values were calculated by standard formulae. A true positive was defined as a positive smear from a wound from which an organism was subsequently cultured within 48 hours. A false positive had a positive smear but a negative culture within 48 hours. A false negative had a negative smear but a positive culture within 48 hours of incubation. Fisher exact test was applied as a test of significance.

Results

Of 12 083 women delivered during the study period; 1319 (10.9%) had caesarean section. Of these, 107 (8.1%) developed an abdominal incision infection during hospitalization, 93 of which (86.9%) were classed as positive. A total of 112 organisms were isolated. There were 47 (42%) *Staphylococcus aureus*, 31 (27.7%) *Escherichia coli*, 23 (20.5%) *Klebsiella sp*., 6 (5.3%) *Pseudomonas sp.*, 3 (2.7%) *Enterococcus sp.* and 2 (1.8%) anaerobes.

The wound was open in 87 (81%) of the 107 cases. Eighty-three of the 87 (95.4%) cultures from open wounds were positive.

Gram stains of the exudates and aspirates were used to predict subsequent microbiological culture results (Table 1). Organisms examined by Gram stain yielded a sensitivity of 96.6%, specificity of 88.9%, positive predictive value of 97.7% and negative predictive value of 84.2% when used to predict positive culture results for bacterial wound infection. The difference between positive and negative Gram staining for prediction of subsequent culture results was statistically significant ($P < 0.0001$) by Fisher exact test.

Discussion

Wound infection is a common surgical complication, often requiring a prolonged hospital stay and leading to increased costs. It represents the most common serious complication of caesarean section. There are at least two mechanisms responsible for the development of post-caesarean wound infection: first, increased amniotic fluid and wound colonization by cervicovaginal flora due to prolonged rupture of membranes, and second, increased exogenous bacterial contamination by skin flora due to breaks in sterile technique, often accompanying difficult or emergency surgery [*3,8*].

Table 1 **Results of Gram stain and culture of the 107 wound samples**

Gram stain	Positive culture	Negative culture	Total
Positive Gram stain	86	2	88
Negative Gram stain	3	16	19
Total	89	18	107

P< *0.0001 by Fisher exact test.*

The commonest causative organism of post-caesarean section wound infection in our sample was *S. aureus*. One of the major problems facing the laboratory is distinguishing clinically significant, pathogenic strains of coagulase-negative staphylococci from contaminant strains [*9*]. The importance of coagulase-negative staphylococci is increasing due to the increase in the use of transient or permanent medical devices, such as intravascular catheters and prosthetic devices in seriously ill and immunocompromised patients. All coagulase-negative staphylococci in our study were isolated from open wounds and regarded as skin contaminants. There were only 2 anaerobic organisms isolated.

In all, 10 closed and 4 open wound cultures were negative and did not grow viable organisms. This might be attributed to difficult-to-grow fastidious organisms, inappropriate processing of specimens in the laboratory or the administration of antibiotics prior to specimen collection.

False positive Gram stain results could be due to either stained cotton swab fibres or stain deposits or crystals. False negative Gram stain results could be due to low numbers of organisms or inadequate screening of the smear. Gram stain proved to be simple, rapid, cheap and of acceptable predictive value.

Careful examination of Gram-stained slides is required to determine Gram-stain affinity, morphology and arrangement of the organisms and consequently guide the early choice of the appropriate antimicrobial agent. However it has to be emphasized that Gram stain should not be a substitute for culture.

The reported rate of wound infection after caesarean section ranges widely, largely because of different risk factors among diverse patient populations. In some studies, mean rate of wound infection after caesarean section was found to be 10% among women not receiving prophylactic antibiotics [*10,11*]. The incidence of post-caesarean section wound infection was 4.5% in a tertiary hospital in Saudi Arabia [*12*], however the rate in our sample was 8.1%. Underestimation of wound infection rates has always been a concern as some hospitals send comparatively few swabs to the laboratory for examination, consequently any measure of infection that depends on routinely analysed swabs is likely to underestimate the actual level [*13*]. Similarly, wound infections may present later after discharge from hospital, as women who have a caesarean section usually have a relatively short stay. Hence, without follow-up in the community, underestimation may exist. [*14–16*], and one study reported that 36% of post-caesarean section wound infections were diagnosed following the patients' discharge from hospital [*15*]. Therefore, it is strongly recommended that data on post-discharge surveillance should always be included to realistically estimate the true rates of post-caesarean section wound infection and to allow the implementation of adequate preventive measures.

The incidence of post-caesarean wound infection has been found to be higher following emergency rather than elective caesarean section [*8,17,18*], in general ward rather than private ward cases [*19*], in clinic rather than private patients [*18*] and in patients from lower rather than higher socioeconomic groups [*15,20*].

Various risk factors have been assessed in relation to post-caesarean surgical site infection [*21,22*]. Prolonged rupture of membranes [*8,19*], multiple pelvic examinations [*18,19*], duration of operation, vertical skin incision, category of surgeon [*18*], maternal weight, obesity and thickness of subcutaneous tissue at the surgery

site [*15*,*20*] and anaemia [*19*,*22*] have been identified as statistically significant factors associated with a high risk of post-caesarean wound infection.

Antibiotic prophylaxis has been found to be the most significant protective factor in reducing both the rate of post-caesarean section wound infection [*15*,*23*] and costs [*24*]. Most clinical trials have shown no significant difference in the efficacy of various antibiotic regimens [*25*]. However, antibiotic prophylaxis will not prevent infection if poor surgical techniques have been employed, and will result in the selection of resistant bacteria [*26*,*27*]. Post-caesarean wound infection caused by enterococci have been significantly associated with the use of cephalosporin prophylaxis [*28*]. Therefore, anxieties about antimicrobial toxicity (including allergic reactions), the potential to cause an increase in hospital-acquired infection with resistant organisms and the possible masking of early infection in the neonate have suggested that the overall risk–benefit ratio and cost–effectiveness may not be favourable.

A significant reduction in the rate and severity of postoperative endometritis after caesarean section has been reported in association with the application of strict preoperative hygienic routines. However, no similar reduction was found concerning wound infections [*29*]. The redisinfection of the skin around the caesarean incision before skin closure has been reported to reduce the incidence of postoperative wound infection [*30*], however no benefit from the use of adhesive plastic drapes could be demonstrated [*30*,*31*]. It has also been reported that antibiotic irrigation is safe, showing no noted adverse effects, and is an effective method in reducing post-caesarean section infectious morbidity and wound infections [*32*].

In a controlled clinical trial to study the treatment of postoperative wound infections following caesarean section or total abdominal hysterectomy, the topical application of crude undiluted honey was associated with faster eradication of bacterial infections, shorter periods of concomitant antibiotic use and hospital stay, acceleration of wound healing, prevention of wound dehiscence with the consequent need for re-suturing, and finally minimal scar formation [*33*].

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مواقف الأطباء العامين تجاه مندوبي شركات الأدوية بجهة سوسة (تونس)

أحمد بن عبد العزيز، عماد هرابي، سعاد الرحموني، عادل غديرة، خالد قحة، حسن غنام[1]

الخلاصة: يعتبر الإعلام الصيدلاني للأطباء حجر الزاوية في استراتيجية الاستعمال الرشيد للدواء. لولا أن ترويجه يتم أساساً من قِبَل الصناعات الدوائية عبر ممثليها التجاريين. وتهدف هذه الدراسة إلى قياس أهمية الزيارات الدعائية التي يقوم بها مندوبو شركات الأدوية للأطباء أولاً، وإلى وصف مواقف الأطباء العامين نحو هؤلاء الزائرين الطبيين ثانياً. هذه الدراسة وصفية مقطعية شمولية شملت 140 طبيباً عاماً ممارساً قبلوا الرد على استبيان ذي أسئلة مقفلة. وقد بلغت نسبة المشاركة 78٪ وتَوَزَّعَ المشاركون بين 72 طبيباً بالقطاع العام و 68 طبيباً بالقطاع الخاص. وصرح 10 ٪ من الأطباء أنهم يستقبلون المندوبين التجاريين يومياً. واعتبر 84٪ من المستجوَبين أن الممثلين التجاريين مصدر ناجع للإعلام الصيدلاني، كما اعترف 30٪ من الأطباء بتغيير اختياراتهم العلاجية إثر اتصالهم بالزائرين الطبيين. ويخلص البحث إلى أهمية استناد الأطباء العامين على مندوبي الدعاية لشركات الأدوية في مجال الإعلام الصيدلاني، وإلى حساسيتهم تجاه رسائلهم الإعلامية نتيجة الصورة الإيجابية التي يحملونها عنهم مما يجعل مراقبة الإعلام الصيدلاني المرتبط بالصناعات الدوائية جزءاً أساسياً في برنامج ترشيد استعمال الأدوية.

Attitudes of general practitioners to pharmaceutical sales representatives in Sousse

ABSTRACT The therapeutic knowledge of physicians is the corner stone to the rational use of medicines; however information about medicines is generally obtained from the pharmaceutical industry via their sales representatives (reps). We aimed to identify general practitioners' (GPs) attitudes to pharmaceutical reps and the information they provide. We surveyed 140 GPs using a self-administered questionnaire. The response rate was 78% (72 GPs from the public sector and 68 from the private sector). About 10% of the GPs said they received daily visits from pharmaceutical reps; 84% of GPs considered them an efficient source of information and 31% said they might change their therapeutic prescribing following visits from these reps. Because of their positive perception of pharmaceutical reps, GPs are susceptible to the information they provide. Controlling the validity of the therapeutic information imparted by the pharmaceutical industry is thus a fundamental component of the programme for the rational use of medicines.

Attitudes des généralistes vis-à-vis des représentants pharmaceutiques à Sousse

RESUME Les connaissances thérapeutiques des médecins sont à la base de l'usage rationnel des médicaments ; toutefois, les informations sur les médicaments leur sont fournies en règle générale par l'industrie pharmaceutique par le biais de ses représentants. Notre objectif était d'identifier les attitudes des généralistes vis-à-vis des représentants pharmaceutiques et de l'information qu'ils fournissent. Nous avons effectué une enquête auprès de 140 généralistes à l'aide d'un questionnaire auto-administré. Le taux de réponse était de 78 % (72 généralistes du secteur public et 68 du secteur privé). Environ 10 % des généralistes ont déclaré recevoir des visites de représentants pharmaceutiques quotidiennement ; 84 % des généralistes les considéraient comme une source d'information efficace et 31 % reconnaissaient qu'ils pouvaient modifier leur prescription thérapeutique suite à la visite de ces représentants. Par conséquent, du fait de la perception positive qu'ils ont des représentants pharmaceutiques, les généralistes sont réceptifs à l'information fournie par ces derniers. Le contrôle de la validité des informations thérapeutiques transmises par l'industrie pharmaceutique est donc une composante fondamentale du programme sur l'usage rationnel des médicaments.

[1] *A. Ben Abdelaziz, I. Harrabi, S. Rahmani, A. Ghedira, K. Gaha, H. Ghannem*
Department of Community Medicine, Faculty of Medicine Ibn El Jazzar, Sousse, Tunisia.
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معلومات عامّة

يعتبر الاستعمال الرشيد للدواء إحدى الاستراتيجيات الرئيسية للتحكم في الإنفاق الصّحي، ولاسيَّما في البلدان النامية حيث يخصّص ثلث النفقات الصحّية في مجال الّدواء. و يمثل شراء الأدوية ما يزيد على ثلث النفقات الصحّية للعائلات [1] وتزيد مرحلة التحوُّل الوبائي والديمغرافي والثقافي والاجتماعي التي انطلقت في كثير من هذه البلدان من استهلاك الدواء مما يهدّد التوازن المالي للأنظمة الصحّية. ومن ثم تظهر الحاجة إلى تطبيق استراتيجية شاملة للاستعمال الرشيد للأدوية، معتمدة أساسا على الأطباء الممارسين [2]. إنّ كثرة الوصفات في العيادات العلاجية والاستعمال المفرط للمضادات الحيوية والحقن، تعبر عن استفحال ظاهرة الاستعمال غير المرشَّد للأدوية، ولاسيَّما بمراكز الرعاية الصحية الأولية [3]. ومن ثمّ فإن الإعلام الصيدلاني للأطباء هو حجر الزاوية في استراتيجية الاستعمال الرشيد للأدوية، بشرط أن يكون هذا الإعلام صادقاً، ناجحاً، دقيقاً، شاملاً ومناسباً [4،5]. إلا أنّ الإعلام الصيدلاني تروِّجه أساساً الصناعات الدوائية التي تخصص ميزانيات هائلة وتشغل مهارات متعدّدة في التسويق: للعمل في الدعاية. إنّ السلوك العلاجي للأطباء تحدّده بالإضافة إلى القاعدة الدّوائية المتمثِّلة في ديناميكية الأدوية وتوافُرها الحيوي؛ القاعدةُ غير الدوائية المتمثِّلة في ضغوط المرضى والدعاية الدوائية [6]. ويحاول هذا البحث أن يدرس موقع مندوبي الدعاية لشركات الأدوية في الإعلام الصيدلاني للأطباء العامين من خلال:

(1) قياس أهمية الزيارات التي يقوم بها المندوبون التجاريون للأطباء الممارسين.

(2) وصف مواقف الأطباء نحو هؤلاء المندوبين التجاريين.

(3) تقييم نوعية الإعلام الصيدلاني المقدَّم من قِبَل مندوبي الشركات التجارية.

الطريقة

هذه الدراسة وصفية مقطعية شمولية شملت 140 طبيباً عاماً عملوا بالجهة الصحيّة لسوسة خلال سنة 1999 في القطاعين العمومي والخاص بعد استبعاد الأطباء العامين المشتغلين بالمستشفيات الجامعية والأجانب والمعوضين خلال فترة الدراسة، كان هناك 179 طبيباً عاماً مؤهلين للدراسة. تمّ الاتصال فعلياً بـ 173 منهم بأماكن عملهم. قبل 140 الإجابة عن الاستبيان، وهكذا كانت نسبة المشاركة العامة 78٪.

تمّ توزيع الاستبيان على الأطباء العامين أثناء زيارات ميدانية لعياداتهم الخاصة أو لمراكز الصحة العمومية. يحتوي هذا الاستبيان على 76 سؤالاً أغلبها أسئلة مقفلة. وتغطي هذه الأسئلة: وسائل الإعلام الصيدلاني من ناحية ومواقف الأطباء من مندوبي الدعاية لشركات الأدوية، وستقتصر هذه الورقة على المعطيات المتعلقة بالمندوبين الطبيين.

وتعتمد شركات الأدوية بتونس في ترويج منتجاتها الصيدلانية على مندوبي الدعاية الذين تنتقيهم من بين الخريجين الجدد لكليات الطب والصيدلة وفق معطيات تسويقية، وتقوم على تأهيلهم باتباع دورات تدريبية ودراسات ميدانية في علوم التواصل والتجارة.

ويركز هؤلاء المندوبون على عيادات الطب الخاص لعدم التزامها بقائمة أدوية أساسية، وعلى المستشفيات الجامعية العمومية لاستهلاكها لأدوية باهظة الثمن. ويكسب المندوبون التجاريون حوافز مالية مرتبطة بحجم المبيعات، بالإضافة إلى جراية قارَّة (رواتب ثابتة) ومنح ثابتة تفوق مستوى دخل الطبيب العام الذي يعمل بالوظيفة العمومية. استغرق البحث ثلاثة أشهر: حزيران/يونيو/جوان، آب/أغسطس/أوت 1999. وتمّ تحليل المعطيات باستعمال برمجية Epi-info 6 وتلخيصها باستعمال الإحصائيات الوصفية (التواتر المطلق والتواتر النسبي).

النتائج

1. خصائص جمهرة الدراسة

تحتوي جمهرة البحث على 68 طبيباً ممارساً يعملون بالقطاع الخاص و72 طبيباً يشتغلون بالمؤسسات الصحية العمومية. يتراوح العمر من 28 إلى 61 سنة مع معدّل عام 40 سنة. نسبة الجنسين كانت 3 لصالح الرجال في القطاع الخاص و0.4 فقط لصالح النساء في القطاع العام. وكان معدل الأقدمية المهنية بـ 10 سنوات، وهي أرفع قليلا عند أطباء الممارسة في القطاع الخاص (11.2 سنة) بالمقارنة مع زملائهم في القطاع العام (8.5 سنة).

2. أهمية زيارات المندوبين التجاريين

صرح طبيب من بين 10 أطباء أنه يستقبل يومياً مندوبي دعاية للمصانع الدوائية. وكانت وتيرة الزيارات أكثر تقارباً بين أطباء الممارسة في القطاع الخاص مقارنة بين زملائهم في القطاع العام. وتستغرق المقابلة أكثر من 15 دقيقة لدى نصف المستجوبين (الجدول 1) .

الجدول 1: أهمية زيارة مندوبي الشركات الدوائية لـ 140 طبيب عام يشتغلون بالجهة الصحية بسوسة سنة 1999 (٪)

	القطاع العام (n = 72)	القطاع الخاص (n = 68)	مجموع القطاعين (n = 140)
المعدل الأدنى لزيارة الممثلين التجاريين			
▪ مرة/اليوم	02	19	10
▪ مرّة/الأسبوع	22	46	33
▪ مرّة/الشهر	36	20	29
▪ مرة/ الثلاثية	25	12	19
▪ مرّة / السنة أوأقل	15	03	09
مدّة الزيارة للممثل التجاري			
▪ أقل 15 من دقيقة	85	15	51
▪ 15 دقيقة أو أكثر	15	85	49

3. مواقف الأطباء الـمُمارسين العامِّين نحو زيارة المندوبين التجاريين

يعتبر 84 ٪ من المستجوبين أن مندوبي شركات الأدوية مصدر ناجع للإعلام الصيدلاني ومتلائم مع نوعية ممارستهم الطبية. لدى 72٪ من الأطباء العامِّين ثقة في مصداقية الإعلام الصيدلاني المروّج من قِبَلهم. واعترف 30٪ من المستجوَبين بتغير قراراتهم العلاجية إثر زيارة هؤلاء المندوبين التجاريين، كما صرح 6 أطباء من أصل 7 أنهم ينتظرون من خلال هذه اللقاءات التزوُّد بعينات مجانية من الأدوية المقدمة (الجدول 2).

الجدول 2: المواقف لدى مندوبي شركات الأدوية
لدى 140 طبيب عام بالجهة الصحية بسوسة سنة 1999 (٪)

	القطاع العام (n = 72)	القطاع الخاص (n = 68)	مجموع القطاعين (n = 140)
استقبال مندوب الدعاية:			
▪ واجب أخلاقي	54	56	55
▪ فرصة للتواصل	45	73	59
▪ مصدر إعلامي نافع للممارسة	80	88	84
▪ فرصة للحصول على بعض العينات	66	69	68
الإعلام الصيدلاني المقدَّم من طرف مندوب الدعاية صادق	76	67	72
أغيِّر غالباً مواقفي أو ممارستي بعد زيارة مندوب الدعاية	28	31	29

4. نوعية المعلومات المقدمة من قِبَل المندوبين التجاريين

إن الآثار الغير المحبذة والتفاعلات الدوائية والحالات الممنوعة كانت نادراً ما يصرح بها من قِبَل مندوبي دعاية الشركات الدوائية، إذ لم تسجل تباعاً إلا في 36٪، 23٪ و32٪ فقط من المستجوَبين. كما أن الجوانب الاقتصادية للدّواء المقدّم كانت غائبة حسب 47 ٪ من الأطباء العامين. ويقدَّم المستحضر الصّيدلاني عادة من قِبَل الزائرين الطبيين باعتباره المرجع العلاجي الذي لا يحتوي على أي خطورة حسب 63٪ و53٪ من الأطباء تباعاً (انظر الجدول 3).

5. مواقف الأطباء تجاه العينات الصيدلانية

صرّح 52٪ من الأطباء في القطاع الخاص و18٪ بالقطاع العام أنهم حصلوا على هدايا من قِبَل المندوبين التجاريين. إن قبول العينات الدوائية يعتبر عادة مستساغة من قِبَل 88٪ من الأطباء العامين الذين صرحوا أنهم يتلقون تشجيعات من قِبَل الزائرين الطبيين على تجربة هذه الأدوية على المرضى (الجدول 4).

الجدول 3: نوعية خطاب مندوب شركات الأدوية ووثائقه الدعائية لدى 140 طبيب عام يمارسون بالجهة الصحية لسوسة سنة 1999 (٪)

	القطاع العام (n = 72)	القطاع الخاص (n = 68)	مجموع القطاعين (n = 140)
خطاب مندوب شركات الأدوية			
▪ أثناء زيارته، الممثل التجاري:			
▪ يستعمل جزافاً مصطلحات من قبيل «لا خَطَرَ منه»	52	53	53
▪ يذكر عفوياً التداخلات الدوائية	22	23	23
▪ يذكر عفوياً الثمن	53	54	53
▪ يذكر عفوياً الآثار غير المحبذة	32	32	32
▪ يذكر عفوياً الحالات التي يمنع استعمال الدواء فيها	36	36	36
▪ مستعد للإجابة عن الأسئلة	91	88	90
▪ مقنع	65	63	64
▪ يقدم الدواء كمرجع علاجي	64	63	63
محتوى التوثيق لدعائي:			
▪ متفق مع خطاب المندوب التجاري	65	47	56
▪ متفق مع مرجع VIDAL .	36	35	35
▪ واضح	61	47	54
▪ ناجع لممارسة الطب العام	22	23	23

المناقشة

أثناء الممارسة العلاجية، يحتاج الأطباء العامون إلى إعلام صيدلاني يستجيب لشروط أساسية، أخلاقية، وعلمية، ومؤسساتية وتجارية، تساهم في تنمية استعمال رشيد للأدوية وتحكّم في تكلفة العلاج [7]. ويواجه الطبيب المعالج كمّية هائلة من المعلومات الصيدلانية تصدر عن مصادر متفرقة مختلفة أهمّها مؤسسات الصناعات الدوائية التي تستعمل وسائل وطرق مختلفة ومتنوعة للدعاية الدوائية، كالنشريات وتنظيم المؤتمرات وتمويل أنشطة التأهيل المستمر وخاصة الاستعانة بالمندوبين التجاريين [8].

هذا البحث الذي يسعى إلى دراسة موقع الممثلين الطبيين في الإعلام الصيدلاني للأطباء العامين لم يكن محصَّناً من أخطاء مردُّها إلى انحياز الملاحظة، وهو أمر مألوف في الدراسات المعتمدة على استبيان.

الجدول 4: المواقف والسلوكيات تجاه العينات الدوائية والهدايا المقدمة من قِبَل مندوبي شركات الأدوية لدى 140 طبيب عام يمارسون بالجهة الصحية بسوسة سنة 1999 (٪)

	القطاع العام (n = 72)	القطاع الخاص (n = 68)	مجموع القطاعين (n = 140)
▪ أتلقى غالباً هدايا من مندوبي الدعاية	18	56	36
▪ أتلقى غالباً عينات من مندوبي الدعاية	86	91	88
▪ أتلقى تشجيعاً على تجربة الأدوية الجديدة على المرضى	43	72	73
▪ أجرّب غالباً الأدوية الجديدة على مرضاي	75	70	73
▪ أجرّب غالباً العينات على نفسي أو على أحد مرضاي	57	57	57
▪ الاختبارات العلاجية للأدوية المقدمة تعكس غالباً نجاعتها	64	81	72
▪ نتائج طيبة لهذه الاختبارات العلاجية تشجعني على وصف هذه الأدوية لمرضاي	84	91	88

ويخلص البحث إلى ثلاثة نقاط هامة:

- أهمية اعتماد الأطباء العامين على مندوبي الدعاية
- حساسية الأطباء العامين نحو الرسائل الإعلامية لمندوبي الدعاية
- والنوعية المشبوهة للمعلومات العلاجية الموّجهة أثناء الزّيارة للأطباء العامين

أهمية زيارات مندوبي الدعاية

ككل الصناعات، تسعى الصناعات الدوائية لخلق سلوكيات وصف أدويتها باستعمال التواصل المباشر وجها لوجه بين الطبيب والزائر، الذي هو مثل كل بائع جيّد، عمليٌّ لا يبحث عن الإبداع، ولكنّه يمثّل بكل بساطة أداة ناجعة للبيع أكثر والتحصّل على مزيد من المنح [9].

وقد تبيّن من خلال هذا البحث أن 10٪ من الأطباء العموميين يستقبلون يوميا زائرين طبيين، ويتجاوز هذا اللقاء معهم 15 دقيقة حسب نصف المستجوَبين. هذه الظاهرة التي تمّ رصدها خلال دراسة سابقة بالوسط والشمال التونسي، بيَّنت أن 90٪ من الأطباء العموميين يزورهم غالباً المندوبون التجاريون و54٪ يخصصون وقتاً للقاء مع الزائر الطبي يفوق الوقت الذي تستغرقه عيادة طبية لمريض [10]. وفي بلد كفرنسا يستقبل الطبيب العام في المعدّل 9.3 زيارات [11] لمندوبين تجاريين أسبوعياً، مخصصاً 1.8 ساعات لهم كل أسبوع، بحساب 10 إلى 14 دقيقة لكل لقاء [12]. كما ينجز كل ممثل تجاري أسبوعياً، 31 زيارة لعيادات طبية مما يؤدي إلى أ كثر من 20 مليون مقابلة انفرادية حول الأدوية كل عام [13]. وهكذا بحساب زائر طبي لكل 6 أطباء [11] وتكلفة اجتماعية تفوق 15٪ من أرقام المعاملات الفرنسية وتكلفة زيارة تقدّر بـ 500 فرنك فرنسي [8]، تأمل الصناعات الدوائية إحداث تغيرات في السلوكيات العلاجية للأطباء لصالح مزيد من المبيعات لمستحضراتهم الصيدلانية المصنعة.

قابلية تأثر الأطباء العامين

إنّ الظروف الخاصّة لممارسة الطب العام، والوضعية المالية للأطباء الممارسين بالخط الأول، المتميزة بالصعوبة لا تسمح لهم بالاشتراك بالمجلاّت المعتمدة، كمّا أنّهم لا يملكون متسعاً من الوقت لغربلة واستخلاص المعلومات الصيدلانية النّافعة والصحيحة [14-16]. فالاستعانة بمندوبي الدعاية لشركات الأدوية يعتبر حلاً سهلاً للإعلام الدوائي متناسباً مع شروط الممارسة للأطباء العامين. إلا أن التهيؤّ الموضوعي لاستقبال الرسائل الدعائية للمندوبين التجاريين سيكون أقوى إثر وجود تصوّر إيجابي لهؤلاء الزائرين مما يؤدِّي إلى حالة تقبُّل.

ومن خلال هذا البحث، تبين أنّ الزائر الطبي يتمتع بصورة إيجابية عند الأطباء العامين الذين يعتبرونه مصدراً ناجعاً للإعلام الصيدلاني، متلائماً مع نوعية ممارستهم الطبية، صادقاً ومعللاً لتغيير اختياراتهم العلاجية. هذه المكانة المتميزة التي يحتلها الزائرون الطبيون كمصدر للإعلام تمّ توثيقها أيضاً في دراسات أخرى. ففي استقصاء جرى بفرنسا سنة 1987 اعتبر 87٪ من الممارسين أن الزيارة الدعائية للمندوبين هي وسيلة ضرورية للإعلام [17]، وحسب دراسة أخرى، أنّ 96٪ من الأطباء يتم إعلامهم بالأدوية الجديدة من قِبَل المندوبين التجاريين الذين يحتلون المرتبة الأولى في تصنيف مصادر الإعلام [12] .

نوعية الإعلام الصيدلاني العربي

إنّ المعلومات المقدَّمة من قِبَل المندوبين التجاريين يجب اعتبارها نسبية، فهي ليست دائماً موضوعية باعتبار أن الهدف الرئيسي للزائر الطبي هو تحفيز الأطباء على وصف الأدوية التي يصنعها المختبر الذي يوظّفه. إنّ مندوبي شركات الأدوية يقدمون معطيات مختارة حول الأدوية، إيجابية في الأغلب [17-19].

أمّا الجوانب السلبية للدواء فهي تمثل نسبة صغيرة من مجموع المعلومات المقدمة من قِبَلهم خلال لقائهم مع الأطباء العامين في جهتنا.هذه الظاهرة عرضتها شبكة الملاحظة لمجلّة (Prescribre) [20] التي صرّحت أنّ الحالات التي يتعذر وصف الدواء منها والآثار الضائرة والتداخلات الدّوائية لم يقع ذكرها من قِبَل الزائرين إلاّ بنسبة 23٪ و26٪ و20٪ من اللقاءات تباعاً. وفي دراسة فرنسية [21] تناولت 33 زيارة طبية حول 107 دواء، قدمها 31 مندوباً تجارياً، تمّ إحصاء 1244 معلومة علمية مقدمة، من بينها 11٪ فقط اهتمت بالجوانب السلبية للدواء، و لم يذكر الثمن عموماً إلا لتأكيد انخفاضه.

وإضافةً إلى هذا السّهو الكبير المتعلق بسلبيات الأدوية، فإنّ مصداقية الإعلام المقدَّم من قِبَل الممثلين التجاريين قد تـمَّت مناقشتها من قِبَل بحوث أخرى [18]. وتبيَّن أن تكرار تذكير الأطباء بهذه الرسائل الدعائية هي في بعض الأحيان متناقضة مع المعطيات الحالية للعلم مما يؤدي إلى توجه نحو استعمال غير مُرشّد للأدوية [22].

لقد كشفت هذه الدراسة عن مفارقة كبيرة بين ثقة مفرط فيها يعبر عنها الأطباء العامون ببلادنا نحو مندوبي الدعاية لشركات الأدوية من ناحية، وضعف مصداقية الإعلام الصيدلاني الموجَّه من قِبَل هؤلاء نحو الأطباء الممارسين، إذ تكاد تختفي فيه الجوانب السلبية للدواء من آثار جانبية وتفاعلات دوائية وارتفاع تكلفة.

وتنكشف هذه المفارقة في ورقة حديثة نشرت حول مصادر أخرى للمعلومات الدوائية متاحة للأطباء بمنطقة الدراسة كفهارس الأدوية (مثل الفهرس الفرنسي فيدال VIDAL) والصحافة الطبية المجانية

(كـ "المغرب الطبي" و"الهدف الطبي") وكلها مصادر إعلامية مرتبطة بالصناعات الدوائية التي توظف أموالاً طائلة وتستخدم خبرات عالية في توجيه قرار المعالج في وصف الدواء [23].

وتعود هذه المفارقات إلى ضعف التأهيل الطبي في مجال البعد الاقتصادي لاستعمال الأدوية من ناحية أولى، إذ ينهي طالب الطب سنوات تحصيله العلمي بكليات الطب دون أن يعلم شيئاً عن تصنيع الدواء وتسويقه وتكلفته وكذلك إلى غياب تقاليد المراقبة. والمتابعة لمدى التزام الشركات الدوائية للقواعد الأخلاقية في ترويج الأدوية والدعاية لها عَبْر مندوبيها أو نشراتها من ناحية ثانية. إذ لا يحال بين المندوبين الطبيين وبين مدربي الطب بالمستشفيات، وتوجّه الصناعات الدوائية برامج التكوين الطبي المستمر عَبْر تمويلها للمؤتمرات والندوات والمحاضرات [24].

وفي الختام فإنّ الصورة الإيجابية لدور مندوبي الدعاية لشركات الأدوية في الإعلام الصيدلاني للأطباء العامين قد يساعد في تقليص نجاح استراتيجية الاستعمال الرشيد للدواء، ولاسيَّما بين الأطباء العاملين في الخط الصحي الأول، خاصة وأنّ هؤلاء لا يتصلون بسهولة بالمصادر الصادقة للإعلام حول الدواء، وأنّهم غير مدرَّبين على تقنيات تقييم الخبر [25]. إنّ مراقبة الإعلام الصيدلاني المرتبط بالصناعات الدوائية أصبحت تمثِّل مكوِّناً أساسياً لبرنامج ترشيد الدواء [26] إضافة للمتابعة المستمرة لتحليل نمط وصف الأدوية من قِبَل الأطباء في كل قطاعات الممارسة العلاجية [27].

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Innovative learning approaches in an established medical school: the experience at JUST in Jordan

I. Beni Hani,[1] K. Al Saudi[2] and A. Alkafajei[3]

أساليب مبتكرة للتعلم في الكليات الطبية الراسخة: خبرة الجامعة الأردنية للعلوم والتكنولوجيا

إبراهيم بني هاني، قاسم السوادي، أحمد الخفاجي

الخلاصة: تأسست كلية الطب في الجامعة الأردنية للعلوم والتكنولوجيا عام 1986. وتم في عام 1999 إدخال تغييرات مبتكرة على المنهج التدريسي التقليدي المستشفَوي التوجُّه والمرتكز على المواضيع، وقد هدفت هذه التغييرات إلى إدخال مضمومة متكاملة للتعلم، والتأكيد على التعلم المتمحور حول الطلاب، والتدريب في مواقع مجتمعية، والتعلم الانتقائي. ولتقييم التعلم التكاملي في المنهج الدراسي الجديد قمنا بتقييم مدى صحة وموثوقية ما يحرزه الطلاب من نتائج، ثم مقارنة ما أحرزه الطلاب الذين يدرسون المناهج التكاملية مع ما أحرزه الطلاب الذين يدرسون بالطريقة التقليدية. وتوضح دراستنا هذه أن نتائج الاختبارات التي أجريت على الطريقة الجديدة تدل على أنها تمثل تدابير موثوقة وصحيحة لتقييم أداء الطلاب.

ABSTRACT The Faculty of Medicine at Jordan University of Science and Technology was established in 1986. Innovative changes were introduced to the traditional subject-based, hospital-oriented curriculum in 1999, the objectives of which were to integrate student learning, emphasize student-centred learning, develop training in a community setting, and introduce elective learning packages. To evaluate the integrated learning in the new curriculum, we assessed the validity and reliability of students' scores. The scores for the integrated 'modules' were compared with those in general subjects studied in the traditional way. Our study showed that results of tests taken on the new 'modules' are both valid and reliable measures of students' performance.

Approches didactiques novatrices dans une école de médicine bien établie : l'expérience de l'Université jordanienne des sciences et de la technologie

RESUME La Faculté de médecine de l'Université jordanienne des sciences et de la technologie a été créée en 1986. Des changements novateurs ont été introduits en 1999 dans le programme traditionnel d'études par matières à orientation hospitalière ; ces changements avaient pour objectifs d'intégrer l'apprentissage des étudiants, de faire une large place à l'apprentissage centré sur l'étudiant, de développer la formation au sein de la communauté, et d'introduire des modules d'apprentissage optionnels. Pour évaluer l'apprentissage intégré dans le nouveau programme, nous avons déterminé la validité et la fiabilité des scores des étudiants. Les scores pour les modules intégrés ont été comparés avec ceux obtenus dans les disciplines générales étudiées de manière traditionnelle. Notre étude montre que les résultats des tests passés sur les nouveaux « modules » sont des mesures valables et fiables de la performance des étudiants.

[1]Faculty of Medicine, Jordan University of Science and Technology, Irbid, Jordan.
[2]Department of Pharmacology; [3]Department of Public Health, Faculty of Medicine, Jordan University of Science and Technology, Irbid, Jordan.
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Introduction

The medical school

The Faculty of Medicine in Jordan University of Science and Technology (JUST) was established in 1986. It was the second faculty of medicine to be opened in Jordan (the first being at the University of Jordan in Amman). The campus also houses the 860-bed teaching hospital, King Abdullah University Hospital. The first group of students graduated in June 1991. Annual student intake increased from around 50 in the early years to about 200 in more recent years. The original 6-year curriculum followed the well-established traditional, discipline-based, hospital-oriented model.

Rationale for innovation

Global standards of medical education and the evolving needs of the national health system

The curriculum content is a balance between universals such as the basic sciences and clinical skills, and the particular local health priorities as determined by the community context and the national health system, and embracing the socioeconomic, environmental, health and cultural characteristics of both. Education should take full account of this context.

Global changes in medical education, namely the increasing globalization of medicine and the global initiatives to establish international standards for the content, process, and educational outcome of undergraduate medical education programmes, give great consideration to the issue of context [*1–3*].

The common ground for internationally sound standards in medical education must be the academic quality and clinical development of the student. But without application to context, medical education is incomplete. Context must be attended to by addressing the needs of the national health system, and health personnel training programmes should primarily cater to the needs of the health care services.

Health needs of the community

The health needs of the community were assessed and an appraisal of the functional components of the health system helped to determine how far these were conducive to meeting those needs. It was evident that the traditional curriculum, which is individual patient-oriented and hospital-based, lacked the desired social orientation of health and disease. Student training was invariably centred around disease from the narrow angle of diagnosis and management.

In designing the new curriculum, the challenges that lie ahead and the tasks medical students have to perform have to be brought to the fore. The recognized importance of health care delivery in the community and the importance of improving training in family medicine should constitute the pillars on which curriculum innovation is built [*4,5*]. It was therefore decided that both the learning objectives and the training setting had to be remodelled.

Fragmentation of learning

An increased orientation towards the consumer, i.e. the student, and the shift of focus from teacher or trainer to student or trainee was an added mandate that helped in formulating the changes that were needed in the faculty's educational strategy [*6*].

Another factor was the problems associated with increasing specialization in medicine and the need to view the patient as a whole. The rapid growth of knowledge also fuelled a concern that students were learning less and less about more and more [*7,8*].

A major shortcoming of traditional teaching is that it fragments the patient into a collection of organs and disease entities. It fails to capture the full psychological and spiritual dimensions of a patient's illness. Physicians can seem only concerned about patients as bearers of pathologies to be eliminated. This is augmented by the artificial division of medical education into components related to the academic departments or disciplines. For example, in a discipline-based curriculum, peptic ulcer is taught separately by each of the following departments: pathology, pharmacology, medicine and surgery.

It was decided that the innovations in the curriculum should introduce the full range and complexity of health, disease, illness and sickness. Students will be trained to be alert to the social conditions in which people live, which are increasingly understood to play an important role in illness and anxiety about illness.

Objectives of the innovation

The objectives were to integrate student learning, put emphasis on student-centred learning, develop training in a community setting and introduce elective learning packages.

The integrated curriculum

Horizontal integration between basic and paraclinical disciplines is augmented by the vertical integration with clinical application. The integration of medical sciences with clinical medicine is emphasized even during the early phases of training.

During the first year and a half, the general subjects of basic medical sciences are taught in the traditional subject-based fashion. The next year and a half is devoted to the study of nine body systems called 'modules'—the cardiovascular system, respiratory system, haemopoietic system, digestive system, endocrine system, musculoskeletal system, neuroscience 1, neuroscience 2, and the reproductive and urinary system. The remaining 3 years are spent in various clinical disciplines.

Student-centred learning

The characteristic mode of student assessment in the traditional model is based on testing factual knowledge. In the new curriculum, success is judged by what students learn, rather than what they are taught. The move from an emphasis on the delivery of knowledge by the teacher to student self-learning is reflected in the student-centred approach.

Methods

In order to evaluate the integrated learning in the new curriculum, we assessed the validity and reliability of students' test scores in the integrated module subjects (both reliability and validity obtained here refer to the results of the tests and not to the tests themselves). The students' test scores in integrated modules were compared with their test scores in general subjects studied in the traditional way.

The study population comprised all second year medical students, 262 in total, for the academic year 2000/2001. They were in the first batch under the new curriculum, and were the first to study the integrated modules during the second semester.

The mean scores of all students in all 4 general subjects studied during the first semester of the second year (pathology, microbiology, pharmacology, and biostatistics) were compared with the mean scores in 3 modules (cardiovascular system, respiratory system, and haemopoietic system) covered during the second semester of the second year. The scores in the 4

discipline-based general subjects were used as the standard for measuring validity and reliability of scores in the 3 modules.

A student score in any 1 subject, whether it is a general or a module, is made up of scores in 2 mid-term and 1 end of term examinations. The pass score is 50 out of 100 marks. Since these are criterion-referenced examinations, any student with a score of less than 50 is obliged to restudy the subject concerned.

Criterion-related predictive validity was used in this study to see how well test scores achieved in the integrated module subjects could be predicted by the scores obtained in traditionally learned subjects. Criterion-related predictive validity uses a validity coefficient, which is the correlation coefficient, as its index of measurement. The validity coefficient is best determined by the Pearson product-moment technique when large sample size is involved, as in the present study [*9*].

Results

The values of central tendency and dispersion of scores in the general and module subjects are shown in Table 1. It can be seen that there is a wide spread of scores in both the general subjects and the modules as evidenced by the range of values. This variability among scores is necessary for computing validity coefficients.

Table 2 shows the validity coefficients between various subjects expressed as Pearson product-moment correlation coefficient, *r*. All the *r*-values are high enough to indicate a fairly strong positive relationship between the general subjects and the modules, as well as between the module subjects themselves. The larger *r*-values reveal that the characteristics measured in the general subjects and the module subjects are almost the same (e.g. specific knowledge recall and information synthesis). Greater *r*-values usually suggest the stability of the scores is greater, the time span between the examinations has been short and the spread of the scores is large. The calculated validity coefficients in Table 2 also suggest that scores in general subjects (predictor) are actually predictive of the scores in module subjects (criterion).

In Figure 1, the linear regression indicates that high predictor (general subjects) scores tend to correlate with high criterion (modules) scores and that low predictor

Table 1 **Values of central tendency and dispersion of examination scores in general subjects and in the new modules for 262 second year students, 2000/2001**

Subject	Mean score (%)	*s*	Median	Range
General (4 subjects)	67.7	12.3	66.5	38.8–95.8
Modules (3 subjects)	65.6	12.5	65.3	35.0–92.7
Cardiovascular system	63.8	13.7	63.0	35.0–96.0
Haemopoietic system	69.1	12.5	70.0	35.0–94.0
Respiratory system	63.6	13.2	64.0	35.0–90.0

s = *standard deviation.*

Table 2 **Pearson correlation coefficient (*r*) between examination scores in various subjects**

	General	Modules	Cardiovascular system	Haemopoietic system
Modules	0.797			
Cardiovascular system	0.873	0.846		
Haemopoietic system	0.881	0.832	0.885	
Respiratory system	0.776	0.956	0.781	0.765

All r-*values are statistically significant,* $P < 0.001$.
Using t-*test,* $t = r\sqrt{[(n-2)/(1-r^2)]}$.

scores tend to correlate with low criterion scores, the coefficients of determination (R^2) being high in the 4 regression lines.

Table 3 shows that the linear regression lines between scores of the general subjects and those of the modules illustrated in Figure 1 provide good fit to the data (statistically significant).

Again, since these tests are criterion-referenced tests, the reliability of scores obtained in both the general and the module subjects can best be determined by computing the percentage of consistent decisions over any 2 tests. For example, all students obtaining a score of 80 or higher on tests in both general and module subjects are classified as masters in both subjects. All students obtaining a score of less than 80 on both tests are classified as nonmasters on both tests. The remaining students are classified as master on 1 test and nonmaster on the other. If this latter group of reversals is relatively large, the tests are inconsistent in classifying students. Consistency (reliability) is determined as the sum of masters and nonmasters in both tests divided by the total number of students.

Table 4 displays the consistency of examination scores in general subjects with those in the new modules, using different cut-off points for masters. The students' scores reveal higher consistency for the 2 extreme cut-off points, 50 and 80. The total agreement between scores in general subjects with those in module subjects is in the order of 9 out of 10 students at cut-off points 50 and 80. However, the majority of those students are classed as masters when the 50 cut-off point is considered, while many of them are classed as nonmasters when 80 is the cut-off point.

Discussion

The important qualities to consider when evaluating innovative instructional methods are validity and reliability of the results of tests measuring students' achievements in the innovative programme. Testing students' achievements provides information that is used in educational decisions. Evaluation of tests done after the introduction of a new instructional strategy is essential for describing changes in students' performance as well as for judging the desirability of the innovative programme itself.

Measuring the validity of the integrated modules in the present study could best be done by determining the extent to which students achieved the intended objectives

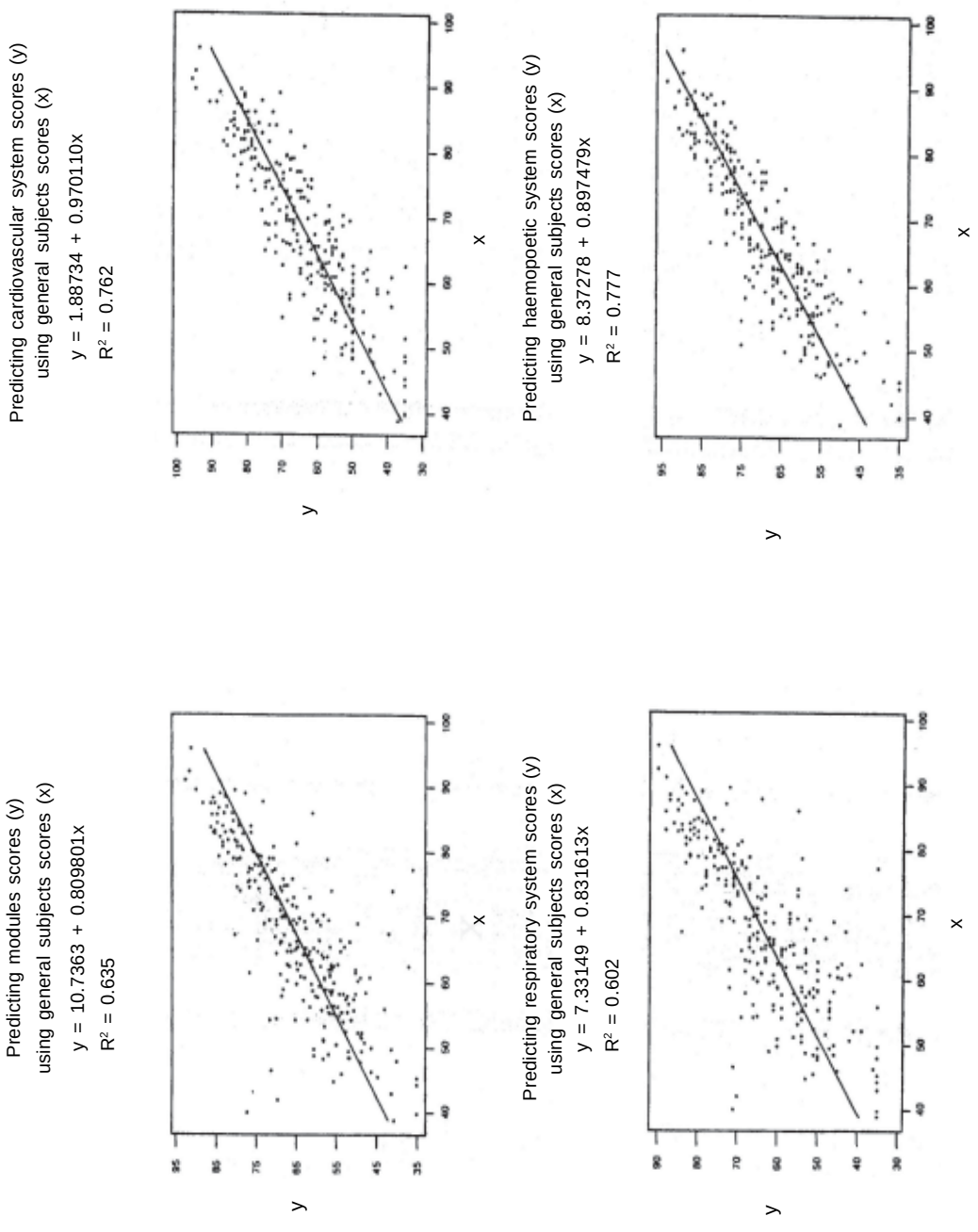

Figure 1 **Linear regression of scores on modules on general subjects**

Table 3 **Analysis of variance for simple linear regression of mean examination scores in modules (criterion) on mean scores in general subjects (predictor) for 262 students**

Regression	SS	df	MS	*F*	*P*
Modules on general					
Linear regression	25 902	1	25 902	452.19	< 0.001
Residuals	14 893	260	57		
Cardiovascular system on general					
Linear regression	37 172	1	37 172	834.72	< 0.001
Residuals	11 578	260	45		
Haemopoietic system on general					
Linear regression	31 814	1	31 814	904.38	< 0.001
Residuals	9 146	260	35		
Respiratory system on general					
Linear regression	27 316	1	27 316	392.71	< 0.001
Residuals	18 085	260	70		

SS = sum of squares.
df = degrees of freedom.
MS = mean square.

of the modules. Validity here refers to the meaningfulness and appropriateness of the interpretations made on test scores rather than on the test instrument itself.

A high degree of correlation was found between the predictor, i.e. general subjects, and the criterion, i.e. module subjects. There was a significant fit for regression lines drawn between the criterion and the predictor. These regression lines support the illustrated high degree of validity of students' performance in the modules.

Table 4 **Consistency (%) of examination scores in general subjects with those in modules using different master cut-off points for 262 second year medical students, 2000/2001**

Test subjects	Consistency of scores (%) Mastery cut-off point			
	50	60	70	80
General:modules	89.3	79.0	86.2	91.2
General:cardiovascular system	92.0	80.2	84.4	91.6
General:haemopoetic system	93.9	86.2	84.7	90.8
General:respiratory system	88.5	74.8	85.9	90.1

The evaluation of students' test results in the integrated modules of cardiovascular, respiratory, and haemopoietic systems when compared to their performance in subjects taught in the traditional fashion indicates that their performance in these modules has high validity. Examinations done in both modes of teaching were testing almost similar characteristics and the stability of the scores is high.

The results exhibited in Tables 2 and 3 and Figure 1 indicate that students' scores in the integrated modules are accurate (valid) measures of students' performance.

Next to validity, reliability is the most important quality to seek in the evaluation of the innovative instructional method of integrated modules. Again, in interpreting and using reliability information, it is important to remember that reliability estimates refer to the results of the test and not the test itself. It is equally essential to remember that a valid measure is not necessarily reliable and that reliability is strictly a statistical concept.

When criterion-referenced tests are considered, as in this study, it is best to measure reliability by classifying students as masters or nonmasters using an arbitrary cut-off point. The percentage of consistent decisions over two tests provides a simple and effective index of reliability.

The students' performance in these innovative modules has a high degree of reliability. Results obtained from tests on modules are highly consistent with results obtained from traditionally taught general subjects. The results of tests done in the integrated modules give a precise (reliable) measure of students' performance.

The observed high degree of reliability of the innovative modules also provides the consistency that makes validity of these innovations more prominent. Reliability is a necessary condition for validity. The high reliability indices revealed in Table 4 illustrate that the results of the examinations for the new modules are reliable and precise measures of student performance.

In conclusion, we found that the results of students' assessments in the innovative 'modules' are both valid and reliable measures of students' performance.

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Medical Education in the EMR

The Regional Office has assigned top priority to human resources policies formulation, planning and management. Human resources policies have been developed in very few countries of the Region. In most cases plans for human resources for health have been worked out in the absence of clear-cut or agreed policies. To meet this deficiency, guidelines for formulation of policies on human resources development, prepared by a working group, are available. Better performance of health personnel has been the most important reason for the emphasis the Regional Office has placed on strengthening and promoting programmes for continuing education as well as programmes on management of human resources.

Source: http://www.emro.who.int/EMROInfo/MedicalEducation.htm

Rythme du cortisol pendant le mois de ramadan

L. Ben Salem,[1] S. B'chir,[1] F. Bchir,[2] R. Bouguerra[1] et C. Ben Slama[1]

نَظْم الكورتيزول في شهر رمضان

ليلى بن سالم، سلوى بشير، فطوم بشير، راضية بوقرّة، كلود بن سلامة

الخلاصة: أُجريت دراسة لنَظْم إفراز الكورتيزول الليلي واستجابة الكورتيزول لإعطاء الكورتيكوتروبين خلال شهر رمضان في أحدَ عَشَر من المتطوعين الذكور الأصحاء الذين تتراوح أعمارهم بين 20 و35 عاماً. فتم قبل أسبوعين من بداية رمضان استقصاء استجابتهم لإعطاء 250 مكروغرام من 1–24 كورتيكوتروبين، وذلك بإجراء الاختبار في الساعة الثامنة صباحاً والثامنة مساءً. وبعد 16–22 يوماً من الصيام قيسَتْ مستويات الكورتيزول فيهم في الساعة الثامنة صباحاً. كما قيست استجابتهم للكورتيكوتروبين في الساعة الثامنة مساءً. وقد كان المستوى القاعدي للكورتيزول قبل شهر رمضان أكثر بشكل ملحوظ في الساعة الثامنة صباحاً منه في الساعة الثامنة مساءً، كما كانت استجابة الكورتيزول للكورتيكوتروبين أعلى في الساعة الثامنة صباحاً كذلك، ولو أن هذا الفرق لا يُعتدَّ به إحصائياً. أما خلال شهر رمضان فكان مستوى الكورتيزول في الثامنة صباحاً أقلَّ منه في الثامنة صباحاً قبل رمضان؛ في حين أن مستواه في الثامنة مساءً كان أعلى بقليل منه في نفس الوقت قبل رمضان، ولكنه أقل بصورة ملحوظة من المستويات الصباحية قبل وأثناء رمضان. ولم يكن هناك فرق جوهري بين استجابة الكورتيزول للكورتيكوتروبين في الساعة الثامنة مساءً أثناء رمضان، وبين الاستجابة قبل رمضان في كلٍّ من الساعة الثامنة صباحاً والساعة الثامنة مساءً.

RESUME Nous avons étudié le rythme nycthéméral de sécrétion du cortisol et la réponse du cortisol à la 1-24 corticotropine pendant le ramadan chez 11 sujets volontaires sains, de sexe masculin, âgés de 20 à 35 ans. Ceux-ci ont d'abord été explorés deux semaines avant le ramadan par deux tests à 250 mg de 1-24 corticotropine pratiqués l'un à 8 h et l'autre à 20 h, puis après 16 à 22 jours de jeûne, par un dosage de la cortisolémie à 8 h et un test à la 1-24 corticotropine à 20 h. Avant le ramadan, le taux de cortisol de base était significativement plus élevé à 8 h qu'à 20 h et la réponse du cortisol à la 1-24 corticotropine était également plus élevée à 8 h qu'à 20 h mais cette différence était non significative. Pendant le ramadan, le taux de cortisol à 8 h s'abaisse par rapport à sa valeur à la même heure avant le ramadan ; le taux de 20 h s'élève légèrement par rapport à sa valeur à la même heure avant le ramadan. La réponse du cortisol à la 1-24 corticotropine à 20 h pendant le ramadan ne présente pas de différence significative avec les réponses avant le ramadan à 20 h et à 8 h.

Cortisol rhythm during Ramadan

ABSTRACT We studied the nyctohemeral cortisol secretion rhythm and the cortisol response to 1-24 corticotropin during Ramadan in 11 healthy, male volunteers aged 20–35 years. Their response to 250 mg 1-24 corticotropin was investigated 2 weeks before Ramadan by testing daily at 08:00 and 20:00 hours. After 16-22 days of fasting, their cortisol levels were measured at 08:00 hours and their response to 1-24 corticotropin at 20:00 hours. Before Ramadan, the baseline cortisol level was significantly higher at 08:00 hours than at 20:00 hours and the cortisol response to 1-24 corticotropin was also higher at 08:00 hours but this difference was not significant. During Ramadan, the cortisol level at 08:00 hours was lower than at the same time before Ramadan; the level at 20:00 hours was slightly higher than at the same time before Ramadan. There was no significant difference between the cortisol response to 1-24 corticotropin at 20:00 hours during Ramadan and the responses before Ramadan at 20:00 hours and 08:00 hours.

[1]Service d'Endocrinologie, Métabolisme et Nutrition, Institut National de Nutrition, Tunis (Tunisie).
[2]Laboratoire d'Hormonologie, Institut Pasteur, Tunis (Tunisie).
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Introduction

Le mois du ramadan (9e mois de l'année lunaire) est un mois sacré au cours duquel le jeûne est obligatoire pour les musulmans entre le lever et le coucher du soleil. Au cours de ce mois, on assiste à une inversion partielle du rythme nycthéméral avec un jeûne diurne, une prise alimentaire nocturne et un état de veille prolongé compensé par une période de sommeil diurne variable. Ces modifications peuvent-elles influencer le rythme circadien de la sécrétion du cortisol ? L' objectif de notre étude est d'évaluer l'influence des modifications du mode de vie pendant le mois du ramadan sur le rythme nycthéméral de sécrétion du cortisol.

Méthodes

Onze (11) sujets masculins volontaires sains ont participé à cette étude. Ils sont âgés de 20 à 35 ans (âge moyen 26,5 ± 1,4 ans) ; leur indice de corpulence moyen est de 23,5 ± 2,8 kg/m^2 et ils ne prennent aucune médication.

La réponse surrénalienne à la corticotrophine (ACTH) est évaluée par l'augmentation du taux de cortisol 30 minutes (T30') et 60 minutes (T60') après une injection intraveineuse de 250 µg de Synacthène® immédiat (ACTH 1-24). La première exploration pratiquée une quinzaine de jours avant le début du mois de ramadan comprend un test au Synacthène® à 8 h puis à 20 h, avec un intervalle minimal de cinq jours entre les deux tests.

Le mois de ramadan, pendant notre étude, coïncide avec le mois de décembre 2000. Les sujets jeûnent du lever du soleil (6 h) jusqu'au coucher (17 h 15).

La deuxième exploration est faite pendant le ramadan, après une durée moyenne de 17 jours de jeûne (extrêmes 16-22 jours) et comprend un dosage de la cortisolémie de base à 8 h et un test au Synacthène® le même jour à 20 h, soit 3 h environ après la rupture du jeûne. Le dosage du cortisol plasmatique est fait par méthode radio-immunologique de compétition. La sensibileté du test est de 10 nmol. Les valeurs normales sont comprises le matin entre 260 et 720 nmol/L et le soir entre 50 et 350 nmol/L. L'analyse statistique est réalisée à l'aide du logiciel Epi Info version 6. Les comparaisons entre les variables continues utilisent le test *t* de Student. Le Δ cortisol correspond à la différence entre le taux du cortisol à T60' au cours du test au Synacthène® et le taux de cortisol de base (T0).

Résultats

Avant le ramadan

Exploration à 8 h

Le taux de base du cortisol à 8 h est de 749,50 ± 207 nmol/L. Ce taux augmente en moyenne de 67 % au cours du test de stimulation par l'ACTH ; il passe à 1118 ± 53 nmol/L à la 30e minute et à 1167 ± 46 nmol/L à la 60e minute, ce qui correspond à un Δ cortisol de 424,4 ± 185,7 nmol/L.

Exploration à 20 h

Le taux de base du cortisol à 20 h est de 195,18 ± 79 nmol/L. Ce taux augmente en moyenne de 456 % au cours du test de stimulation par l'ACTH ; il passe à 769 ± 27 nmol/L à la 30e minute et à 950 ± 41 nmol/L à la 60e minute, ce qui correspond à un Δ cortisol de 742,5 ± 138,1 nmol/L.

Comparé aux résultats de 8 h, le taux de cortisol à 20 h est moins élevé ($p < 0,001$) et son pic au cours du test est moins important mais cette différence n'est pas statis-

tiquement significative. La comparaison des Δ cortisol montre que la réponse du cortisol est significativement plus élevée à 20 h qu'à 8 h ($p < 0,001$).

Pendant le ramadan

Exploration à 8 h

Le taux de base du cortisol à 8 h est de 646,30 ± 81 nmol/L. Ce taux est plus bas qu'à la même heure avant le ramadan, mais cette différence n'est pas statistiquement significative.

Exploration à 20 h

Le taux de base du cortisol à 20 h est de 319 ± 19 nmol/L. Ce taux augmente en moyenne de 254 % au cours du test de stimulation par l'ACTH ; il passe à 904 ± 41 nmol/L à la 30e minute et à 1102 ± 51 nmol/L à la 60e minute, ce qui correspond à un Δ cortisol de 595,2 ± 97,9 nmol/L. Le taux de 20 h s'élève légèrement par rapport à sa valeur à la même heure avant le ramadan ($p = 0,08$) mais reste nettement inférieur au taux matinal pendant le ramadan ($p = 0,001$) et avant le ramadan ($p < 0,001$).

L'élévation du cortisol au cours du test au Synacthène® à 20 h pendant le ramadan ne présente pas de différence significative avec l'élévation d'avant le ramadan à la même heure ni avec celle d'avant le ramadan à 8 h.

Discussion

Les rythmes biologiques représentent un phénomène adaptatif des êtres vivants aux variations périodiques de l'environnement : alternance jour/nuit ou variations saisonnières [*1*]. Les activités endocrines humaines ne sont pas constantes et varient suivant des rythmes ultradiens (90 à 120 minutes), circadiens (24 heures) et circannuels (1 an) afin d'assurer le maintien des équilibres physiologiques et biochimiques de l'organisme [*2,3*]. Toute modification du mode de vie (inversion du rythme veille/sommeil ou jeûne prolongé) entraînant une perturbation des horloges biologiques peut influencer l'activité, en particulier circadienne, de la sécrétion de certaines hormones et même de leurs actions sur leurs tissus cibles [*2,4*]. Le système endocrinien le plus sensible à ce genre de variations est l'axe hypothalamo-hypophyso-surrénalien [*4*].

Il est admis que la rythmicité hypothalamique (CRH) circadienne transmet ses signaux à la rythmicité pituitaire (ACTH) qui, à son tour, les communique à la rythmicité du cortex surrénalien. La sécrétion du cortisol, principale hormone du stress, suit donc un rythme nycthéméral répondant aux besoins de l'individu. L'ACTH suit un mouvement comparable mais décalé dans le temps ; son pic se situe entre minuit et 3 h du matin [*5*].

Il existe aussi des variations circadiennes de la susceptibilité des organes cibles à l'ACTH [*2,5,6*]. Les variations circadiennes des effets de l'ACTH sur l'activité corticosurrénalienne sont rapportées depuis les années 60 [*7,8*]. Reinberg et coll. ont comparé le pic de cortisol obtenu au cours de trois épreuves de stimulation par l'ACTH 1-17, pratiquées respectivement à 7 h, 14 h et à 21 h. Les résultats obtenus montrent que les concentrations plasmatiques de cortisol les plus élevées s'observent après l'injection de 7 h et les plus faibles après l'injection de 21 h [*2,5*]. Les auteurs concluent que la stimulation est maximale lorsqu'elle est faite au voisinage du pic circadien spontané de la sécrétion du cortisol [*2*].

Nos résultats pour les tests réalisés avant le mois de ramadan concordent avec ces constatations puisque le pic du cortisol

après Synacthène® à 8 h est plus élevé que celui de 20 h. Cependant, dans notre étude, le Δ cortisol au cours du test à 20 h est plus élevé que celui obtenu à 8 h. En effet, nous avons calculé les variations relativement au taux de base ; or ce dernier est plus bas à 20 h. Ferrari et coll. ont aussi démontré que les concentrations plasmatiques de cortisol après une stimulation par l'ACTH sont plus élevées le matin que le soir, mais en exprimant leurs résultats en augmentation relative par rapport au taux de base, ces derniers concluent que la réponse est plus forte à 21 h qu'à 7 h, ce qui se rapproche de nos résultats [*9*].

Plusieurs facteurs peuvent modifier le rythme nycthéméral de l'axe corticotrope. L'alternance lumière/obscurité est habituellement parallèle au rythme veille/sommeil. Toute modification de la durée d'éveil entraînant par conséquent une modification de la durée d'exposition à la lumière peut influencer le rythme nycthéméral de la sécrétion de cortisol. Ceci est observé principalement au cours des phénomènes de décalage horaire (*jet lag*) [*10,11*]. Toute situation de stress, d'ordre physique ou psychique, provoque une stimulation de la sécrétion de cortisol. L'effet du jeûne sur la sécrétion de cortisol a été aussi étudié par plusieurs auteurs. Un jeûne court (8 à 10 h) n'altère pas le taux de cortisol de base mais diminue la réponse de l'axe corticotrope à la stimulation induite par le stress [*12*]. Un jeûne calorique de cinq jours entraîne une augmentation du taux de cortisol de base et une modification du rythme nycthéméral avec un décalage du pic du cortisol vers le début de l'après-midi [*13*].

Pendant le mois du ramadan, plusieurs auteurs se sont intéressés aux variations de certains paramètres biologiques. Ben Rayana et coll. ont constaté une augmentation des taux sanguins de calcium, phosphore, créatinine et protides et une baisse du taux des triglycérides après 10 h de jeûne [*14*]. Zebidi et coll. ont rapporté une baisse significative de la glycémie avec une augmentation des triglycérides et des acides gras libres en fin de jeûne [*15*]. Iraki et coll. ont noté une élévation du taux plasmatique de la gastrine et une baisse du pH gastrique [*16*].

L'état de jeûne hydrique et calorique, relativement court (12 h) mais répété sur 29 à 30 jours, qui caractérise le mois du ramadan peut expliquer la baisse du taux de cortisol à 8 h observée pendant ce mois. Ceci est en accord avec les résultats des études déjà citées [*13*]. Il peut s'agir soit d'un décalage du pic matinal [*13*], soit d'une baisse du taux de base secondaire à des baisses modérées et récurrentes de la glycémie [*17*]. Outre l'état de jeûne, on assiste aussi pendant le mois du ramadan à une modification du rythme veille/sommeil, la prise alimentaire étant concentrée pendant la période nocturne, d'où une tendance à veiller le plus souvent au-delà de minuit. Une étude marocaine a montré une augmentation de la durée d'éveil pendant le ramadan [*18*]. Ceci peut entraîner un décalage de la sécrétion de l'ACTH et peut-être un décalage du pic matinal du cortisol.

Dans notre étude, le taux du cortisol à 20 h pendant le ramadan est légèrement plus élevé que celui d'avant le ramadan à la même heure. Cette élévation peut être expliquée par une stimulation de la sécrétion du cortisol suite à la prise alimentaire relativement riche en protéines au moment de la rupture du jeûne.

Al-Hadramy et coll. ont aussi constaté pendant le ramadan une baisse du taux matinal du cortisol (prélevé à 10 h) et une élévation de son taux nocturne (prélevé à minuit) [*19*].

Récemment, l'étude du cycle du cortisol pendant le mois du ramadan par Bogdan et coll. a démontré un décalage du pic ma-

tinal du cortisol, mais ce dernier est plus important que le pic matinal observé avant le ramadan [*20*]. Ils ont constaté aussi une augmentation du taux de cortisol en fin d'après-midi avec un plateau entre 16 h et 20 h, sachant que la prise alimentaire au cours de cette étude s'est faite à 20 h.

Le rythme nycthéméral de la sécrétion du cortisol est globalement conservé pendant le mois du ramadan, puisque le taux de 20 h reste nettement inférieur à celui de 8 h. Cette constatation a été initialement rapportée par Chossat puis confirmée par d'autres études au cours desquelles on a démontré que, pendant une diète protéique, le rythme circadien est conservé pour toutes les variables physiologiques étudiées (GH, insuline, Glucagon et cortisol) [*21*].

La sensibilité de la surrénale à la stimulation par l'ACTH ne semble pas être influencée par les modifications observées pendant le mois du ramadan.

Conclusion

Pendant le ramadan, il existe une élévation du cortisol à 20 h non accompagnée d'une baisse nette du cortisol à 8 h. Cette situation pourrait aboutir à une hyperproduction du cortisol sur les 24 h qui serait mieux explorée par la mesure du cortisol libre urinaire. Des prélèvements réguliers au cours de la journée pendant le ramadan devraient aussi permettre de mieux étudier le cycle du cortisol dans cette période de jeûne et de modification du rythme veille/sommeil.

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Les effets métaboliques du jeûne du mois de ramadan chez des diabétiques de type 2

R. Bouguerra[1], A. Belkadhi[2], J. Jabrane[2], J. Hamzaoui[2], C. Maâtki[3], M.C. Ben Rayana[4] et C. Ben Slama[1]

تأثير صيام رمضان على ضبط الاستقلاب في النمط الثاني من السكري

راضية بوحيرة، أمينة بلقاضي، جيلودي جبران، جازية حمزاوي، شيراز معتوقي، محمد شهاب بن رايانا، كلود بن سلامة

خلاصة: قمنا بتقييم تأثيرات صيام رمضان على الضبط الاستقلابي، ولاسيما ما يطرأ على كولسترول البروتينات الشحمية الرفيعة الكثافة HDL من تغيُّرات، لدى 25 من المصابين بالنمط الثاني من السكري الذين عولجوا بالنظام الغذائي أو بالأدوية المخفضة للسكر عن طريق الفم مع ضبط استقلابي جيد. كما قمنا بتقييم المُتَثَابتات السريرية (الإكلينيكية) والطبية الحيوية ومقدار المأخوذ من الطعام قبل رمضان بثلاثة أسابيع، وفي الأسبوع الرابع من رمضان، وبعد مرور ثلاثة أسابيع على انقضاء رمضان. لم يُشاهَدْ أيُّ تغيُّر في وزن البدن وفي ضغط الدم، ولم تُلاحظ أيُّ مضاعفات استقلابية. ولم يطرأ أيُّ تغيُّر على القيمة الوسطية للغلوكوز أثناء الصيام، أو الفروكتوزامين في المصل، أو الهيموغلوبين (A1c). وقد شُوهدَ ترابط عكسي بين تناول الكوليسترول أثناء رمضان، وبين مستوى كوليسترول البروتينات الشحمية الرفيعة الكثافة. كما أنه عندما ينقص المُتَنَاوَل من الكوليسترول عن 400 ميلي غرام يومياً، فإن مستوى كوليسترول البروتينات الشحمية الرفيعة الكثافة HDL، يزداد بمقدار 13٪ في نهاية رمضان وبمقدار 23٪ بعد مرور 3 أسابيع على انقضاء رمضان.

Metabolic effects of Ramadan fasting on type 2 diabetes

ABSTRACT We assessed the effects of Ramadan fasting on metabolic control, particularly change of HDL-cholesterol in 25 type 2 diabetic patients treated with diet or oral agents, with good metabolic control. Clinical and biochemical parameters and food intake were evaluated 3 weeks before Ramadan, in the fourth week of Ramadan and 3 weeks after Ramadan. There were no changes in body weight and blood pressure nor any metabolic complications. The mean plasma fasting glucose, serum fructosamin and haemoglobin A1c did not change. We found a negative relation between cholesterol intake during Ramadan and the change of HDL-cholesterol. When cholesterol intake was lower than 400 mg/day, plasma HDL-cholesterol increased by 13% at the end of Ramadan and by 23% 3 weeks after Ramadan.

RESUME Nous avons analysé les effets métaboliques, en particulier les variations du cholestérol HDL, du jeûne du mois de ramadan chez 25 diabétiques de type 2 bien équilibrés traités par le régime ou les antidiabétiques oraux. Nos patients ont été évalués trois semaines avant le ramadan, durant la quatrième semaine du mois de ramadan et trois semaines aprés le mois de ramadan. Cette évaluation a comporté une enquête clinique, une enquête nutritionnelle et des analyses biologiques. Le jeûne du mois de ramadan n'a pas eu d'influence sur le poids, la tension artérielle, la glycémie, la fructosamine et l'hémoglobine A_{1c}. Nous avons trouvé une relation négative entre les variations du cholestérol HDL et la consommation alimentaire de cholestérol. Le cholestérol HDL a augmenté de 13 % à la fin du jeûne et de 23 % trois semaines après la fin du jeûne chez les diabétiques ayant eu une consommation alimentaire de cholestérol inférieure à 400 mg/j.

[1]Service d'Endocrinologie, Métabolisme et Nutrition ; [4]Laboratoire de Biochimie Clinique, Institut National de Nutrition, Tunis (Tunisie).
[2]Docteur en Médecine
[3]Nutritionniste
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Introduction

Il existe plusieurs types de jeûne, des jeûnes de courte durée supprimant un ou deux repas, des jeûnes prolongés se limitant à l'absorption d'eau durant plusieurs jours et des jeûnes sélectifs qui suppriment une catégorie d'aliments : matières grasses, protides, glucides. Ces jeûnes entraînent une restriction partielle, totale ou sélective des aliments pour une durée variable.

Le jeûne religieux a une finalité et une signification différentes du jeûne médical. Le jeûne est une prescription religieuse qui remonte loin dans l'histoire de l'humanité. Le mois de ramadan est le 9e mois de l'année lunaire. C'est un mois sacré où les musulmans sont assignés à jeûner de l'aube jusqu'au coucher du soleil. Quand le jeûne peut altérer de façon significative la santé du jeûneur ou quand celui-ci est malade, l'islam le dispense du jeûne. « Allah cherche à vous faciliter l'accomplissement de la règle, il ne cherche pas à vous la rendre difficile ». Sourate 2, La Génisse , verset 185 [*1*].

Le diabète étant une maladie chronique, le non-accomplissement du jeûne est autorisé par la religion. Le plus souvent, les diabétiques traités à l'insuline acceptent facilement de ne pas jeûner alors que les diabétiques traités par le régime seul ou/et par les antidiabétiques oraux sont souvent réticents et décident de jeûner [*1-3*].

Le jeûne pratiqué par les musulmans au cours du mois de ramadan se caractérise par une privation aussi bien hydrique qu'énergétique concomitante dont la durée n'excède pas 14 heures par jour, répétée pendant un mois. Il diffère du jeûne physiologique normal par sa position dans le cycle nycthéméral puisqu'il correspond à la période où l'organisme est habitué à être ravitaillé en énergie et/ou ses besoins sont les plus forts et il diffère donc du jeûne de longue durée par sa périodicité et sa courte durée.

Les apports alimentaires sont exclusivement nocturnes et caractérisés par un repas copieux à la rupture du jeûne avec un repas léger à l'aube à base de sucres lents [*3,4*]. Ces modifications du comportement alimentaire sont accompagnées de changements du rythme de vie et de perturbations du cycle du sommeil. En effet, au cours du mois de ramadan, le début du sommeil est décalé à 0 ± 1 heure alors qu'il a lieu vers 22 h en dehors du ramadan, et le réveil matinal est retardé de 2 heures en moyenne [*5*]. Peu d'études ont été publiées sur les effets du jeûne et sa tolérance chez les diabétiques de type 2, et en particulier les effets du jeûne sur les modifications des lipides plasmatiques et sur les habitudes et la consommation alimentaire [*2,6-8*].

Les objectifs de notre étude sont d'analyser les conséquences du jeûne du mois de ramadan sur le poids, la tension artérielle, le contrôle glycémique et les lipoprotéines plasmatiques chez des diabétiques de type 2 bien équilibrés sous antidiabétiques oraux, et d'étudier les modifications qualitatives et quantitatives des apports alimentaires et leur influence sur les lipoprotéines, en particulier sur le cholestérol HDL.

Méthodes

C'est une étude descriptive comparative incluant 25 diabétiques de type 2 ayant décidé de jeûner le mois de ramadan et accepté de se soumettre à notre protocole. Tous les patients ont observé le jeûne pendant tout le mois de ramadan, qui a coïncidé avec la période allant du 10 décembre 1999 au 10 janvier 2000. Le jeûne débutait alors entre 5 h et 5 h 30 le matin et finissait vers 17 h 30, soit une durée moyenne de 12 heures.

Les critères d'inclusion concernent des diabétiques de type 2 traités par régime et/ou traitement oral (glycémie à jeun < 10 mmol/L et glycémie post-prandiale < 11 mmol/L), d'âge inférieur à 60 ans et indemnes de complications dégénératives graves.

Les critères d'exclusion sont un mauvais équilibre du diabète, la présence d'une hypertension artérielle et/ou d'une hyperlipoprotéinémie, et le risque d'hypoglycémie grave.

Nos patients sont évalués sur trois périodes différentes : la première période (T0), 20 à 30 jours avant le début du mois de ramadan ; la 2e période (T1), entre le 25e et le 27e jour du mois de ramadan ; et la 3e période (T2), 20 jours après la fin du mois de ramadan.

L'adhésion au protocole : les patients sont recrutés 30 jours avant le début du mois de ramadan et le protocole est présenté et discuté avec chaque patient. Le recrutement a concerné 25 patients ayant accepté de se soumettre aux différentes phases du protocole. Ces patients habitent dans le district de la ville de Tunis. Dix-huit (18) patients (8 femmes et 10 hommes) seulement ont participé aux 3 phases du protocole et ont rempli soigneusement les enquêtes alimentaires du point de vue qualitatif et quantitatif. L'âge moyen est de 46,4 ± 8 ans et l'indice de masse corporelle de 27,1 ± 3 kg/m². Seize (16) de nos patients sont traités par les antidiabétiques oraux (89 %) et 2 par régime seul (11 %). La durée connue du diabète est de 6 ± 2 ans ; la pression artérielle systolique est en moyenne 129 ± 16 mmHg et la pression artérielle diastolique est en moyenne de 76 ± 8 mmHg. Le poids moyen est de 70,5 ± 17,7 kg.

Le jeûne pratiqué par les musulmans au cours du mois de ramadan se caractérise par une privation aussi bien hydrique qu'énergétique concomitante dont la durée est de 12 heures en moyenne par jour, répétée pendant un mois.

Au cours du mois de ramadan, les médicaments sont pris soit le soir, soit en fin de nuit à l'aube au moment du *souhour* qui consiste en une collation à base de glucides lents. La posologie habituelle des biguanides est répartie en 2 prises, au *souhour* et à la rupture du jeûne. Pour les sulfamides, la dose habituelle du soir est maintenue juste avant la rupture du jeûne, la dose habituelle du matin est prise au *souhour*, la dose de midi est supprimée.

L'examen clinique a précisé le poids, la pression artérielle systolique et diastolique avec la recherche de corps cétoniques dans les urines et des signes d'hypoglycémie par le même médecin au cours des trois périodes. Tous ces paramètres ont été notés sur une fiche clinique aux différents temps de l'étude.

L'enquête nutritionnelle utilise la méthode du semainier. Les patients ont répondu aux 3 enquêtes alimentaires à T0, T1 et T2 en enregistrant eux-mêmes par écrit et de façon minutieuse pendant 3 jours consécutifs la nature et la quantité des aliments ingérés ainsi que l'horaire de prise des repas. Chaque enregistrement a été validé par la même diététicienne et le bilan nutritionnel est traité grâce au logiciel Bilnut [©Nutrisoft].

Les paramètres biologiques étudiés sont la glycémie, l'hémoglobine A_{1c}, la fructosamine, l'uricémie, la créatininémie, la protidémie et les paramètres lipidiques : cholestérol total, triglycérides, cholestérol HDL, cholestérol LDL, apolipoprotéines AI, apolipoprotéines B. Ils ont été réalisés au cours des 3 périodes. Les prélèvements sont tous réalisés après un jeûne d'au moins 12 heures. Au cours du mois de ramadan, le *souhour,* qui représente la der-

nière prise alimentaire, est consommé obligatoirement à minuit la veille du prélèvement pour pouvoir pratiquer les analyses le lendemain à midi en respectant les 12 heures de jeûne.

Le dosage de la glycémie est fait par la méthode enzymatique à la glucose oxydase (Kit Hycel sur analyseur LISA-HYCEL). L'hémoglobine A_{1c} a été déterminée par chromatographie échangeuse d'ions sur des microcolonnes Biosystem.

La fructosamine a été dosée par la méthode cinétique colorimétrique de Johnson (Kit Biosystem adapté sur analyseur LISA-HYCEL).

La créatinine a été dosée par méthode cinétique colorimétrique de Jaffé (Kit Hycel – analyseur LISA-HYCEL).

L'acide urique, le cholestérol total et les triglycérides ont été dosés par méthodes enzymatiques (Kits Hycel adaptés sur analyseur LISA-HYCEL).

Le cholestérol HDL a été dosé par précipitation sélective (Kit Randox) et le cholestérol LDL a été calculé selon la formule de Friedwald. Les apolipoprotéines AI et B ont été dosées par immunoturbidimétrie (Kit Hycel adapté sur analyseur LISA-HYCEL).

Les différents paramètres sont saisis à l'aide d'un logiciel Epi Info et exprimés en moyenne ± écart-type. On a utilisé l'analyse de variance (ANOVA) et les tests non paramétriques de Kruskal-Wallis pour la comparaison des moyennes et le test du khi-carré pour la comparaison des fréquences.

Résultats

Paramètres cliniques

Le jeûne du mois de ramadan n'a pas eu d'influence statistiquement significative sur le poids, sur la pression artérielle systolique (PAS) et diastolique (PAD). Ces constantes sont restées stables au cours du jeûne et 3 semaines après la fin du mois de ramadan (Tableau 1).

Contrôle glycémique

Aucun incident ni accident n'a été signalé par les patients au cours du jeûne du mois de ramadan ; la glycémie à jeun est restée stable accompagnée d'une légère augmentation du taux de fructosamine et de l'hémoglobine A_{1c} pendant ramadan mais cette différence n'est pas statistiquement significative (Tableau 2).

L'analyse de l'équilibre glycémique selon le type de traitement ne montre pas de variations de la glycémie à jeun et de l'hémoglobine A_{1c} selon le type de traitement.

Paramètres lipidiques

Les taux de cholestérol total et des triglycérides n'ont pas significativement changé pendant le mois de ramadan.

Le cholestérol total est de 4,24 ± 1 mmol/L à T0 , 4,45 ± 1 mmol/L à T1 et 4,30 ± 1 mmol/L à T2. Le cholestérol HDL a subi une légère augmentation (Tableau 3).

L'étude des variations en pourcentage des lipoprotéines montre une augmentation de + 8,3 % du taux de cholestérol HDL à la fin du mois de ramadan (T1 - T0), qui se

Tableau 1 **Evolution des paramètres cliniques**

Paramètres cliniques	T0	T1	T2
Poids (kg)	70,5 ± 17	70 ± 17	70 ±18
PAS (mmHg)	129 ± 16	131 ± 17	131 ± 18
PAD (mmHg)	76 ± 8	68 ± 7	79 ± 7
IMC (kg/m²)	27,12 ± 8,76)	27,0 ± 8	27,0 ± 8

T0 : 3 semaines avant ramadan ; T1 : 25e-27e jour du ramadan ; T2 : 20 jours après la fin du ramadan.

Tableau 2 **Evolution des paramètres métaboliques**

Paramètres métaboliques	T0	T1	T2
Glycémie à jeun (mmol/L)	9,6 ± 3	9,8 ± 3	8,5 ± 3
HbA_{1c} (%)	9,2 ± 2,4	10,7 ± 1,2	8,5 ± 2,3
Fructosamine (µmol/L)	288,7 ± 50	303 ± 60	291 ± 75
Créatinine (µmol/L)	66 ± 13	67 ± 11	73 ± 13
Acide urique (µmol/L)	254 ± 64	252 ± 66	280 ± 68

T0 : 3 semaines avant ramadan ;T1 : 25e-27e jour du ramadan ; T2 : 20 jours après la fin du ramadan.

maintient 20 jours après la fin du jeûne à plus de 13 % (T2 - T0). Le cholestérol LDL a augmenté de 3 % au cours du mois de ramadan (T1 - T0) et a diminué de 2 % 20 jours après la fin du jeûne (T2 - T0) sans modification significative du cholestérol total. Ces modifications ne sont pas statistiquement significatives (Tableau 4).

Evolution des apports alimentaires

L'apport calorique total pendant le mois de ramadan diminue de façon substantielle et passe de 2084 ± 515 calories par jour à T0, à 1981 ± 464 calories par jour à T1 et à 2183 ± 485 calories à T2 ; mais cette modification n'est pas statistiquement significative et ne s'accompagne pas de variation du poids.

Cette diminution de l'apport calorique s'accompagne d'une diminution de la fréquence des prises alimentaires, qui est passée de 4,5 ± 0,8/j à 2,8 ± 0,5/j. La plus grande part de la ration énergétique totale est consommée au moment même de la rupture du jeûne. Concernant l'évolution de l'apport des différents nutriments, on ne note pas de variation pour les glucides (229,8 ± 65 g ; 231,8 g ± 62 g et 249 ± 67 g respectivement avant, pendant et après ramadan). De même, les lipides et les protides n'ont pas subi de variation.

L'apport protidique est de 75,72 ± 17 g avant ramadan et de 73,9 ± 17 g au cours du mois de ramadan et passe à 78,9 ± 18 g après ramadan mais il se produit une nette augmentation de l'apport en protéines animales par rapport aux protéines végétales pendant ramadan avec un rapport protéines animales/protéines végétales qui passe de 1,87 avant ramadan à 2,07 au cours du mois de ramadan. L'apport alimentaire en cholestérol a augmenté en moyenne de 40 % au cours du jeûne. Il est passé de 301 mg/j à 435 mg/j (Tableau 5) alors que

Tableau 3 **Modifications des paramètres lipidiques**

Paramètres lipidiques		T0	T1	T2
Cholestérol (mmol/L)	Total	4,24 ± 1	4,45 ± 1	4,30 ± 1
	HDL	1,05 ± 0,3	1,11 ± 0,2	1,16 ± 0,4
	LDL	2,81 ± 1	2,89 ± 0,8	2,76 ± 0,9
Apolipoprotéines (g/L)	A I	1,54 ± 0,3	1,58 ± 0,3	1,52 ± 0,3
	B	1,22 ± 0,2	1,33 ± 0,3	1,18 ± 0,3
Triglycérides (mmol/L)		0,83 ± 0,5	0,82 ± 0,5	0,87 ± 0,5

Tableau 4 **Variation en pourcentage des lipoprotéines**

Lipoprotéines	T1-T0 (%)	T2-T0 (%)
Cholestérol HDL	+ 8,3 ± 17,7	+ 13 ± 22
Cholestérol LDL	+ 3	- 2

T0 : 3 semaines avant ramadan ; T1 : 25e-27e jour du ramadan ; T2 : 20 jours après la fin du ramadan.

l'apport lipidique a diminué au cours du mois de ramadan ; il est de 85 ± 22 g/j pendant ramadan alors qu'il était de 95,5 g ± 31 g/j avant le mois de ramadan.

Apports alimentaires en cholestérol et variation du cholestérol HDL

Dans le groupe consommant moins de 400 mg/j de cholestérol pendant ramadan, le taux moyen de cholestérol HDL avant ramadan est de 1,12 ± 0,37 mmol/L et passe respectivement à 1,22 ± 0,27 mmol/L à la fin du mois de ramadan (soit 13,5 % d'augmentation) et à 1,36 ± 0,45 mmol/L 20 jours après la fin du mois de ramadan (20 % d'augmentation). Le groupe des patients consommant plus de 400 mg/j de cholestérol (Tableaux 6 et 7) n'ont pas bénéficié de cette augmentation du taux de

Tableau 5 **Evolution de l'apport calorique global et des différents nutriments**

Nutriments	T0	T1	T2
Fréquence des repas	4,5 ± 0,8	2,8 ± 0,5	3,8 ±0,9
Apport calorique global (kcal/j)	2084 ± 515	1981 ± 464	2183 ± 485
Glucides (%)	41 ± 7	39 ± 5	40 ± 7
Glucides (g/j)	229,8 ± 65	231,8 ± 62	249,6 ± 67
Protides (%)	15 ± 2	15 ± 2	14 ± 2
Protides (g/j)	75,72 ± 17	73,9 ± 17	78,9 ± 18
Rapport protéines animales/végétales	1,87 ± 0,6	2,07 ± 0,68	1,77 ± 0,66
Lipides totaux (g/j)	95,5 ± 31	85,0 ± 22	96,6 ± 30
Lipides totaux (%)	44	46	46
AGS g/j (%)	28,1 (29)	25,3 (30)	28,4 (29)
AGM g/j (%)	45,1 (48)	40 (47)	45,3 (47)
AGP g/j (%)	21,1 (23)	19,8 (23)	23 (24)
Cholestérol alimentaire (mg/j)	301 ± 138	435 ± 204	320 ±159

T0 : 3 semaines avant ramadan ; T1 : 25e-27e jour du ramadan ;
T2 : 20 jours après la fin du ramadan.
AGS : acides gras saturés.
AGM : acides gras monoinsaturés.
AGP : acides polyinsaturés.

Tableau 6 **Moyenne du cholestérol HDL en fonction de l'apport alimentaire en cholestérol au cours du mois de ramadan**

Cholestérol HDL (mmol/L)	Apport en cholestérol < 400 mg/j (n = 10)	Apport en cholestérol ≥ 400 mg/j (n = 8)	Signification statistique
T0	1,12 ± 0,37	0,99 ± 0,28	NS
T1	1,22 ± 0,27	0,97 ± 0,25	p < 0,04
T2	1,36 ± 0,45	0,94 ± 0,22	p < 0,02

T0 : 3 semaines avant ramadan ; T1 : 25e - 27e jour du ramadan ; T2 : 20 jours après la fin du ramadan.
NS : différence statistiquement non significative.

cholestérol HDL. La valeur de p est à 4 % (Tableau 7).

Discussion

Il n'y a pas eu de variation significative du poids au cours du jeûne dans notre étude. Le poids moyen est resté stable à 70 kg à cause de la stabilité de l'apport calorique global et de la stabilisation des valeurs glycémiques. En effet, le poids ne subit pas de variation significative au cours du jeûne chez le diabétique de type 2 dans la majorité des études [*2,6,8*], et ceci malgré une diminution de l'activité physique. Habituellement, les diabétiques de type 2 réduisent leur activité physique de peur de faire des hypoglycémies [*2,3*]. Cependant une diminution du poids (p < 0,03) a été rapportée [*9*] et serait secondaire à une diminution des apports énergétiques chez 22 diabétiques de type 2 sous traitement oral avec un équilibre glycémique stable, l'apport calorique étant de 1480 ± 326 kcal/j avant ramadan et de 1193 ± 378 kcal au cours du mois de ramadan.

Nous n'avons pas noté également de variations des chiffres tensionnels au cours du mois de ramadan dans notre étude. Dans une population de 99 patients ayant une hypertension artérielle essentielle non compliquée, le jeûne du mois de ramadan n'a pas eu d'influence significative sur les chiffres de la tension artérielle systolique et dias-

Tableau 7 **Variation (en %) du cholestérol HDL en fonction de l'apport en cholestérol au cours du mois de ramadan**

Apport alimentaire	T1-T0 (%)	T2-T0 (%)
Cholestérol < 400 mg/j	+ 13,5 % ± 20	+ 23,0 % ± 13,2
Cholestérol ≥ 400 mg/j	+ 0,6 % ± 13,1	- 0,29 % ± 25,6
Signification statistique	NS	p < 0,04

T0 : 3 semaines avant ramadan ; T1 : 25e-27e jour du ramadan ;
T2 : 20 jours après la fin du ramadan.
NS : différence statistiquement non significative.

tolique. Ces patients ont eu un enregistrement continu de la pression artérielle en ambulatoire par la méthode du MAPA. Le jeûne a été bien supporté et les variations de la pression artérielle sont minimes et seraient secondaires au changement du cycle de sommeil et de l'activité physique [*5*].

A la fin du mois de ramadan, nous n'avons pas noté de différence statistiquement significative en ce qui concerne la glycémie à jeun, la fructosamine et l'hémoglobine A_{1c}. Il n'y a pas eu non plus d'hypoglycémie clinique ou biologique dans notre étude. L'équilibre glycémique chez le diabétique de type 2 ne se modifie pas au cours du jeûne du mois de ramadan [*2,3,7,8,10,11*]. L'incidence des épisodes hypoglycémiques n'est pas différente dans le groupe jeûneurs par rapport au groupe non-jeûneurs dans l'étude évaluant l'efficacité et la tolérance du glimépiride chez les diabétiques de type 2 au cours du mois de ramadan [*6*]. C'est une étude multicentrique, internationale, randomisée ayant inclus 381 diabétiques. Les auteurs concluent que le glimépiride, pris une fois par jour, est efficace et bien toléré chez le diabétique de type 2 ayant décidé d'observer le jeûne et que la réduction de la dose de glimépiride de 1 mg par rapport à la dose administrée avant ramadan réduit de manière significative le risque d'hypoglycémie [*6*].

Dans l'étude de Belkadir, ayant inclus 542 diabétiques de type 2 traités par les sulfamides hypoglycémiants, il n'a pas été montré de différence significative de l'hémoglobine A_{1c} et de la fructosamine au cours du mois de ramadan par rapport au groupe témoin [*8*].

Le nombre d'épisodes d'hypoglycémies est évalué à 0,8 épisodes par patient par année. Cette fréquence semble un peu élevée malgré un mauvais contrôle glycémique avec une hémoglobine A_{1c} à 13-14 % [*12*].

Dans notre étude, l'apport calorique global pendant le mois de ramadan a diminué. Cette baisse de l'apport calorique pourrait s'expliquer par une diminution de la fréquence des repas : en effet, 93 % des patients font 2 repas par jour au maximum pendant le mois de ramadan. L'apport alimentaire en cholestérol a augmenté de 40 % avec augmentation du rapport protéines animales/protéines végétales égal à 2. Ceci est lié aux habitudes alimentaires observées lors du mois de ramadan, avec consommation importante de mets et de plats traditionnels riches en protéines animales. La consommation de viande et d'œufs augmente avec une fréquence moyenne de 4,3 et 6,1 fois par semaine respectivement. Cette surconsommation de protéines animales contraste avec une tendance à la baisse de la consommation de légumes et une réduction des apports en glucides [*13*]. La structure de la ration observée chez nos patients est particulièrement riche en lipides (47 % de la ration calorique globale) dont presque la moitié est sous forme d'acides gras monoinsaturés.

Lors de l'analyse globale des paramètres lipidiques, le cholestérol total et le cholestérol HDL ont subi une légère augmentation au cours du jeûne. Si l'apport alimentaire en cholestérol au cours du mois de ramadan est inférieur à 400 mg/j, le HDL-cholestérol augmente de 13 % et cette augmentation atteint 23 % 20 jours après la fin du mois de ramadan, avec une légère diminution du LDL-cholestérol. Cependant, les patients ayant eu une consommation importante en cholestérol alimentaire (> 400 mg/j) au cours du mois de ramadan n'ont pas bénéficié de cette augmentation du cholestérol HDL et on a même observé une légère baisse du cholestérol HDL.

Peu d'études se sont intéressées aux effets du jeûne de ramadan sur les lipoprotéines chez le diabétique. Maislos a rapporté

une augmentation de 30 % du cholestérol HDL et de l'apoprotéine AI chez des bédouins nomades en bonne santé du Nejev sans modification significative du cholestérol total, des triglycérides et du cholestérol LDL [*14,15*]. Cette augmentation du cholestérol HDL est observée aussi dans 2 études ayant intéressé des diabétiques de type 2 sous traitement oral sans modification significative du cholestérol total et du cholestérol LDL [*2,7,11*].

L'apport alimentaire en acides gras saturés et en cholestérol augmente le taux du cholestérol total et du cholestérol LDL plasmatique. Les acides gras polyinsaturés ont moins d'effet délétère que les acides gras saturés [*16,17*], alors que les acides gras monoinsaturés comme l'acide oléique retrouvé dans l'huile d'olive diminue le taux de cholestérol total mais reste sans action sur le cholestérol HDL [*16-18*]. Une alimentation riche en acides gras monoinsaturés et en carbohydrates à index glycémique faible et pauvre en acides gras saturés pourrait avoir de meilleurs effets métaboliques sur les lipoprotéines chez le diabétique [*19*].

L'effet de la fréquence des repas sur le métabolisme des lipoprotéines a attiré l'attention de plusieurs auteurs et reste sujet de controverses [*14,15,20*]. L'augmentation de la fréquence de la prise alimentaire (17 snacks par jour = « nibling diet ») diminue le taux de cholestérol total et de cholestérol LDL respectivement de 8 et de 15 % mais est sans effet sur le cholestérol HDL [*20,21*].

Les moyens non pharmacologiques qui contribuent à augmenter le taux de cholestérol HDL chez le diabétique sont essentiellement la perte de poids, l'exercice physique, le contrôle glycémique et l'arrêt du tabac. La consommation de tabac diminue en moyenne de moitié au cours du mois de ramadan [*13*] mais ce paramètre n'a pas été étudié dans notre série. Dans notre échantillon, au cours du jeûne du mois de ramadan, le poids, l'activité physique et le contrôle glycémique n'ont pas changé alors qu'on a observé une augmentation du cholestérol HDL qui serait donc en rapport avec la consommation d'un repas copieux au coucher du soleil « gorging diet model » [*15*].

Conclusion

Nos résultats soulignent l'absence de conséquences significatives du jeûne de ramadan sur les différents métabolismes chez le diabétique de type 2 équilibré sous traitement oral et indemne de complications dégénératives. Les effets sur les lipoprotéines dépendent des apports alimentaires en cholestérol. Le cholestérol HDL augmente au cours du mois de ramadan ; cette augmentation se maintient 20 jours après la fin du jeûne et est inversement corrélée à l'apport alimentaire en cholestérol. Il est nécessaire d'assurer une éducation nutritionnelle adéquate avant d'autoriser les patients diabétiques à jeûner.

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Effect of water softening on the colour intensity of routine haematoxylin and eosin stain

S.R. Malkawi,[1] R.M. Abu-Hazeem[1] and M.O. Easa[1]

تأثير يُسْرَة المياه على شدة التلوُّن بملوّن الهيماتوكسيلين والأيوزين الروتيني

صالح ملكاوي، رولا أبو هزيم، محمد عيسى

الخلاصة: يُعَدُّ التلوين بالهيماتوكسيلين والأيوزين أكثر الملوِّنات المستخدمة في المختبرات الباثولوجية شيوعاً لإيضاح البِنَى الخلوية. ولدراسة تأثير يُسْرَة مياه الحنفية باستخلاص الكالسيوم على التلوين بالهيماتوكسيلين والأيوزين تم تحضير 5 مجموعات من الشرائح المأخوذة من 30 قطعة نسيجية باثولوجية بشرية مغموسة في البرافين، سبق أن حضِّرت باستخدام نفس الطريقة، باستثناء غسلها بواحد من 5 أنواع مختلفة من المياه. وقد اتّضح أن الشرائح المغسولة بمياه حنفية لم تخضع للمعالجة، تتمتع بأفضل النتائج من حيث التمييز وشدة التلوين، أما الشرائح المغسولة بمياه أزيلت عُسْرَتها أو لغير ذلك من المعالجات فلم تتمتع إلا بقدر ضئيل من درجات التمايز وشدة الألوان. في حين كانت أسوأ النتائج عند استخدام ماء يحتوي على بيكربونات الصوديوم. فقلة شوارد الكالسيوم والمغنيزيوم وازدياد شوارد الصوديوم في المياه اليَسَرَة يؤثِّر تأثيراً سيئاً على نتائج التلوين الروتيني بالهيماتوكسيلين والأيوزين.

ABSTRACT Haematoxylin and eosin (H&E) is the most popular routine stain used in pathology laboratories for highlighting cellular structures. To study the effect of tap water 'softening' (i.e. calcium extraction) on H&E stains, 5 sets of slides from 30 different paraffin-embedded human pathologic tissue blocks were prepared in the same way except for washing with 5 different types of water. Slides washed in untreated tap water showed the best results concerning differentiation and colour intensity, while slides washed with softened or other treated water showed poorer degrees of differentiation and colour intensity. The worst results were obtained from slides washed with water containing sodium bicarbonate. Low calcium and magnesium ions and high sodium ions in soft water adversely affect the results of routine H&E stain.

Effet de l'adoucissement de l'eau sur l'intensité de la couleur de la coloration de routine à l'hématoxyline-éosine

RESUME L'hématoxyline et l'éosine sont les colorations les plus couramment utilisées dans les laboratoires de pathologie pour la mise en évidence des structures cellulaires. Afin d'étudier l'effet de l'adoucissement de l'eau du robinet (extraction du calcium) sur les colorations à l'hématoxyline et à l'éosine, cinq (5) séries de lames issues de 30 blocs de tissus pathologiques humains différents inclus en paraffine ont été préparées de la même manière, sauf pour le lavage qui a été effectué avec cinq types d'eau différents. Les lames lavées à l'eau du robinet non traitée ont montré les meilleurs résultats pour ce qui concerne la différenciation et l'intensité de la couleur, tandis que les lames lavées à l'eau adoucie ou avec une autre eau traitée affichaient des degrés plus faibles de différenciation et d'intensité de la couleur. Les plus mauvais résultats ont été obtenus avec les lames lavées à l'eau contenant du bicarbonate de sodium. La teneur faible en ions calcium et magnésium et élevée en ions sodium de l'eau douce affecte négativement les résultats de la coloration de routine à l'hématoxyline-éosine.

[1]Princess Iman Research and Laboratory Sciences Centre, King Hussein Medical Centre, Amman, Jordan.

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Introduction

Haematoxylin and eosin (H&E) is the most widely applied routine stain in the histopathology laboratory because of its ability to highlight tissue structures and because it is an inexpensive, quick method that is readily available as powders or ready-to-use solutions.

Haematoxylin stain is extracted from the logwood of a tropical tree, *Haematoxylon campechianum* [*1*]. The nuclei of cells are stained by its active product, haematin, which is produced when an oxidizing agent is added. Haematin by itself has poor affinity to stain nuclei without combining with a mordant, such as aluminium, iron or other metallic salts. Ripened haematoxylin can stain nuclei by electrostatic attraction between its positive-charged ions with the negative-charged contents in the nucleus such as phosphate groups in DNA and RNA and carboxylated or sulfated mucosubstances [*2,3*].

Eosin is an anionic dye that is usually used as a counterstain to haematoxylin. It can stain cytoplasmic organelles by electrostatic attraction with positive-charged ions in tissues such as collagen or muscle.

Many factors affect the colour intensity of a stain, including the type of mordant, the duration of each step in the staining process, tissue fixation methods, pH and many others. One of these factors may be the tap water used for washing slides during processing. At the laboratories of the King Hussein Medical Centre in Jordan, it was noticed that H&E stained slides washed with 'softened' (treated) water became faint compared with those previously washed with 'hard' (untreated) tap water. This led us to make a systematic comparison of different types of treated tap water on the colour intensity of slides and to investigate changes in the chemical content of tap water before and after treatment.

Methods

A total of 30 different human pathology tissue specimens embedded in paraffin blocks, previously fixed in 10% buffered formalin, were processed routinely for histopathology. The tissue specimens included samples from the endometrium, appendix, gall bladder, spleen and other gastric and pleural tissues obtained by surgery, curettage and biopsy. Five sections (5 µm thick) were prepared from each paraffin block and placed on different slides. The slides were divided into 5 groups. Each group was stained routinely with H&E stain under the same conditions except that different waters were used for the washing steps:

- tap water (untreated),
- soft water (treated tap water),
- 1% magnesium sulfate ($MgSO_4$) dissolved in soft water,
- 1% calcium carbonate ($CaCO_3$) dissolved in soft water, or
- 1% sodium bicarbonate ($NaHCO_3$) dissolved in soft water.

The following H&E staining procedure was applied:

1. De-wax slides in xylene.
2. Hydrate sections by applying different concentrates of ethyl alcohol (70%, 85%, 95% up to absolute alcohol).
3. Wash in water.
4. Stain in Coles haematoxylin stain for 8 min.
5. Wash in water for 20 s.
6. Differentiate in 1% HCl dissolved in 70% alcohol for 10 s.
7. Wash in water for 20 s.

8. Blue in Scott's tap water solution for 1 min.
9. Wash in water for 1 min.
10. Stain in 0.5% eosin yellowish for 3 min.
11. Wash in water for 30 s.
12. Dehydrate through different concentrates of alcohol, clear in xylene, and permanent mount with distrene-plasticizer-xylene (DPX) synthetic resin.

All stained slides were reviewed microscopically and evaluated for adequacy of H&E stain, taking into consideration the degree of differentiation, background stain and the overall intensity of colour in comparison with slides washed in untreated tap water.

Finally, water samples were taken from the Kind Hussein Medical Centre before and after water softening and the chemical composition was analysed by the Water Authority of Jordan to measure specific conductance, pH and the concentrations of various ions and heavy metals.

Results

Slides washed in raw untreated tap water showed good differentiation and good colour intensity for both the blue colour of haematoxylin and red colour of eosin. This group of slides washed in tap water was used as a reference of colour intensity and differentiation.

Slides washed in soft (treated) tap water, showed faint blue colour and very faint to almost absence of reddish colour of eosin with poor differentiation (Figure 1). Slides washed in 1% $MgSO_4$ dissolved in soft water showed slightly faint blue colour, faint red colour of eosin with moderate differentiation (Figure 2). Slides washed in 1% $CaCO_3$ dissolved in soft water showed slightly faint blue colour, and very faint red colour of eosin with poor differentiation. The worst results were obtained from slides washed in sodium bicarbonate (1% $NaHCO_3$ dissolved in soft water). They showed very faint blue colour, and very faint to almost absence of red colour of eosin with poor differentiation.

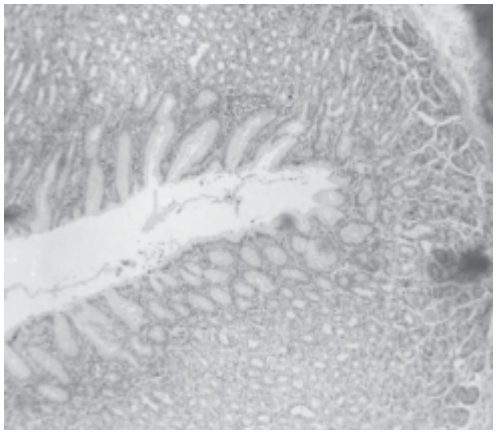

Figure 1 **Stained slide from colon specimen treated with soft water**

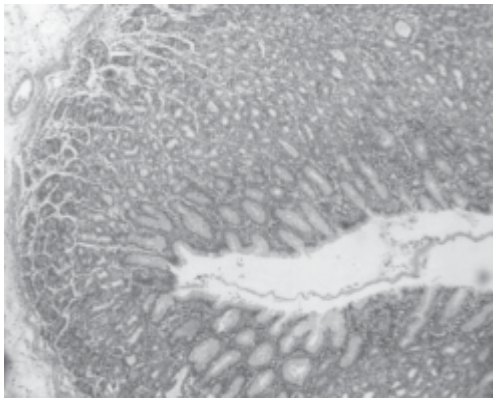

Figure 2 **Stained slide from appendix specimen treated with magnesium sulfate in soft water**

Table 1 shows the chemical composition of water samples taken from the King Hussein Medical Centre before and after water softening. The amount of sodium ions increased after water softening from 1.65 mEq/L in tap water to 7.98 mEq/L in soft water, and the pH of soft water became slightly more alkaline (from 7.60 to 8.02).

Discussion

Tap water contains large amounts of ions such as calcium, magnesium and many other minerals that make it 'hard' [*4*]. As calcium and magnesium cations are relatively insoluble in water, they tend to precipitate out as calcium carbonate, causing scale and deposit problems in heat exchange equipment, boilers and pipelines. 'Hardness' of water is the concentration of calcium and magnesium ions expressed in terms of calcium carbonate. The amount of hardness in natural waters may vary from 60 mg/L to over 180 mg/L calcium carbonate. The main purpose of water softening in big centres, hospitals and modern houses is to eliminate calcium and magnesium ions, which are replaced by sodium ions.

The increase in sodium ions as well as the slightly more alkaline pH of soft water shown here may be responsible for the de-

Table 1 **Chemical composition of water samples taken from King Hussein Medical Centre before and after water softening**

Chemical analysed	Before softening	After softening
Specific conductance (µS/cm)	814	850
pH (units)	7.60	8.02
Ions		
Calcium by titration (mEq/L)	4.40	0.00
Magnesium by calculation (mEq/L)	2.18	0.02
Sodium by flame photometry (mEq/L)	1.65	7.98
Potassium by flame photometry (mEq/L)	0.07	0.01
Chloride by titration (mEq/L)	3.01	2.88
Sulfate by titration (mEq/L)	0.75	0.75
Carbonate by titration (mEq/L)	0.00	0.00
Bicarbonate by H_2SO_4 titration (mEq/L)	4.18	4.09
Nitrate by spectrophotometry (mg/L as NO_3)	30.71	30.61
Heavy metals		
Iron (mg/L)	0.05	0.03
Manganese (mg/L)	0.015	0.013
Copper (mg/L)	< 0.01	< 0.01
Lead (mg/L)	< 0.01	< 0.01
Chromium (mg/L)	< 0.01	< 0.01
Cadmium (mg/L)	< 0.003	< 0.01
Zinc (mg/L)	0.17	0.01
Nickel (mg/L)	< 0.01	< 0.01

terioration in the colour intensity of H&E stain, mainly in the eosin red stain which became faint or almost absent. It is highly recommended to use raw untreated tap water for washing steps in the routine H&E stain and consideration should be given to the effect of soft water on other stains.

Acknowledgements

We would like to thank Miss N. Abu-Hazeem and engineer A-A. Al-Ajarmeh for their support. The technical support of the Water Authority of Jordan is highly appreciated.

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Note from the Editor

We would like to draw our readers' attention to the evaluation form at the end of this issue. We welcome comments from our readers, which can help us improve the EMHJ. We would appreciate it therefore if readers could kindly take the time to complete this form and return it to us. Alternatively, the form can be completed on line at: http://www.emro.who.int/publications/emhj/evaluationform.asp

Report

The diabetes prevention and control programme of the Islamic Republic of Iran

F. Azizi,[1] M.M. Gouya,[2] P. Vazirian,[2] P. Dolatshahi[2] and S. Habibian[1]

SUMMARY Diabetes mellitus has become a monumental problem and a major health concern throughout the world. We report on the programme developed by the Islamic Republic of Iran for control and management of diabetes, which involves screening for type 2 diabetes in adults at risk and a systematic approach for delivery of health care to people with diabetes.

Introduction

There is evidence indicating that diabetes in adults must now be recognized as a significant threat to public health in rapidly developing countries; the World Health Organization has proclaimed it "a silent epidemic"[*1*].

According to global database reports collected by WHO which assess the number of people with diabetes worldwide for 3 specific points in time, viz. the years 1995, 2000 and 2025 [*2*], it has been estimated that, between 1995 and 2025, the adult population (≥ 20 years) will increase by 64%. The prevalence of diabetes will increase by 35% (from 4% in 1995 to 5.4% in 2025) and the number of diabetics will increase by 122%, i.e. from 135 million cases in 1995 to 300 million in the year 2025, the majority occurring in developing countries. There will be a 42% increase, from 51 million to 72 million, in the industrialized countries and a 170% increase, from 84 million to 228 million, in the developing countries. By 2025, it is projected that more than 75% of people with diabetes will reside in developing countries compared to 62% in 1995. Over and above the increase in prevalence, researchers have estimated a loss of 5–10 years in life expectancy in patients over the age of 40 [*3*].

Background

In recent years type 2 diabetes has claimed the attention of the health authorities of the Islamic Republic of Iran. Since 1991 activities for the prevention and control of diabetes have been initiated as a pilot study in 3 rural areas, but because of the lack of valid screening tests and well-equipped health centres they were discontinued in 1993. Nonetheless, in 1996, a report covering the diabetes situation was presented to

[1]Endocrine Research Centre, Shaheed Beheshti University of Medical Sciences, Babol, Islamic Republic of Iran.
[2]Department of Disease Control and National Committee for the Control and Management of Diabetes, Ministry of Health and Medical Education, Tehran, Islamic Republic of Iran.
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WHO (unpublished report) and a vital step was taken towards diabetes prevention. The same year, the Iranian National Advisory Committee resumed its work, and a new comprehensive national strategy was designed, with the support of the health authorities concerned, for the prevention and control of type 2 diabetes. Meanwhile, provincial advisory subcommittees for diabetes with an endocrinologist or an internist were established as a diabetes focal point. Since 1999, the national programme has been implemented as a pilot project in some areas of 17 provinces of the Islamic Republic of Iran.

The health care system

The national programme for the prevention and control of diabetes mellitus has been adopted to concur with the current health care system. The Islamic Republic of Iran is committed to achieving health for all through the primary health care approach. Three sectors are currently involved in the provision of health: government services, health insurance, and the private sector. The private health sector plays an important role in the delivery of health care services, especially in urban areas. The public health care system encompasses the district, provincial and national levels.

District level

From the very outset, the district has been the smallest autonomous unit in the primary health care network. Apart from the sections involved in overall planning, evaluation and supervision, which are located within higher-level facilities, all components of the health care system function at the district level [*4*]. Despite variations in size and population density, the district is undoubtedly the most appropriate location for problem recognition, identification of objectives specific to the area, coordination of intrasectorial and intersectorial projects, and on-site evaluation and supervision.

The health house

Health houses are located in villages and are the most outlying rural facility in the network. Each health house is capable of serving about 1500 people, and often covers up to 4 satellite villages in addition to the main village.

Most villages in the Islamic Republic of Iran have far fewer than 1500 inhabitants. The health house is staffed by 1 (or more) male and 1 (or more) female *behvarz* (community health worker), chosen preferably from among the local inhabitants. The main function of a health house is to offer primary health care services to the community it serves. Candidates used to be required to have completed primary school, however, from 2001, they have had to be high school graduates. Candidates must successfully complete a written exam and be interviewed before enrolment in the training course; their studies span 2 full years. Some of the most important tasks of the *behvarz* are:

- an annual census of the population covered
- public health education and encouragement of community participation
- family health care services (family planning services, immunization for children < 5, health care for school age children)
- disease control services (communicable and noncommunicable diseases)
- patient care and referral to the rural health centres when necessary
- environmental health activities
- providing essential drugs
- home visits for follow-up of drop-out cases

- data collection, documentation, and regular reporting.

Currently, over 22 000 *behvarz* in 14 924 health houses give coverage to about 20 million people.

The rural health centre

The rural health centre is a village-based facility which supervises the health house in its own village and usually 4 other health houses in neighbouring villages. Each rural health centre covers an average of 90 000 people. Apart from the general physician, a fully established rural health centre includes on its staff at least 1 person trained in each of the following fields: family health, disease control, environmental health, oral health, laboratory technology, nursing assistance and administration. The physician supervises the staff. The rural health centre's main responsibilities are:

- monitoring supervising, and supporting 3–5 health houses
- providing outpatient care and screening of individuals referred to the health house
- providing oral health services
- performing basic laboratory tests (some)
- providing maternity facilities (some)
- environmental health services
- data collection and regular reporting.

At present, 2243 rural health centres are operational.

National programme for the prevention and control of diabetes mellitus

History of the programme

The Islamic Republic of Iran is one of the first countries to have responded to "a call for action" from the Eastern Mediterranean Regional Office of the World Health Organization for the prevention and control of diabetes mellitus [5]

The National Advisory Committee, established in 1992, despite having been inactive for years, finally resumed its operations with new members in 1996. The national programme for the prevention and control of type 2 diabetes was designed in the same year.

The aim of this programme is primary, secondary, and tertiary prevention, through community and high-risk screening, and the integration of diabetes care into the primary healthcare network. The Ministry of Health and Medical Education, with the coordination of the National Diabetes Advisory Committee, launched 6 comprehensive workshops about diabetes for physicians, nurses and nutritionists in 1997 and 1998, in which about 60 physicians, 60 nurses and 60 nutritionists participated each year.

Objectives of the programme

General objectives

Prevention and control of type 2 diabetes and its complications in the Islamic Republic of Iran.

Specific objectives

Primary prevention is a specific objective and aims to reduce the prevalence and incidence of type 2 diabetes and also to reduce the prevalence and incidence of modifiable predisposing factors to the condition (obesity, physical inactivity, unhealthy diet, etc).

Strategies for achieving these objectives are to:

- modify life-styles in high-risk Iranian populations
- control and reduce the predisposing factors of diabetes

- screen those at risk of type 2 diabetes (see screening criteria below)
- control and follow up high risk populations
- enhance the perception and knowledge of the community and health care personnel on diabetes, its predisposing factors and its complications.

Secondary prevention aims to prevent and reduce short-term and long-term complications and to postpone their development—in effect, to alter the natural course of the disease and stop its progression.

Tertiary prevention aims to reduce (and postpone) the number of disabilities and deaths caused by diabetes and its complications.

Outcome

- Reduce economic costs imposed by diabetes and it complications.
- Reduce disabilities caused by diabetes and its complications.
- Reduce the mortality rate of diabetes and its complications.
- Increase years of effective life.

The programme in operation

Four levels of health care have been designed (Figure 1). At the first level, the *behvarz* in the health house, and the *kardan* (health technician) in the urban health post screen the community, evaluating men and women at risk. At the second level, general physicians and laboratory facilities are made available in rural and urban health centres in a diabetes team. General physicians treat and control all patients according to established protocols (Figure 2). Patients are then referred for early detection of complications (screening) to the third level, which is located in a district hospital where an internist (or endocrinologist if available), a full-time educational nurse and a part-time nutritionist staff the diabetes unit. Patients needing more specific facilities for diagnosis and treatment are then referred to the fourth level, which is situated in a university (provincial) hospital and has an internist (or an endocrinologist if available) and a full-time educational nurse and a part-time nutritionist who constitute the diabetes team in the centre. The third and fourth levels are responsible for detection and management of the complications of diabetes according to set protocols (Figure 3).

Screening criteria for individuals at risk of type 2 diabetes mellitus

Three groups of individuals have been designated for screening:

- men and women ≥ 30 years of age who have any of the following:
  - history of diabetes mellitus among first-degree relatives (father, mother, brother or sister)
  - at least 2 symptoms of diabetes (polyuria, polydipsia, polyphagia)
  - blood pressure ≥ 140/90 mmHg
  - obesity (body mass index ≥ 30 kg/m^2)
- women who have had any of the following:
  - ≥ 2 spontaneous abortions of unknown cause
  - intra-uterine fetal death
  - children with birth weight ≥ 4 kg
  - history of gestational diabetes mellitus
- pregnant women:
  - in their 24–28th weeks of pregnancy
  - classified as high-risk at the beginning of their pregnancy (includes criteria of groups listed above).

First level	2nd level	3rd level	4th level
			Diabetes centre
			Internist (endocrinologist), educational nurse, nutritionist, consultant physicians
		Diabetes unit	• Education (public, patients, health personnel)
		Internist (endocrinologist), educational nurse, nutritionist, consultant physicians	• Management of complications • Feedback • Data collection and reporting • Research
	Diabetes team	• Education (public, patients health personnel)	
	General physicians	• Early diagnosis of complications • Referral to next level • Feedback • Data collection and reporting • Research	
First level	• Screening those at high risk • Early diagnosis of diabetes • Control and treatment • Referral to the next level • Patient screening • Complications • Quality control • Feedback • Education (public, patients) • Data collection and reporting		
Behvarz, kardan (with volunteer aid)			
• Education of: • the public • high risk individuals • patients • Follow-up of: • high risk individuals • patients • Data collecting and reporting			
Health houses and posts	Health centres (rural and urban)	District hospital	University (provincial hospital)

Figure 1 **Levels of diabetes care provided by the health care system of the Islamic Republic of Iran**

Discussion

The manifestations of diabetes cause considerable human suffering and are increasing burdens on the health care system. The financial costs are enormous. In addition, diabetes causes serious health complications: progressive damage to the eyes, kidneys, nerves and arteries represent the major threats faced. Retinopathy is the

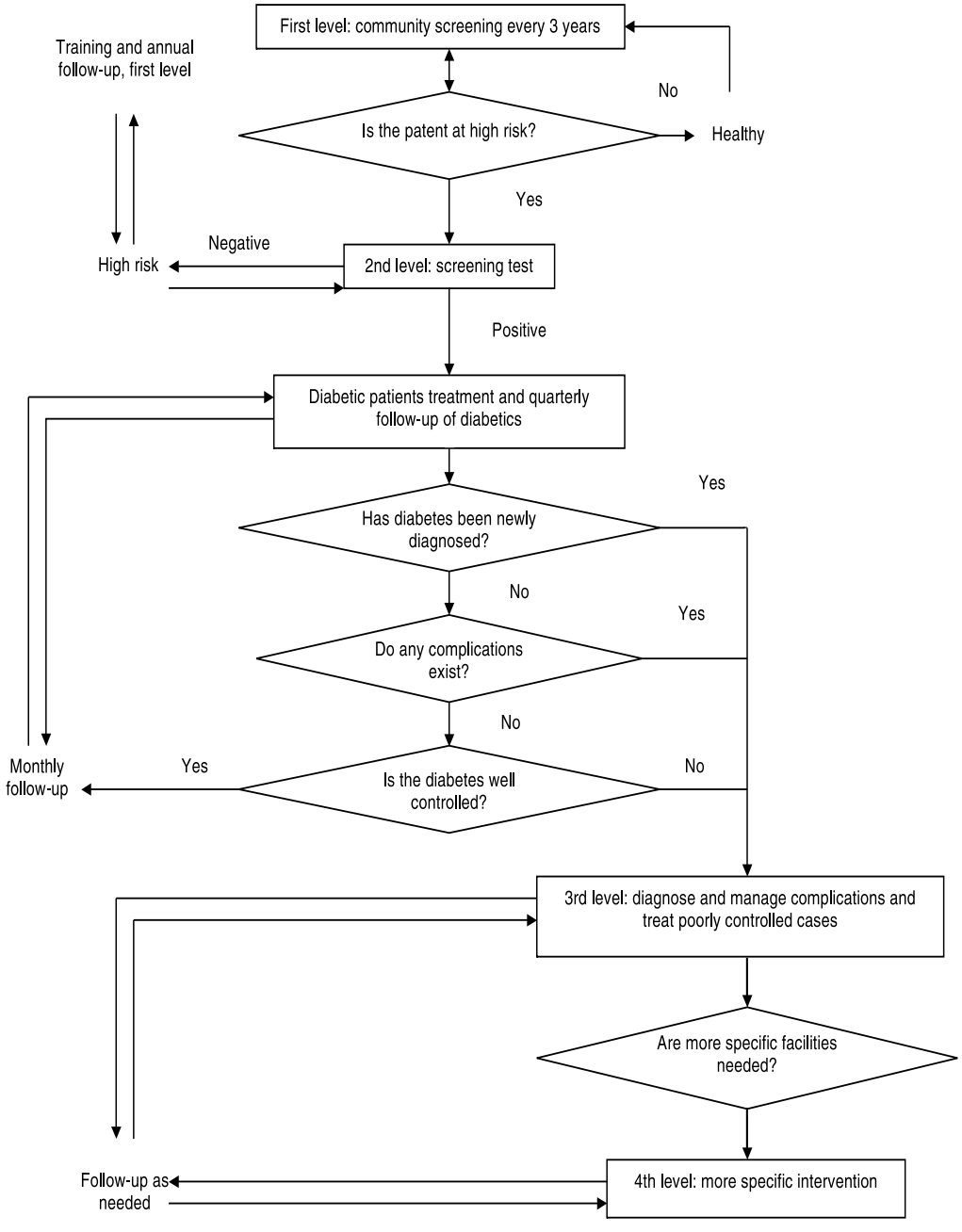
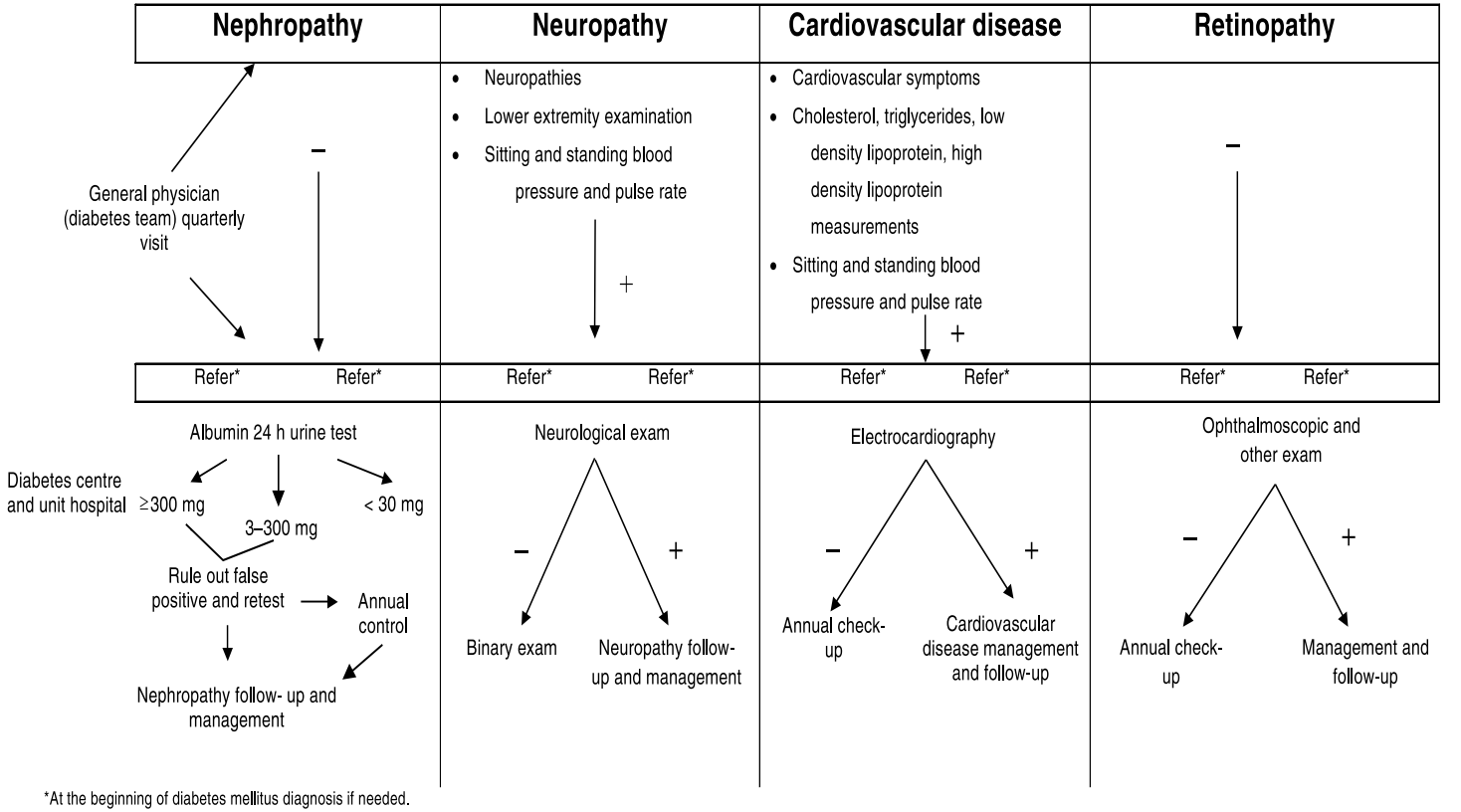


Figure 2 **Algorithm for detection and management of diabetes mellitus in the National Diabetes Programme of the Islamic Republic of Iran**



*At the beginning of diabetes mellitus diagnosis if needed.

Figure 3 **Algorithm for early detection and management of complications of diabetes**

leading cause of visual disability. Progressive impairment of kidney function, culminating in end-stage renal failure, threatens the health and lives of a substantial proportion of those afflicted by diabetes. People with diabetes run a particularly high risk of developing coronary heart disease, a leading cause of death in the diabetic population [*1,2*].

Despite the considerable repercussions of the problem, evidence indicates that major improvements in quality of life, a reduction in the incidence of complications and a reduction in expenditure can be achieved through effective mechanisms and appropriate actions taken by health authorities [*6*].

The appropriate control and management of diabetes, education of the population and utilization of advanced technology for diabetes health care would all contribute to a better quality of life. In spite of the high prevalence of diabetes and its complications and the availability of successful prevention strategies, however, essential healthcare requirements and facilities are still lacking for the control of this disease.

Accepting diabetes and its associated complications as a progressive, potentially devastating, disease needing life-long treatment and accounting for a significant proportion of health care budgets makes this condition a subject of major concern. Specific considerations for prevention and control of type 2 diabetes are needed at all levels of the healthcare system in order to improve healthcare delivery to patients. Education of healthcare teams in the management of diabetes and methods for increasing knowledge in the community are major aspects that need reinforcement.

The network for control and management of type 2 diabetes in the Islamic Republic of Iran is a systematic approach for delivery of healthcare to patients. Evaluation and monitoring of this network has been initiated, and will play an important role in the enhancement of this urgently needed network.

Acknowledgements

The authors would like to express their deep appreciation to the members of the National Diabetes Advisory Committee and all persons involved in planning, education and execution of the diabetes control and management programme in various provinces.

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Report

Screening for type 2 diabetes in the Iranian national programme: a preliminary report

F. Azizi,[1] M.M. Gouya,[2] P. Vazirian,[2] P. Dolatshahi[2] and S. Habibian[1]

SUMMARY Diabetes mellitus is a significant threat to public health. It is estimated that more than 1.5 million people with diabetes live in the Islamic Republic of Iran. We report on the preliminary results of the national programme for the prevention and control of type 2 diabetes which began in 1996. The pilot project has so far been instituted in 17 provinces. Of 595 717 people aged 30 years and over, 247 518 were classed as at risk and 3.6% had diabetes, 4.3% of women and 2.6% of men. Diabetes prevalence varied from 1.3% in rural areas to 14.5% in large cities. Early detection and control strategies are aimed at diminishing the heavy burden of diabetes.

Introduction

The manifestations of diabetes cause considerable human suffering and impose enormous expenditures. Worldwide data currently available indicate that diabetes mellitus has become a monumental problem and a major health concern, illustrating thereby the global burden of diabetes [*1–3*]. According to the epidemiological studies, there are 1.5 million people with diabetes in Iran and about 14.5%–22.5% of the population aged 30 and over have impaired glucose tolerance (IGT), one fifth of them are either at risk of macrovascular complications or are potentially diabetic. Overall, 20% of the Iranian population aged 30 years and over is at risk of diabetes [*4*].

Early detection and appropriate management of diabetes is essential to reduce major morbidity and mortality, however, these strategies are not implemented in many countries of the world. In the diabetes centre in Isfahan, the rate of complications among approximately 4000 type 2 diabetes patients have been recorded as: ischaemic heart disease 34%, hypertension 50%, congestive heart failure 12%, retinopathy 44%, cataract 5%, bacteriuria 27%, nephropathy 19%, neuropathy 27%, depression 60%, diabetic foot 2.5%, hypercholesterolaemia 37%, and hypertriglyceridaemia 37% [*4,6*]. Among 296 cases of non-traumatic amputations, 38% were diabetes-related; 27% of stroke cases (cerebrovascular accident), 15 % of patients with acute myocardial infarction and 15% of dialysis patients were also diabetics. Since coding of mortality data according to the International Classification of Disease (ICD) system is not used in the Is-

[1]Endocrine Research Centre, Shaheed Beheshti University of Medical Sciences, Babol, Islamic Republic of Iran.
[2]Department of Disease Control and the National Committee for the Control and Management of Diabetes, Ministry of Health and Medical Education, Tehran, Islamic Republic of Iran.
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lamic Republic of Iran, the actual number of diabetes-related deaths is not known. Life expectancy of diabetic patients has been estimated at 60 for type 2 diabetes and 36 for type 1 diabetes respectively (Diabetes mellitus in the Islamic Republic of Iran, F. Azizi, unpublished report, 1996). Following this report, the Iranian National Advisory Committee resumed its work in 1996, and a new, comprehensive national programme for prevention and control of diabetes was designed [*6*]. In this report we present preliminary results of population screening for diabetes in 17 provinces.

Methods

In February 1999, the national intervention programme was implemented as a pilot project by endocrinologists of the National Diabetes Committee in 17 locations: Khorasan, Yazd, West Azarbayjan, Bushehr, Kermanshah, Zanjan, Mazandaran, Gilan, Golestan, Kerman, Hamedan, Isfahan, Kordestan, Shahrud, and the universities of medical education and health services of Tehran, Shaheed Beheshti and Iran, located in Tehran province.

In the national programme for the prevention and control of type 2 diabetes, 4 levels of health care have been designed. At the first level, *behvarz* (community health workers) in health houses, and health professionals in urban health posts screen the community, evaluating men and women at risk. The following patients are referred to the second level:

- those with a history of diabetes among first degree relatives
- those having 2 diabetes symptoms
- those with a body mass index ≥ 30 kg/m^2
- those with blood pressure ≥ 140/90 mmHg
- women who have had ≥ 2 spontaneous abortions of unknown cause
- women who suffered intrauterine fetal death
- women who had a child with birth weight ≥ 4 kg
- women with a history of gestational diabetes
- women in their 24th–28th weeks of pregnancy or classified as high risk at the beginning of their pregnancy.

At the second level, general physicians and laboratory facilities are available in rural and urban health centres as a diabetes team. General physicians will screen referred person by testing either fasting blood sugar or 2-hour postprandial glucose and manage all patients according to treatment and control protocols defined by the National Diabetes Committee. All patients would then be referred for early detection of complications to the third level, which is located in a district hospital, where an internist (or endocrinologist if available), a full-time educational nurse, and a part-time nutritionist staff the diabetes unit. Patients needing more specific facilities for diagnosis and treatment would then be referred to the fourth level, the diabetes centre, which is situated in a university (provincial) hospital and has an internist (or an endocrinologist if available) and a full-time educational nurse and a part-time nutritionist who constitute the diabetes team in the centre.

From October 1999 to October 2001, pilot areas in 17 provinces entered the screening project for type 2 diabetes. the health authorities in each province selected 1 division to take part in the study. All physicians and *behvarz* in the division were engaged in the programme. Approximately 200 *behvarz* in 984 health houses, 300 physicians and 700 health workers in 161 rural and 171 urban health centres participated.

All those in the selected division aged 30 years and over were screened (cut-off age selected by the National Diabetes Committee). Diagnostic criteria were based on fasting blood sugar ≥ 126 mg/dL or 2-hour postprandial blood glucose ≥ 200 mg/dL.

Results

During the 2 years of this study, 3.5 million people were screened, of whom 998 237 individuals were aged 30 years or over. During this time a total of 595 717 people within this age range were initially screened by *behvarz* in the screening programme. Those found to have risk factors were referred for confirmation and blood testing. More women were screened than men: 347 501 (57.5%) versus 248 217 (42.5%), mainly because during the mornings, when most of the screenings were done, men attended to agricultural work and other business.

The age distribution of the study population is shown in Table 1. In total, 21 637 diabetics, 15 091 women and 6547 men, were detected. Table 2 shows the prevalence of known and newly discovered diabetic patients in the screened population. Overall, 3.6% of the subjects were diabetic, of whom 58.3% were known and 41.7% were newly discovered. The prevalence of risk factors for diabetes in people screened is given in Table 3. Obesity, hypertension, family history of diabetes, and in females history of ≥ 2 abortions and having a baby ≥ 4 kg birth weight were more prevalent than other risk factors.

Table 4 shows the prevalence of diabetes in 11 provinces, the lowest being 1.3% in the rural areas of Kordestan and Khorasan, and the highest 10.7% and 14.5% in two urban areas in Tehran.

Table 1 **Study population displayed proportionally by age group and sex**

Sex	No. screened	Age group (years) 30–39	40–49	50–59	≥ 60
Female	347 501	39	27	16	18
Male	248 216	34	23	16	27
Total	595 717	37	25	16	22

Discussion

This study shows the results of screening procedures for the detection of type 2 diabetes in more than half a million at-risk adults in 17 provinces of the Islamic Republic of Iran.

Epidemiological studies on the prevalence of diabetes have been carried out in some parts of the country in the last decade—there are now an estimated 1.5 million people with diabetes. Since 1976, some studies have been done among children, government employees, and factory workers [*7,8*], but because of their invalid methodology, the results are not reliable. A systematic approach to epidemiological studies was initiated in 1993. The Endocrine Research Centre and the Institute of Nutrition of Shaheed Beheshti University of Medical Sciences conducted the first systematic population study in Iran and reported a prevalence of diabetes of 7.6 % for females, 7.1% for males, while 14.9% of females and 8.9% of males had IGT of 2033 individuals aged 30 years and above, selected by random sampling in Islamshahr (population 244 000) [*9*]. They also found that, of people aged 30 years and over living in rural areas of Tehran province, 7.3% had diabetes and 7.2% had IGT [*10*]. A report covering 2800 inhabitants aged 30 years and over in Tehran city with a mean

Table 2 **Prevalence of diabetes in 595 717 individuals aged 30 years and over**

Sex	No. screened	No. of diabetics (%)		
		Known	Newly discovered	All
Women	347 501	8250 (2.4)	6841 (2.0)	15091 (4.3)
Men	248 216	3774 (1.5)	2772 (1.1)	6546 (2.6)
Total	595 717	12024 (2.0)	9613 (1.6)	21637 (3.6)

age of 47 ± 6 years showed a prevalence of 7.2% for diabetes and 8.2% for IGT [*11*]. In the city of Isfahan, 1.4% of people aged 10 years and over were found to be diabetic during a screening programme conducted on 5000 individuals [*5*]. The prevalence of glucose intolerance was in the range 14.5%–22.5% for those aged 30 years and over according to the above-mentioned studies. Another survey conducted in the remote villages of Zanjan province showed a much lower prevalence of type 2 diabetes and IGT among people aged 30 years and over, 4.3% and 2.3% respectively [*12*]. A survey carried out on 1039 men and women between the ages of 30 and 64 in Bushehr port in 1996–1997 [*13*] showed a prevalence of 13.6% for diabetes and 9.7% for IGT.

The prevalence of diabetes in our study is lower than that reported previously. This difference may partly be because in most provinces (except Tehran) we screened rural populations or mixed rural and urban populations. It might also be due to a lack of attendance of all "at risk" individuals for blood testing. However the prevalence of diabetes in urban Tehran was found to be slightly higher than that reported previously

Table 3 **Prevalence of risk factors for diabetes in the screening programme**

Risk factor	% positive
Both sexes	
Body mass index ≥ 30 kg/m^2	19.4
Blood pressure ≥140/90 mmHg	14.3
Family history of diabetes	10.6
Polydipsia and polyphagia	5.6
Polydipsia and polyuria	8.6
Polyphagia and polyuria	5.2
Females with history of:	
≥ 2 spontaneous abortions	8.2
Fetal death	5.4
Neonate ≥ 4 kg weight	9.5
Gestational diabetes	0.9

Table 4 **Prevalence of diabetes in people aged 30 years and over in various locations**

Province	Prevalence of diabetes (%)
Kordestan	1.3
Khorasan	1.3
Zanjan	2.0
Kermanshah	2.2
Hamedan	2.6
Shahrud	3.5
Bushehr	5.5
Yazd	7.3
Gilan	7.7
Tehran city: area 1	8.7
Tehran city: area 2	14.5

[*4,11*]. Surveys conducted among 2128 pregnant women in some maternity units in Tehran detected 28 (1.3%) cases of known diabetes and 95 (4.5%) cases of gestational diabetes [*14*].

A study performed in Islamshahr on 183 randomly selected people aged 30–74 years concluded that the duration and severity of glucose intolerance affected macrovascular but not microvascular complications and that IGT was accompanied by elevated blood pressure and abnormal exercise tests [*15*]. The prevalence of risk factors for coronary heart disease in type 2 diabetes has been investigated in a few studies. In the port city of Bushehr [*13*], the prevalence of hypertension was 48.9% for diabetes versus 20.2% in non-diabetic individuals and hypercholesterolaemia was found in 68.1% of diabetics as opposed to 44.4% of non-diabetics. In the rural areas of Tehran province [*10*], the prevalence of systolic and diastolic hypertension, high waist–hip ratio, triglyceride and cholesterol levels and low-density lipoprotein to high-density lipoprotein ratios were increased in diabetic patients compared to non-diabetics. The most recent cross-sectional study in district 13 of Tehran, the Tehran Lipid and Glucose Study [*16*] has shown a prevalence of 10.6% and 12.4% for diabetes and IGT respectively in persons aged 20 years and over [*17*].

In the present study, the prevalence of type 2 diabetes was found to be higher in urban areas, in particular large cities such as Tehran, but is still low in remote areas and rural regions.

In conclusion, a diabetic screening programme may be effectively implemented in countries where an appropriate health network exists. Screening for diabetes coupled with a suitable management programme decreases the mortality and morbidity for this devastating disease and increases the standard of health.

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13. Original papers and diskettes will not be returned except upon request by the principal author.

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المجلة الصحية لشرق المتوسط

دلائل إرشادية للمؤلفين

١. ينبغي أن لا تكون الورقات المقدَّمة للنشر، قد نشرت أو قبلت للنشر في أي مكان آخر. ويحتفظ المكتب الإقليمي لمنظمة الصحة العالمية لشرق المتوسط بجميع حقوق استنساخ أو إعادة نشر المواد التي تنشر في *المجلة الصحية لشرق المتوسط*.

٢. يمكن أن ترسل الورقات الأصلية، المكتوبة بالعربية، أو الإنكليزية، أو الفرنسية، للنظر فيها من قِبَل رئيس تحرير المجلة الصحية لشرق المتوسط، بالمكتب الإقليمي لمنظمة الصحة العالمية لشرق المتوسط، ص. ب. (٧٦٠٨)، بمدينة نصر (١١٣٧١)، بالقاهرة، في مصر. ويتم تقديم خلاصات للورقات، باللغات الثلاث.

٣. ينبغي أن يكون موضوع الورقات منتمياً لمجال الصحة العمومية، أو أي ميدان تقني وعلمي آخر، له صلة بالمجالات ذات الأهمية لمنظمة الصحة العالمية، مع الإشارة بشكل خاص إلى إقليم شرق المتوسط.

٤. ينبغي تقديم ثلاث نسخ من كل مخطوطة أو مطبوعة. كما ينبغي أن لا يتعدى النص، مع الجداول، والرسومات المرافقة، ١٥ صفحة مطبوعة على الآلة الكاتبة مع ترك فاصلين بين كل سطر، من القطع A4 (٤٥٠٠ كلمة)، وأن تكون الطباعة على وجه واحد فقط من الصفحة. وعندما يتم إعلان المؤلف بأن المطبوعة التي قدَّمها قد تم قبولها من دون شرط، أو قبولها بشروط، ينبغي أن يقدِّم قرص حاسوبي (٣,٥ بوصة)، يتضمن النص، والجداول، والرسوم البيانية والتوضيحية. وبالنسبة للورقات المقدَّمة باللغتين الإنكليزية والفرنسية، يرجى، بناءً على طلب رئيس التحرير، أن يتم تقديم النص، في كلٍّ من، صيغة معالجة الكلمات (وحبَّذا لو أمكن استخدام برنامج مايكروسوفت وورد Microsoft Word، بالنسبة للحاسوب الشخصي، غير أننا يمكن أن نترجم غالبية الصيغ الأخرى)، وفي شكل محفوظ كنص/ملف الكود الأمريكي القياسي لتبادل المعلومات ASCII (أسكي). وينبغي اتباع نفس الإرشادات في ما يتعلق بالورقات المقدمة باللغة العربية. وإذا كانت الورقة المقدمة، هي ترجمة كلية أو جزئية لعمل آخر لم ينشر، فينبغي تقديم نسخة من هذا العمل، في لغته الأصلية. وحيثما أمكن، يفضل أن تكون الرسوم البيانية في شكل رسوم هارفارد البيانية، مع استخدام برنامج النوافذ Windows أو إكسل Excel، وتقديم الرسوم التوضيحية والصور الفوتوغرافية في صيغة EPS أو TIFF. كما أنه من الضروري تقديم ثلاث مجموعات من الصور الفوتوغرافية والرسومات الأصلية، مع المعطيات الأساسية. وفي حالة وجود أي نص أو حروف مكتوبة على الصور، فينبغي تقديم نسخة إضافية خالية من أي نص مطبوع أوأي حروف مكتوبة .

٥. يتم مراجعة جميع الورقات المقدَّمة مراجعة دقيقة من قِبَل الزملاء، وفي ضوء هذه المراجعة، تحتفظ هيئة التحرير بحق قبول أو رفض أي ورقة. ومن المتفق عليه أن جميع الورقات التي يتم قبولها، تخضع للمراجعة الإحصائية والتحريرية، بحسب ما يلزم، بما في ذلك اختصار النص، أو حذف بعض الجداول أو الرسوم البيانية.

٦. ينبغي أن يكون عنوان الورقة مختصراً على قدر المستطاع، وحبَّذا لو كان حوالي ١٠ كلمات، وأن يكتب على ورقة منفصلة، مع تحديد اسم المؤلف (أو أسماء المؤلفين)، وعضويتهم في المؤسسات المختلفة، وأعلى الدرجات العلمية التي حصلوا عليها. كذلك، ينبغي ذكر العنوان البريدي، والمعلومات الأخرى اللازمة للاتصال بالمؤلف (بريد إلكتروني، فاكس، هاتف). ويجب أن لا يزيد عدد المؤلفين على خمسة. ولابد أن يكونوا قد ساهموا جميعاً في تصميم البحث أو تحليل نتائجه أو كتابته، وأن يكونوا قد وافقوا، جميعاً على النسخة النهائية المقدَّمة. وقد يطلب من المؤلفين إثبات الإسهام الذي قدَّموه. ويمكن إدراج أسماء أخرى إلى عبارات الشكر التي تكون في مقدِّمة الورقة.

٧. ومن أجل تيسير ترجمة الخلاصات وأسماء المؤلفين، على المؤلفين الذين تكون لغتهم الأم تكتب بحروف عربية، ويكتبون مؤلفاتهم بالإنكليزية أو الفرنسية، أن يزودوا رئيسي التحرير بأسمائهم كاملة، مكتوبة بالحروف العربية، ثم بالحروف اللاتينية.

٨. الورقات التي تمثّل تقارير حول نتائج البحوث الجديدة، ينبغي أن تكتب بالترتيب التالي: المقدمة؛ المواد (المواضيع) والطرق؛ النتائج؛ التحليل؛ والمناقشة. وينبغي أن تشفع هذه الورقات بخلاصة لكل منها، لا تزيد على ١٠٠ كلمة، تبيّن بوضوح، وبإيجاز، الأهداف، والسياق، والنتائج، والاستنتاجات.

٩. ينبغي أن يثبت المؤلفون، بحسب ما يلزم، أن جميع الأشخاص الذين أجري عليهم البحث، قد وافقوا موافقة واعية على ذلك، وفي حالة تعذر الحصول على موافقة المشاركين (أحياء أو أموات)، ينبغي أن يثبت المؤلفون أنه قد تم الحصول على موافقة وكلائهم أو ورثتهم.

١٠. ينبغي أن تتناول مقالات الاستعراض والمراجعة الماضية، النقاط التالية: الأهداف، المصادر، طرق الانتقاء، تجميع المعطيات وتفسيرها والاستنتاجات.

١١. ينبغي أن يقتصر الاستشهاد من أي أعمال منشورة، في النص، على المراجع الحديثة الأساسية. ولا ينصح بزيادة المراجع على ٢٥ مرجعاً على الأكثر، باستثناء المقالات النقدية. ويلزم ترقيم المراجع، كلما ظهرت في النص، وأن يليها أعداد عربية بين أقواس [أقواس مربعة]. كما ينبغي تدوين هذه المراجع في قائمة مرقمة، في صفحة منفصلة، في نهاية الورقة، وأن تتضمن المعلومات التالية، إن أمكن: اسم المؤلف أو أسماء المؤلفين، والحروف الأولى من أسمائهم، وعنوان الورقة أو الكتاب في اللغة الأصلية، إضافة إلى ترجمته؛ واسم المجلة بالكامل، مع رقم المجلد، وعدد الصفحات؛ واسم الناشر (التجاري أو المؤسسي)؛ ومكان النشر (المدينة والبلد)؛ وتاريخ النشر. وسوف يتم إعادة الورقات التي تكون فيها المراجع غير كاملة، أو غير مرتبة بحسب هذه المبادئ، إلى المؤلف، لتصحيحها. وفي ما يلي أمثلة للأسلوب الذي تفضل المجلة الصحية لشرق المتوسط أن يتبع:

كتاب:

.Al Hamza B, Smith A. *The fifth sign of identity*. Cairo, American University Press, 1990

مقالة في مجلة:

.Jones A et al. One day in Tibet. Journal Of tautology, 1993,13(5): 23-7

وثيقة:

Al-Itneen M, ed. The principles of uncertainty. Geneva, World Health Organization, 1985 (document WHO/DOC/537).

١٢. وفي ما يتعلق بالرسومات والجداول، المشفوعة بالشروح الملائمة، فإنه ينبغي أن ترد كل منها في صفحة منفصلة، ومرقمة على التوالي بالأعداد العربية، وملحقة في نهاية الورقة. كما ينبغي الإشارة إلى كل رسم وكل جدول يشار إليه في النص، وتحديد مكانه بوضوح، بحسب ما يلزم، وحبّذا لو أمكن تحديد مصدر كل رسم وكل جدول. وفي حالة نقل أي رسومات أو جداول من مواد أخرى، فإنه تقع على عاتق المؤلف، أو المؤلفين، المسؤولية الكاملة عن الحصول على الأذون اللازمة. وبُغْيَةَ تجنُّب أي مشكلات في طريقة تنسيق المنتج النهائي، فإنه ينبغي الاقتصار على قدر الإمكان في إدراج الجداول والرسومات. وحبّذا لو أمكن الاقتصار على جدول واحد أو رسم واحد لكل ١٠٠٠ كلمة. علماً بأن الرسومات المتعلقة ببعض المعطيات، ينبغي أن تصاحب هذه المعطيات، وأن يتسنّى إعادة رسمها، إذا تطلّب الأمر.

١٣. لا ترد الورقات والقريصات الأصلية، إلا بناءً على طلب من المؤلف الرئيسي.

١٤. بعد النشر، يحصل المؤلفون على نسخة من العدد الذي ترد فيه المقالة، بينما يحصل المؤلف الرئيسي على ٥٠ نسخة من البحث المنشور. وتقدَّم الطلبات للحصول على المزيد من النسخ، أو على معلومات حول الأسعار، إلى رئيس التحرير.

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Correspondence

Editor-in-chief
WHO Eastern Mediterranean Regional Office

P.O. Box 7608
Nasr City, Cairo 11371
Arab Republic of Egypt

Tel: (202) 670 2535
email: khayat@emro.who.int
emhj@emro.who.int

Fax: (202) 670 2492
(202) 670 2494

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