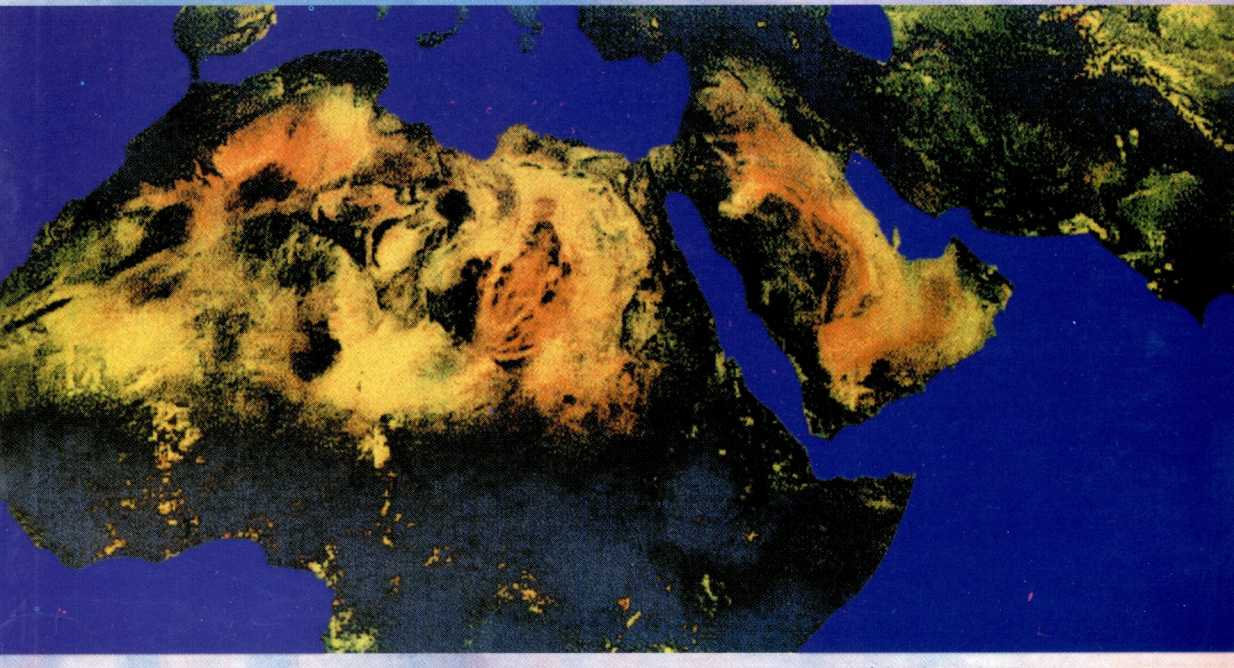
ISSN 1020 - 3397

المجلة الصحية لشرق المتوسط

Eastern Mediterranean Health Journal

La Revue de Santé de la Méditerranée orientale

Vol. 12 No. 5 September/Septembre 2006 المجلد الثاني عشر، العدد ٥ أيلول/سبتمبر



منظمة الصحة العالمية
World Health Organization
Organisation mondiale de la Santé

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

The Eastern Mediterranean Health Journal is abstracted/indexed in the Index Medicus and MEDLINE (Medical Literature Analysis and Retrieval Systems on Line) and the ExtraMed-Full text on CD-ROM, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), CAB International, Lexis Nexis™, Scopus and the Index Medicus for the WHO Eastern Mediterranean Region (IMEMR).
EMHJ is also available on the World Wide Web: http://www/emro.who.int/emhj.htm

ALL ARTICLES ARE PEER REVIEWED

ISSN 1020-3397

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

Cover designed by Ahmed Hassanein
Printed on acid-free paper
Printed by League of Arab States Printshop

المجلة الصحية لشرق المتوسط

Eastern Mediterranean Health Journal

La Revue de Santé de la Méditerranée orientale

Vol. 12 No. 5 September/Septembre 2006 المجلد الثاني عشر، العدد ٥ أيلول/سبتمبر

Contents

Eastern Mediterranean Health Journal

Letter from the Editor

This year, the 53rd session of the Regional Committee for the Eastern Mediterranean will be held in Isfahan, Islamic Republic of Iran, 9–12 September.

One of the key themes at this meeting will be preparedness and response to natural and man-made disasters and emergencies. Two of the items on the agenda exemplify this theme: a technical paper on the *Regional strategy on preparedness and response for human pandemic influenza*, the principal objective of which is to summarize the World Health Organization (WHO) global influenza preparedness plan and to outline the regional strategy for implementation, and the progress report on *Emergency preparedness and response*, which details the steps that have been taken towards the implementation of resolution EM/RC52/R.6 issued in September 2005.

Avian influenza A (H5N1) is primarily a disease of birds and rarely affects humans. As of 6 June 2006, however, the cumulative number of confirmed human cases of influenza A (H5N1) reported to WHO has increased significantly, from 3 in 2003 to 95 in 2005 and 81 in the first half of 2006. Altogether, more than half of these have been fatal. H5N1 avian influenza in humans must be closely monitored because of the potential of this virus to evolve in ways that could start a pandemic.

Experience has shown that detailed preparedness plans are extremely useful in reducing human suffering during natural or man-made disasters and major disease outbreaks. The regional strategy aims to ensure that plans are in place to reduce opportunities for this virus to develop into a form readily transmissible among humans. The latest information on the situation is available on the WHO Epidemic and Pandemic Alert and Response site at http://www.who.int/csr/disease/avian_influenza/en/index.html.

Well trained and equipped disaster experts ensure the coordination and implementation of humanitarian assistance. WHO is, therefore, creating a roster of experts within the Region who have experience in emergency settings. The initial step was to identify the skills needed in emergency response and recovery phases. These include expertise in such areas as epidemiology, environmental health, public health, mental health and logistics. A pre-deployment training course is being developed which will address practical and operational aspects for those providing humanitarian assistance in an affected area.

Since the beginning of the current humanitarian crisis in Lebanon, health partners, led by WHO, have been providing immediate assistance, including access to safe drinking water, health care, vaccines and medications. The focus is on early recovery and reconstruction of the health system. Further information on emergency preparedness and response in the WHO Eastern Mediterranean Region can be found at http://www.emro.who.int/eha/.

رسالة من المحرِّر

تنعقد الدورة الثالثة والخمسون للّجنة الإقليمية لشرق المتوسط في مدينة إصفهان، بجمهورية إيران الإسلامية، في المدة من 9 إلى 12 أيلول/سبتمبر 2006.

ويأتي موضوع الاستعداد والتصدِّي للطوارئ والكوارث الطبيعية وتلك التي هي من صنع البشر، ضمن المواضيع الرئيسية لهذه الدورة. ويتجسَّد هذا الموضوع في بندَيْن من بنود جدول الأعمال، هما: الورقة التقنية حول *الاستراتيجية الإقليمية للاستعداد لجائحة الإنفلونزا البشرية والاستجابة لها*، والتي تهدف في المقام الأول إلى تلخيص الخطة العالمية للمنظمة للاستعداد للإنفلونزا وتحديد الملامح العامة للاستراتيجية الإقليمية لتنفيذ الخطة؛ والتقرير المرحلي حول *الاستعداد للطوارئ والتصدِّي لها*، والذي يحدِّد بالتفصيل الخطوات التي اتُّخذت في سبيل تنفيذ قرار اللجنة الإقليمية الثانية والخمسين (ش م/ل إ52/ق - 6) التي انعقدت في أيلول/سبتمبر من عام 2005.

إن إنفلونزا الطيور الناجمة عن الفيروس A (H5N1) هي في المقام الأول مرض يصيب الطيور ونادراً ما يؤثِّر في الإنسان. غير أنه بدايةً من 6 حزيران/يونيو 2006، لوحظ أن عدد حالات الإنفلونزا البشرية المؤكَّدة الناجمة عن الفيروس A (H5N1) والمبلَّغة لمنظمة الصحة العالمية قد تزايد زيادة كبيرة، فمن 3 حالات في عام 2003 إلى 95 حالة في عام 2005 إلى 81 حالة في النصف الأول من عام 2006. وكان أكثر من نصف هذه الحالات قاتلاً. فلابد من رصد دقيق لحالات إنفلونزا الطيور البشرية الناجمة عن هذا الفيروس، نظراً لقدرته على التطوُّر بعدَّة طرق محدثاً جائحة.

ولقد بيَّنت التجربة أن خطط الاستعداد المفصَّلة بالغة النفع في الحدِّ من معاناة البشر أثناء الكوارث الطبيعية وتلك التي هي من صنع البشر، وغير ذلك من الفاشيات المرضية الرئيسية. وتهدف الاستراتيجية الإقليمية إلى ضمان تنفيذ الخطط للحدِّ من فرص تطوُّر هذا الفيروس إلى شكل قابل للسراية بين البشر. ويمكن الاطِّلاع على أحدث المعلومات حول هذا الوضع في موقع المنظمة المعني بالتنبُّه للأوبئة والجائحات والتصدِّي لها: www.who.int/csr/disease/avian_influenza/en/index.html.

ولما كان الخبراء في الكوارث المدرَّبين والمزوَّدين بالعتاد اللازم كفيلين بتنسيق وتنفيذ أنشطة المساعدة الإنسانية، فإن المنظمة تعكف حالياً على إعداد قائمة بالخبراء من بلدان الإقليم من ذوي الخبرة في أوضاع الطوارئ. وقد تمثَّلت الخطوة الأولى في تحديد المهارات اللازمة في مرحلتَيْ التصدِّي للطوارئ والتعافي منها. وتشمل هذه المهارات الخبرة في مجالات من قبيل الوبائيات، وصحة البيئة، والصحة العمومية، والصحة النفسية، واللوجستيات (الإماديات). ويجري حالياً إعداد دورة تدريبية في مرحلة ما قبل الانتشار، تتناول المهارات العملية والميدانية اللازمة لمقدِّمي المساعدة الإنسانية في المناطق المتضرِّرة.

ومنذ اندلاع الأزمة الإنسانية الحالية في لبنان، قدَّم الشركاء في مجال الصحة، تحت قيادة المنظمة، المساعدة العاجلة، بما في ذلك توفير مياه الشرب النقية، والرعاية الصحية، واللقاحات والأدوية. وينصبُّ التركيز على التعافي المبكِّر وإعادة بناء النظام الصحي. ويمكن الاستزادة من المعلومات المتعلقة بالاستعداد للطوارئ والتصدِّي لها في إقليم شرق المتوسط، في الموقع التالي http://www.emro.who.int/eha.

Adjunct therapy with corticosteroids or paracentesis for treatment of tuberculous pleural effusion

A.A. Mansour[1] and T.B. Al-Rbeay[2]

المعالجة المساعدة بالكورتيكوستيرويدات أو بالبزل لعلاج الانصباب الجنبي السُّلي

عباس علي منصور، ضياء بخيت الربيعي

الخلاصة: أُجريت هذه الدراسة الأترابية الاستباقية في المدة من أيار/مايو 2003 إلى نيسان/إبريل 2004، بغرض التعرُّف على تأثير المعالجة المساعدة على 190 من المرضى المصابين بالانصباب الجنبي السُّلي. وقد قُسِّم المرضى إلى ثلاث فئات. وتمت معالجة جميع هذه الفئات بالأدوية المضادة للسل لمدة 6 أشهر؛ أما الفئة الثانية (وعددها 46 مريضاً) فقد أُضيف إليها البريدنيزولون بمعدل 30 مغ/يوم لمدة 10 أيام؛ وأما الفئة الثالثة (وعددها 78 مريضاً) فأُجري لها البزل لنَزْح السوائل. وقد لوحظ اختفاء أعراض الحُمَّى والأعراض البنيوية بسرعة أكبر في الفئة الثانية ($P > 0.05$). وبعد 10 أيام لوحظ انخفاض أكبر بدرجة يُعْتَدُّ بها إحصائياً في حجم الانصباب الجنبي في الفئة الثانية، ولكن لم يكن الفرق بحيث يُعْتَدُّ به إحصائياً بعد 6 أشهر. واستنتج الباحثان من الدراسة أنه لا لزوم لإعطاء الكورتيكوستيرويدات أو البزل العلاجي في علاج الانصباب الجنبي السُّلي.

ABSTRACT To determine the effect of adjunct therapy, we carried out a prospective cohort study on 190 patients with tuberculous pleural effusion during May 2003–April 2004. Patients were divided into 3 groups. All groups were treated with anti-tuberculosis (TB) drugs for 6 months; in group 2 (***n*** = 46) prednisolone, 30 mg/day for 10 days, was added; group 3 (***n*** = 78) were given paracentesis to remove fluid. Fever and constitutional symptoms disappeared faster in group 2 (***P*** > 0.05). After 10 days, there was a significantly greater reduction in the size of pleural effusion in group 2, but after 6 months the difference was not statistically significant. We found corticosteroids and therapeutic paracentesis are not necessary in the management of TB pleural effusion.

Corticothérapie adjuvante ou ponction pour le traitement de l'épanchement pleural tuberculeux

RÉSUMÉ Afin de déterminer l'effet de la thérapie adjuvante, nous avons réalisé une étude de cohorte prospective chez 190 patients atteints d'épanchement pleural tuberculeux entre mai 2003 et avril 2004. Les patients ont été répartis en trois groupes. Tous les groupes ont été traités par antituberculeux pendant 6 mois ; dans le groupe 2 (n = 46), on a donné en supplément 30 mg/jour de prednisolone pendant 10 jours ; dans le groupe 3 (n = 78), les sujets ont subi une ponction pour drainer le liquide. La fièvre et les symptômes constitutionnels ont disparu plus rapidement dans le groupe 2 ($p > 0,05$). Après 10 jours, il y avait une réduction significativement plus importante de la dimension de l'épanchement pleural dans le groupe 2, mais après 6 mois, la différence n'était pas statistiquement significative. On constate que les corticoïdes et la ponction évacuatrice ne sont pas nécessaires pour la prise en charge de l'épanchement pleural tuberculeux.

[1]Department of Medicine, Basra College of Medicine, Basra, Iraq (Correspondence to A.A. Mansour: aambaam@yahoo.com).
[2]Chest Hospital, Basra, Iraq.
Received: 20/09/04; accepted: 22/02/05

Introduction

According to World Health Organization (WHO) recommendations, tuberculous pleural effusion is treated according to the category III regimen: 2 months with 3 anti-tuberculosis (TB) drugs followed by 4 months with 2 anti-TB drugs [*1*].

Adjunct therapy with corticosteroids or pleural fluid aspiration until dryness have been recommended by some researchers [*2–5*]. Corticosteroids in conjunction with anti-TB drugs may be appropriate in particular forms of TB such as tuberculous meningitis and pericardial and pleural disease [*6*]. Cohen and Sahn, however, do not recommended routine use of corticosteroids in tuberculous pleural effusion unless there are acute symptoms such as fever, chest pain or dyspnoea that are disturbing to the patient [*7*]. It has even been suggested that there is insufficient evidence for the effectiveness of adjunctive corticosteroid treatment in such patients [*8*]. Drug interaction with rifampin should, naturally, be taken into consideration [*9*].

The aim of this study was to determine the effect of adjunct therapy (corticosteroids and paracentesis) on tuberculous pleural effusion with regard to symptoms, size of the effusion and pleural thickening (scarring).

Methods

We carried out a prospective cohort study of all patients with TB pleural effusion (all biopsy and biochemically confirmed) in Al-Faiha hospital in Basra, Iraq, from May 2003 to April 2004. The study protocol was explained for all patients and informed consent was taken from them. Patients were recruited in 3 groups: group 1 were enrolled in the first 4 months of the study, group 2 after 4 months and group 3 were enrolled in the last 6 months of the study. For all participants, the total duration of anti-TB drugs was 6 months.

The patients in group 1 ($n = 66$) were treated with anti-TB drugs only for 6 months, in line with WHO recommendations [*1*]. Those in group 2 ($n = 46$) were given the same anti-TB drugs plus corticosteroids in the form of prednisolone, 30 mg/day for 10 days. The patients in group 3 ($n = 78$) were treated with the same anti-TB drugs plus ≥ 1 paracentesis on an as-needed basis to remove as much of the fluid as possible until near dryness. All patients were treated in hospital for at least 10 days. Daily records for presence or absence of malaise, anorexia, weakness and night sweating were completed by the doctor using a chart prepared specifically for the purpose.

The size of pleural effusion was estimated according to the chest X-ray findings. Opacified hemithorax of ≥ two thirds of the hemithorax was classified as severe grade; if it involved > one third of the hemithorax but < two thirds, it was considered moderate grade; if it involved ≤ one third of the hemithorax, it was considered mild grade pleural effusion.

A chest X-ray was taken on diagnosis, again after 10 days, and then monthly for the 6 months of treatment. Reduction in pleural effusion was considered to be 50% if the amount of fluid decreased to a lower grade or 25% if there was reduction in the amount of fluid but still within the same grade.

The size of residual pleural thickening (scarring) was estimated using the same measurement grades as pleural effusion (≥ two thirds of the hemithorax, > one third but < two thirds, and ≤ one third). The term "obliteration of costophrenic angle" was used when the angle was > 90º.

For statistical analysis, the chi-squared test was used as appropriate. $P < 0.05$ was considered significant throughout the analysis.

Results

The total number of patients was 190, 185 males and 5 females (2 in group 1, 2 in group 2 and 1 in group 3). Age range was 17–45 years. There were no significant differences between the 3 groups regarding age, sex or clinical symptoms (Table 1).

The time of disappearance of fever and constitutional symptoms (malaise, anorexia, weakness, and night sweating) in the group who were treated with adjunct corticosteroids was 4 [standard deviation (SD) 3.2] days compared to 1 (SD 1.3) week in the other 2 groups ($P > 0.05$). Two patients, 1 in the corticosteroid group and the other in group 1, showed paradoxical response to anti-TB drugs with increase in fever and size of pleural effusion that lasted for 1 month.

Comparisons between lines of treatment of tuberculous pleural effusion are shown in Table 1. There were no differences between the 3 treatment groups with regard to extent of pleural thickening. After 10 days, there was > 50% reduction in the size of pleural effusion in the group having adjunct corticosteroid treatment (group 2) compared with 25% in the other groups. In all groups, there was progressive reduction of size of pleural effusion up to the third month of treatment. After 6 months there was, however, no statistically significant difference between the 3 groups.

Table 1 **Comparison of 3 lines of treatment for tuberculous pleural effusion (size of pleural effusion before treatment and pleural thickening at the end of treatment)**

Variable	Treatment						Total
	Anti-TB alone[a]		With steroid[b]		With paracentesis[c]		
	No.	%	No.	%	No.	%	No.
Size of pleural effusion before treatment[d]							
Severe	8	12.1	13	28.3	31	39.7	52
Moderate	23	34.8	18	39.1	13	16.7	54
Mild	35	53.0	15	32.6	34	43.6	84
Pleural thickening after 6 months treatment[d]							
Severe	2	3.0	0	–	2	2.6	4
Moderate	4	6.1	0	–	3	3.8	7
Mild	12	18.2	17[e]	37.0	11[e]	14.1	40
Obliteration of costophrenic angle	43	65.2	16[e]	34.7	59[e]	75.6	118
Normal chest X-ray	5	7.6	13[e]	28.3	3[e]	3.8	21
Total	66		46		78		190

[a]Mean age 30 (standard deviation 12.5) years.
[b]Mean age 34 (standard deviation 11.4) years.
[c]Mean age 28 (standard deviation 10.6) years.
[d]Severe: ≥ 2/3 of the hemithorax; moderate: > 1/3 but < 2/3; mild: ≤ 1/3.
[e]P-value > 0.05 (compared with anti-TB drugs alone).

Table 2 **Comparison of size of pleural effusion at presentation and residual pleural thickening after 6 months treatment**

Residual thickening[a]	Pleural effusiona						Total
	Mild		Moderate		Severe		
	No.	%	No.	%	No.	%	No.
Severe	–		1	1.8	3	5.7	4
Moderate	–		3	5.6	4[b]	7.7	7
Mild	12	14.3	17[b]	31.5	11[b]	21.2	40
Obliteration of costophrenic angle	60	71.4	27[b]	50.0	31[b]	59.6	118
Normal chest X-ray	12	14.3	6[b]	11.1	3[b]	5.8	21
Total	84		54		52		190

[a]***Severe:*** ≥ ***2/3 of the hemithorax; moderate: > 1/3 but < 2/3; mild:*** ≤ ***1/3.***
[b]***P-value > 0.05.***

No significant relation was found between size of effusion and later pleural scarring (Table 2).

Discussion

Corticosteroids have been shown to be beneficial in treatment of TB [*6,10,11*] although in the study of Kalita and Misra no benefit was shown, even in tuberculous meningitis [*12*]. This is not absolute fact, and adjunctive corticosteroid therapy appears to offer significant short-term, but minimal long-term, benefit for patients with TB [*11*].

In our study, corticosteroids hastened the recovery of constitutional symptoms and led to early reduction in symptoms, but after 6 months there was no difference between the groups. Some researchers are of the opinion that, although benefit has been shown in pleural disease, adjunct therapy is not routinely required unless there are significant systemic symptoms of fever or a particularly large effusion [*6*].

Though corticosteroids may bring about more rapid resolution of pleural effusion with less pleural scarring, scarring only rarely presents a problem in any event [*5,13*]. Some even advocate repeated paracentesis as superior to other treatments [*5,7*].

Similar findings to those in our study were reported in 3 previous studies [*3–5*], but one of those showed no clinical differences, even in resolution of symptoms in the corticosteroid group, compared to placebo [*5*].

There were some limitations in this study. There may have been selection bias for the 3 groups, since there was no real randomization and the groups were divided according to the time they presented to us rather than any other parameter, and the duration of corticosteroid treatment may have been shorter and the dosage lower than in previous studies [*3–5*].

In conclusion, corticosteroid treatment and therapeutic paracentesis are not necessary in the management of tuberculous pleural effusion, and have no effect on extent of residual pleural thickening after 6 months treatment with anti-TB drugs.

References

1. Maher D et al. ***Treatment of tuberculosis: guidelines for national programmes***, 2nd ed. Geneva, World Health Organization, 1997:29.
2. Satya Sri S. ***Textbook of pulmonary and extrapulmonary tuberculosis***, 2nd ed. New Delhi, Interprint, 1995:82–6.
3. Lee C et al. Corticosteroids in the treatment of tuberculous pleurisy: a double-blind, placebo-controlled, randomized study. ***Chest***, 1988, 94(6):1256–9.
4. Galarza I et al. Randomised trial of corticosteroids in the treatment of tuberculous pleurisy. ***Thorax***, 1995, 50(12):1305–7.
5. Wyser C et al. Corticosteroids in the treatment of tuberculous pleurisy: a double-blind, placebo-controlled, randomized study. ***Chest***, 1996, 110(2):333–8.
6. Alzeer AH, FitzGerald JM. Corticosteroids and tuberculosis: risks and use as adjunct therapy. ***Tubercle and lung disease***, 1993, 74(1):6–11.
7. Cohen M, Sahn SA. Resolution of pleural effusions. ***Chest***, 2001, 119(5):1547–62.
8. Matchaba PT, Volmink J. Steroids for treating tuberculous pleurisy. ***Cochrane database of systematic reviews***, 2000, 2.
9. Grange JM, Winstanley PA, Davies PDO. Clinically significant drug interactions with antituberculosis agents. ***Drug safety***, 1994, 11(4):242–51.
10. Alarifi A, Nylen ES. Dislodging sacred dogmas in combating systemic stress: the case for steroids. ***Annals of Saudi medicine***, 2000, 20(5,6):358–9.
11. Dooley DP, Carpenter JL, Rademacher S. Adjunctive corticosteroids therapy for tuberculosis: a critical reappraisal of the literature. ***Clinical infectious diseases***, 1997, 25(4):872–87.
12. Kalita J, Misra UK. Effect of methyl prednisolone on sensory motor functions in tuberculous meningitis. ***Neurology India***, 2001, 49(3):267–71.
13. Hopewell PC. Tuberculosis and nontuberculous mycobacterial infections. In: Stein JH, Daly WJ, eds. ***Internal medicine***, 2nd ed. Boston, Little, Brown & Co., 1987:1731–48.

Knowledge of tuberculosis among medical professionals and university students in Oman

A.A. Al-Jabri,[1] A.S.S. Dorvlo,[2] S. Al-Rahbi,[1] J. Al-Abri[1] and S. Al-Adawi[1]

معارف أرباب المهن الطبية وطلاب الطب في عُمان حول السل

علي عبد الله الجابري، أتسو دورفلو، سامية الرحبي، جيهان العبري، سمير العدوي

الخلاصة: تعرَّفت هذه الدراسة التي أُجريت في عُمان على ما لدى 142 من طلاب الطب والمساعدين الطبيِّين و133 من طلبة العلوم غير الطبية (مثل طلبة الآداب والعلوم الاجتماعية) من معارف حول السل. وقُيِّمَت المعارف باستخدام استبيان موثوق الصحة يتضمَّن 28 عبارة تدور حول المعارف العامة، وعوامل الخطورة وتشخيص السل. وكما هو متوقَّع، كانت معارف طلاب الطب والمساعدين الطبيين أكثر وبشكل ملحوظ من معارف غيرهم، دون أن يكون هناك فرق بين الرجال والنساء. ورغم أن لدى طلاب الطب والمساعدين الطبيين معارف أكثر من غيرهم بشكل عام، فإن بعض العبارات التقنية قد حظيت بإجابات صحيحة لدى قسم كبير من طلبة العلوم غير الطبية.

ABSTRACT This study in Oman investigated knowledge about tuberculosis among 142 medics (medical students, paramedics) and 133 non-medics (arts and social science students). Knowledge was assessed using a validated questionnaire with 28 statements on general knowledge, risk factors and diagnosis of tuberculosis. As expected, tuberculosis knowledge was significantly higher among medics but there was no significant difference between men and women. Although medics had better knowledge in general, some of the technical statements were answered correctly by higher proportions of non-medics.

Connaissances concernant la tuberculose chez les professionnels médicaux et les étudiants universitaires à Oman

RÉSUMÉ La présente étude réalisée à Oman a examiné les connaissances concernant la tuberculose chez 142 étudiants en médecine et paramédicaux (les « médicaux ») et 133 étudiants de premier cycle en lettres et en sciences sociales (les « non-médicaux »). Les connaissances ont été évaluées au moyen d'un questionnaire validé comportant 28 affirmations relatives aux connaissances générales, aux facteurs de risque et au diagnostic de la tuberculose. Comme on pouvait s'y attendre, le niveau des connaissances concernant la tuberculose était significativement plus élevé chez les médicaux mais il n'y avait pas de différence significative entre les hommes et les femmes. Même si les médicaux avaient de meilleures connaissances en général, une réponse correcte a été fournie à certaines affirmations techniques par une plus grande proportion de non-médicaux.

[1]Department of Behavioural Medicine, Microbiology and Immunology, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman (Correspondence to S. Al-Adawi: adawi@squ.edu.om).
[2]Department of Mathematics and Statistics, College of Science, Sultan Qaboos University, Muscat, Oman.
Received: 24/02/04; accepted: 14/02/05

Introduction

Globally, tuberculosis (TB) is regarded as one of the highest burden communicable diseases [*1*]. One-third of the world's population is already infected with the TB bacterium. By 2020 an estimated 200 million of these people would contract TB and there would be about 35 million deaths among them unless the infection rate is halted [*1*]. The situation is especially challenging in Asia, the Middle East and Africa [*2*] where there is a relatively high incidence of TB. As HIV-seropositivity tends to adversely amplify the severity of other immune-compromised conditions such as TB, the real incidence is likely to be even higher.

One essential step for adequate containment of TB is to ascertain the understanding in society of its risk factors, mode of transmission and diagnosis. It is becoming increasingly clear that many problems which were previously thought of as primarily biomedical are in fact more appropriately disentangled by changing individual and social attitudes and behaviour. TB- and HIV-related knowledge, attitudes, beliefs and practices have been examined in different parts of the world [*3,4*] and suggest the presence of a pervasive misunderstanding about the disease. TB is thought to be due to "idleness and generative tendency" and in some communities the word for TB is often associated with an insult [*4*]. TB has been thought to be hereditary, triggered by smoking, alcohol, even hard work, as well as exposure to cold [*4*]. Sufferers may hide their condition for fear of desertion, rejection or being blamed for spreading TB [*4*]. With the onset of the AIDS pandemic, the stigma of HIV has increased the existing stigma surrounding TB [*5*]. Such negative attitudes also persist among health care professionals. As TB control is essentially a management problem and health care professionals play a vital role, negative opinions among them are likely to have a wide-ranging influence, affecting the personal consequences of infection, prevention, care and management of the disease. Education may be one of the principal means for reducing or even halting the spread of TB.

As groundwork for embarking on such an undertaking, there is a need to establish the prevailing awareness towards TB. Despite a few anecdotal observations, attitudes towards TB have been little reported in the Arab world and to our knowledge, there has been no study on psychosocial issues associated with TB from Oman. Increasing affluence in the country has resulted in Omanis travelling to high-burden TB countries [*6*]. Oman also attracts a large labour force from parts of the world known to have epidemics of infectious diseases including TB [*7*]. The prevalence of TB in Oman has been classified as moderate with an annual risk of TB estimated to be around 1% [*8*]. The Ministry of Health in Oman has instituted the bacille Calmette–Guérin (BCG) vaccination programme to be universally dispensed to all infants at birth [*8*]. However, little is known about how TB is perceived by the Omani public.

The present study aimed to examine the knowledge about TB by medical professionals (medical students and paramedics) and by non-medical students. It was hypothesized that medics who have better health education were likely to have fewer misconceptions about the mode of transmission and other clinical aspects of TB than non-medics. We also postulated according to the "contact hypothesis" that previous exposure to TB would enhance a person's understanding and form a basis for heightening essential knowledge towards TB [*9*]. In a paternalistic society such as Oman, women have traditionally played a domestic role and it is not clear how such division of

roles would influence TB awareness. Studies carried out in different cultures suggest that there are gender differences in attitudes towards TB [*10*], and thus another aim of the present study was to examine whether knowledge differs between men and women in Oman.

Methods

Participants

The participants consisted of 2 groups operationalized for this study as "medics" and "non-medics". Medics were medical students and paramedics (nurses and technicians) working in a hospital setting. A random sample of 120 medical students were selected from the pool of medical students at the College of Medicine of Sultan Qaboos University: 105 completed the questionnaire. Out of a convenience sample of 50 nurses and technicians at the Sultan Qaboos University Teaching Hospital, 37 agreed to participate. The medical students were selected on the basis of their training in a subject that has an element of microbiology, and paramedics were those whose work involved contact with patients who were likely to carry some air borne diseases and therefore should have received some training in universal precautions procedures [*11*]. Non-medics were a convenience sample of 180 various arts and social science students at Sultan Qaboos University, of whom 133 participated.

Verbal consent was sought from each participant before a questionnaire was handed out. Most of the subjects filled the questionnaire within the vicinity of the clinics and laboratories at the Sultan Qaboos University Teaching Hospital. The participants were requested not to discuss the questionnaire with others. The students were also informed that their responses would have no influence on their grades or examination performance. The data were collected between April and May 2002.

Development of the questionnaire

The material for the questionnaire was adapted from the literature that reported on the understanding and attitudes toward infectious diseases [*3*]. The items of the questionnaire were specifically chosen for their established psychometric properties and their cross-cultural relevance and sensitivity. Literature searches resulted in a questionnaire that consisted of 28 different statements to elicit information on 3 broad areas; 14 items on general knowledge about TB, 5 on statements on risk factors and 9 statements on basic diagnosis of TB to which the respondents could respond "agree", "disagree" or "don't know". An initial sample of 60 health care professionals and 64 non-health care professionals (as defined above) were used for examining the factor structure and internal consistency and reliability of the assessment measure. The reliability (internal consistency and test–retest stability) has an alpha of 0.88 for the total scores. Only about 27% of the bivariate correlations were significantly different from zero at the 5% level; an indication of the lack of a relationship between the variables. Nine factors, out of a possible 28, explained only 60% of the variation. Hence all the variables were retained in the questionnaire.

Data analysis

The data was entered into the statistical software package *SPSS*. Cross-tabulations were computed from which odd ratios (OR) and their 95% confidence intervals (CI) were calculated. Tests of equal proportions were carried out using a large-sample test for proportions.

Results

Demographic data

A total of 275 students, technicians and nurses participated in the study: 43% male and 57% female. The medics comprised 105 medical students (45% pre-clinical and 55% clinical students) and 37 paramedics who were biomedical technicians and nurses. The non-medics were 133 students from the colleges of Arts and Social Science. The response rate was 78.6%. The overall mean age of respondents was 22.8 years (range 18–48 years): medics 23.7 years; non-medics 21.7 years; medical students 22.2 years and nurses and technicians 28.2 years. The non-medics were significantly older than the students.

Overall knowledge about TB

For all 28 questions about knowledge of TB, a significantly higher proportion of medics than non-medics gave the correct responses (71% versus 63%). A medic was 1.5 times more likely to give a correct response than a non-medic. There was no sex difference overall. The correct response rate among the student medics was significantly higher than for the technicians and nurses (72% overall versus 69%).

General knowledge about TB

There were 14 questions on general knowledge about TB. Overall, medics and non-medics gave 73% and 67% correct responses to the general statements (Table 1). The medics did better on 5 of the statements, the non-medics did better on 2 statements and there was no significant difference between the 2 groups for 7 statements. Almost all respondents believed that Oman is not free of TB; however, they believed the incidence to be low in the country. They knew that close contact with an infected person is harmful: 55% of medics and 38% of non-medics felt uncomfortable in the presence of a TB patient and 72% and 55% believed that keeping a TB patient at home carries a high risk of infecting others.

The proportion of males and females giving correct responses were not significantly different on 13/14 statements (Table 2). A higher proportion of males agreed that BCG vaccine does not provide 100% protection against TB and close contact with TB patients is harmful but this was not significant ($P = 0.06$). A higher proportion of females, agreed that simple hygienic precautions such as wearing masks and washing hands should be taken when taking care of TB patients but this was also not significant.

A comparison of medical students and paramedics in the medics group indicated that the 2 groups were similar on most of the general knowledge statements (Table 3). The students scored significantly higher on the statement "*Mycobacterium* could be dormant for many years and get reactivated" while the paramedics scored significantly higher for "incidence of TB in Oman is high".

Knowledge about risk factors or factors precipitating contracting TB

Various issues pertaining to risk factors for contracting TB were explored. Overall, medics knew the causes of TB 76% of the time as opposed to only 55% by the non-medics. Both medics and non-medics agreed that poor living conditions are a major contributing factor to the incidence of TB (Table 1). More medics (55%) correctly indicated that drinking raw infected milk could result in contracting TB than did non-medics (41%). High proportions of both groups agreed that TB is an airborne disease. Not surprisingly, a significantly higher proportion of medics (81%) than non-medics (46%) knew that TB is not caused by a virus. The odds of a medics knowing that TB is caused by a

Table1 Response rates for medics (medical students and paramedics) and non-medics (arts and social sciences students) on knowledge statements about tuberculosis (TB)

Variable	% correct response		P-value[a]	OR	(95% CI)
	Medics (n = 142)	Non-medics (n = 133)			
Knowledge factors					
An AIDS patient could be infected with the agent causing TB even if Mantoux test is negative	52	15	0.00	5.96	(3.34–10.64)
Two-weeks treatment with antibiotics ensures cure of TB	96	93	0.34	1.66	(0.57–4.80)
Mycobacterium could be dormant for many years and get reactivated	81	40	0.00	6.46	(3.73–11.17)
Protection against TB can be established by chemoprophylaxis	48	58	0.08	0.66	(0.41–1.06)
There are > 30 million deaths/year because of TB infection worldwide	60	79	0.00	0.40	(0.23–0.68)
All immigrants to Oman should be screened for Mycobacterium	81	77	0.43	1.27	(0.70–2.31)
Incidence of TB in Oman is high	79	87	0.10	0.58	(0.30–1.11)
Oman is a country which is free of TB	99	95	0.12	3.34	(0.66–16.83)
BCG vaccine ensures 100% protection against TB	87	92	0.17	0.57	(0.25–1.28)
Close contact with a patient having TB is harmless	89	83	0.20	1.56	(0.78–3.13)
Simple precautions like wearing mask, washing hands and good ventilation are helpful while taking care of a TB patient	83	72	0.03	1.92	(1.07–3.43)
I feel uncomfortable while talking to a patient with TB	55	38	0.00	2.02	(1.24–3.29)
A patient with TB must not share kitchen tools (plates, spoons, glasses, etc.) with others	36	50	0.02	0.56	(0.35–0.92)
Keeping a patient with TB at home carries the risk of infecting others	72	55	0.00	2.12	(1.28–3.52)
Risk factors					
TB is caused by a virus	81	46	0.00	4.96	(2.89–8.52)
Poor living conditions, crowdedness and refugee camps are good environments for transmission of TB	92	87	0.17	1.75	(0.79–3.88
HIV epidemic is the main reason behind the new outbreaks of TB worldwide	71	29	0.00	6.16	(3.65–10.39)
You can get TB by drinking raw milk from an infected animal	55	41	0.02	1.73	(1.07–2.79)
The commonest mode of transmission of TB is through inhalation of M. tuberculosis in aerosols and dust	81	71	0.05	1.77	(1.01–3.10)

Table1 Response rates for medics (medical students and paramedics) and non-medics (arts and social sciences students) on knowledge statements about tuberculosis (TB) (concluded)

Variable	% correct response		P-value[a]	OR	(95% CI)
	Medics (n = 142)	Non-medics (n = 133)			
Diagnosis factors					
A 1-week dry cough is suggestive of TB	67	63	0.46	1.20	(0.73–1.98)
Every patient with TB coughs out bloody sputum	58	46	0.04	1.64	(1.02–2.65)
A person could be infected with TB but show no clinical symptoms throughout life	36	10	0.00	5.23	(2.68–10.20)
Disseminated TB does not involve meninges and bones	92	80	0.01	2.63	(1.27–5.46)
TB is only confined to the respiratory tract	91	73	0.00	3.68	(1.85–7.32)
TB is diagnosed using blood smears	59	61	0.79	0.94	(0.58–1.52)
Night fever and sweating are symptoms of patients with TB	67	46	0.00	2.44	(1.49–4.00)
A positive Mantoux test means a definite TB infection	89	89	0.99	1.01	(0.47–2.18)
A tuberculin test is essential to diagnose suspected cases of TB	39	88	0.00	0.09	(0.05–0.16)

OR = odds ratio, the odds of a medical person getting the correct answer versus a non-medical person.
[a]Two-sided P-value for testing equality of proportions.

bacterium was 5 times higher than non-medics.

In all statements except 2 there was no significant difference in the knowledge of the risk factors of TB between men and women (Table 2). Significantly more females knew that "poor living conditions, crowdedness and refugee camps were good environments for the transmission of TB" and "the commonest mode of transmission of TB is through inhalation of *M. tuberculosis* in aerosols and dust". The correct response was high for both sexes on these statements.

Both medical students and paramedics scored highly on most of the statements on the risk factors (Table 3). Medical students scored significantly higher only on 1 statement: "HIV is the main reason behind the new outbreaks of TB worldwide".

Knowledge about diagnosis of TB

Various issues regarding symptoms, signs and diagnosis of TB were compared between medics and non-medics. A direct comparison of the groups indicated that out of 9 questions, the proportion of respondents giving correct responses was similar on 3 questions. More of the medics knew the correct responses on 9 statements than the non-medics; however the differences were not significant (Table 1). On average 67% and 63% of the medics and non-medics knew some of the ways of diagnosing TB, and 92% of medics and 80% of non-medics knew that disseminated TB did not involve meninges and bones. Also 91% and 73% of medics and non-medics respectively knew that "TB is not confined only to the respiratory tract". Most of both groups (89%) agreed that a positive Mantoux

Table 2 Response rates for males and females on knowledge statements about tuberculosis (TB)

Variable	% correct response Males (n = 117)	Females (n = 152)	P-value[a]	OR	(95% CI)
Knowledge factors					
An AIDS patient could be infected with the agent causing TB even if Mantoux test is negative	33	35	0.72	0.91	(0.80–10.71)
Two-weeks treatment with antibiotics ensures cure of TB	97	93	0.09	2.92	(0.45–1.20)
Mycobacterium could be dormant for many years and get reactivated	57	64	0.22	0.73	(0.80–2.09
Protection against TB can be established by chemoprophylaxis	56	50	0.30	1.29	(0.57–1.61)
There are > 30 million deaths/year because of TB infection worldwide	69	70	0.86	0.95	(0.35–1.16)
All immigrants to Oman should be screened for Mycobacterium	75	83	0.13	0.63	(0.92–3.61)
Incidence of TB in Oman is high	88	80	0.08	1.82	(0.22–4.55)
Oman is a country which is free of TB	97	97	1.00	1.00	(1.01–6.00)
BCG vaccine ensures 100% protection against TB	94	86	0.04	2.46	(0.96–4.28)
Close contact with a patient having TB is harmless	91	82	0.06	2.03	(0.33–1.03)
Simple precautions like wearing mask, washing hands and good ventilation are helpful while taking care of a TB patient	72	82	0.06	0.58	(0.53–1.41)
I feel uncomfortable while talking to a patient with TB	45	48	0.56	0.87	(0.58–1.53)
A patient with TB must not share kitchen tools (plates, spoons, glasses, etc.) with others	41	43	0.81	0.94	(0.47–1.28)
Keeping a patient with TB at home carries the risk of infecting others	60	66	0.32	0.78	(1.28–3.52)
Risk factors					
TB is caused by a virus	62	66	0.50	0.84	(0.07–0.45)
Poor living conditions, crowdedness and refugee camps are good environments for transmission of TB	81	96	0.00	0.17	(0.45–1.17)
HIV epidemic is the main reason behind the new outbreaks of TB worldwide	46	54	0.19	0.73	(0.51–1.32)
You can get TB by drinking raw milk from an infected animal	45	50	0.42	0.82	(0.32–0.97)
The commonest mode of transmission of TB is through inhalation of M. tuberculosis in aerosols and dust	70	81	0.04	0.55	(0.82–2.27)

Table 2 Response rates for males and females on knowledge statements about tuberculosis (TB) (concluded)

Variable	% correct response				
	Males (n = 117)	Females (n = 152)	P-value[a]	OR	(95% CI)
Diagnosis factors					
A 1-week dry cough is suggestive of TB	69	63	0.23	1.36	(0.80–2.09)
Every patient with TB coughs out bloody sputum	56	50	0.30	1.29	(0.49–1.54)
A person could be infected with TB but show no clinical symptoms throughout life	22	25	0.63	0.87	(0.68–2.79)
Disseminated TB does not involve meninges and bones	88	85	0.38	1.37	(0.74–2.65)
TB is only confined to the respiratory tract	85	80	0.30	1.40	(0.61–1.62)
TB is diagnosed using blood smears	59	60	0.97	0.99	(0.30–0.81)
Night fever and sweating are symptoms of patients with TB	47	64	0.00	0.49	(0.56–2.71)
A positive Mantoux test means a definite TB infection	90	88	0.61	1.23	(1.00–2.77)
A tuberculin test is essential to diagnose suspected cases of TB	69	57	0.06	1.67	(0.55–1.52)

OR = odds ratio, the odds of a male getting the correct answer versus a female.
[a]Two-sided P-value for testing equality of proportions.

test meant a definite TB infection. Significantly more of the non-medics (88%) than the medics (39%) knew that the tuberculin test is not essential to diagnose suspected cases of TB, whereas significantly more medics (67%) than non-medics (46%) knew that night fever and sweating are symptoms of TB. Very low proportions of medics (36%) and non-medics (10%) knew that a person could be infected with TB but show no clinical symptoms throughout life.

Overall, there were no significant differences between males and females as regards the diagnosis of TB; 65% of males and 64% of females knew the correct responses to the questions on diagnosis. Out of the 9 questions, there was only 1 question where the females significantly outperformed the males. Significantly more females correctly identified night fever and sweating as symptoms of TB. Very high proportions of both males and females knew that a positive Mantoux test did not mean a definite TB infection and also that TB was not confined only to the respiratory tract (Table 2).

The medical students scored significantly better than the paramedics on only 1 statement: that night fevers and sweating are symptoms of TB. Both medical students (40%) and paramedics (25%) scored poorly on the diagnosis statement "a person could be infected with TB but show no clinical symptoms throughout life" (Table 3). On all other statements there were no differences.

Discussion

Despite the triumph of "germ theory" and the enthusiasm for eradication in the past decade, infectious diseases continue to pose a global challenge. There have been no major recent advances in anti-TB drug development or research efforts that would translate into immediate meaningful reduc-

Table 3 Response rates for medics, comparing medical students and paramedics, on knowledge statements about tuberculosis (TB)

Variable	% correct response		P-value[a]	OR	(95% CI)
	Medical students (n = 105)	Paramedics (n = 37)			
Knowledge factors					
An AIDS patient could be infected with the agent causing TB even if Mantoux test is negative	56	41	0.11	1.85	(0.86–3.96)
Two-weeks treatment with antibiotics ensures cure of TB	94	100	0.14	0.00	–
Mycobacterium could be dormant for many years and get reactivated	87	65	0.00	3.48	(1.45–8.39)
Protection against TB can be established by chemoprophylaxis	43	59	0.09	0.52	(0.24–1.11)
There are > 30 million deaths/year because of TB infection worldwide	58	68	0.29	0.65	(0.30–1.44)
All immigrants to Oman should be screened for Mycobacterium	82	78	0.60	1.29	(0.51–3.27)
Incidence of TB in Oman is high	75	92	0.03	0.26	(0.07–0.93)
Oman is a country which is free of TB	99	97	0.44	2.86	(0.17–46.94)
BCG vaccine ensures 100% protection against TB	88	86	0.87	1.09	(0.36–3.31)
Close contact with a patient having TB is harmless	88	89	0.89	0.92	(0.28–3.05)
Simple precautions like wearing mask, washing hands and good ventilation are helpful while taking care of a TB patient	84	81	0.72	1.19	(0.45–3.16)
I feel uncomfortable while talking to a patient with TB	59	46	0.18	1.67	(0.78–3.55)
A patient with TB must not share kitchen tools (plates, spoons, glasses, etc.) with others	38	31	0.45	1.36	(0.60–3.07)
Keeping a patient with TB at home carries the risk of infecting others	75	64	0.20	1.70	(0.75–3.82)
Risk factors					
TB is caused by a virus	84	73	0.15	1.92	(0.79–4.68)
Poor living conditions, crowdedness and refugee camps are good environments for transmission of TB	91	94	0.56	0.63	(0.13–3.05)
HIV epidemic is the main reason behind the new outbreaks of TB worldwide	78	51	0.00	3.38	(1.53–7.47)
You can get TB by drinking raw milk from an infected animal	56	51	0.61	1.22	(0.57–2.58)
The commonest mode of transmission of TB is through inhalation of M. tuberculosis in aerosols and dust	82	78	0.64	1.25	(0.49–3.16)

Table 3 Response rates for medics, comparing medical students and paramedics, on knowledge statements about tuberculosis (TB) (concluded)

Variable	% correct response		P-value[a]	OR	(95% CI)
	Medical students (n = 105)	Paramedics (n = 37)			
Diagnosis factors					
A 1-week dry cough is suggestive of TB	69	62	0.43	1.37	(0.63–3.00)
Every patient with TB coughs out bloody sputum	57	62	0.59	0.81	(0.38–1.75)
A person could be infected with TB but show no clinical symptoms throughout life	40	25	0.11	2.00	(0.86–4.68)
Disseminated TB does not involve meninges and bones	93	86	0.20	2.19	(0.65–7.37)
TB is only confined to the respiratory tract	90	92	0.80	0.84	(0.22–3.23)
TB is diagnosed using blood smears	57	64	0.49	0.76	(0.35–1.66)
Night fever and sweating are symptoms of patients with TB	72	54	0.04	2.20	(1.01–4.78)
A positive Mantoux test means a definite TB infection	88	91	0.62	0.72	(0.19–2.71)
A tuberculin test is essential to diagnose suspected cases of TB	37	43	0.50	0.77	(0.36–1.65)

OR = odds ratio, the odds of a medical student getting the correct answer versus a paramedic (nurse and technicians).
[a]Two-sided P-value for testing equality of proportions.

tion of transmission [*12,13*]. This means that other cost-effective ways to create a sustainable control of infectious diseases need to be considered to counter and control the rising tide of infectious diseases such as TB. As there is a pervasive lack of understanding of various aspects of TB among health practitioners [*12*], the International Union Against TB and Lung Disease and the World Health Organization have called for campaigns to increase awareness of TB [*14*], and many countries have made it mandatory for health sciences professionals to acquire training in universal precautions [*11*].

This study is the first of its type to be conducted in Oman. It was confined to students from the national university in Oman and it suggested that arts and social science students (operationalized as non-medics) do have an adequate knowledge of TB. Overall, 63% know the correct responses to the items on the questionnaire compared with 71% of those who are working as nurses, laboratory technicians or are medical students (operationalized as medics). If close proximity to an event leads to a better understanding of it [*9*], medics working with TB would be expected to have significantly better understanding than non-medics. The present study supports this idea, as medical professionals generally scored higher than non-medics on 20 out of 28 statements, although some of the differences were not significant.

Globally, TB kills more women than any single cause of maternal mortality [*15*]. As a result, campaigns to reduce the burden of TB have targeted women. In some parts of the world, women's movements are leading the efforts to control TB [*16*]. Little is known of the level of knowledge of TB among Omani women. This study compared men and women

and found, in general, that knowledge of TB was similar. Such a finding is not surprising since recent modernization has helped to equalize access to education in Oman. However, it is not clear whether this finding can be generalized to the rest of the country since the present sample consisted only of educated women attending university. More studies are needed to explore the effect of education and sex on awareness towards health-related matters.

The third aim of the present study was to assess whether awareness varies between medical students and their paramedical counterparts who are nurses and biomedical laboratory technicians. On the whole, medical students showed more accurate knowledge than paramedics. This is not surprising, as medical students were likely to have recently acquired knowledge about TB via their microbiology studies. It is possible that paramedics, being older, would have had their education when TB was viewed as a "conquered" illness.

Previous studies have generally demonstrated that both health care personnel and the general public do harbour negative attitudes toward people with TB and generally showed lack of knowledge [*17*]. Nonetheless, there are a few studies that have compared differences in the awareness of TB. At face value, the students appear to have a reasonable understanding of TB. On the other hand, the results of the present study are surprising because the gap in the knowledge of the 2 groups, "expert" and "non-expert", is very small.

It is important to consider the limitations of the present findings. It is possible that "ceiling" or "floor" effects might have resulted in the small difference between the 2 groups, medics and non-medics. However, assessment of the individual items did not suggest that questions were either too easy or too hard for the 2 groups. For example, it would be expected that only experts would know that a positive Mantoux test does not mean a presence of TB infection. However, a high proportion of the non-medics knew the correct response to statements that only experts would be expected to know. For example, a higher proportion of non-medics (88%) knew that the tuberculin test is not essential to diagnose suspected cases of TB as opposed to only 39% of the medics.

This study suggested that non-health-care professionals do have an adequate knowledge of TB. It is possible that this knowledge was obtained from the many readily available information sources on infectious diseases in Oman. However, the knowledge gap between medical and non-medical groups was low, which suggests that another possible limitation to the study is that the questionnaire did not discriminate between factual knowledge and correct guesses.

Another confounding factor of the present study is the heterogeneity of participants. The medics group comprised those working in a medical setting and included medical students and other paramedics. Such a diverse group might limit the ability to generalize the findings. However, there is a cultural rationale for the grouping, as in the Arab world the general public regards anybody working in the health sector as a "doctor", irrespective of his or her training. This study has operationalized various health professionals or prospective health practitioners as medics in view of the fact that these individuals are potential health care providers in the eyes of the community [*18*].

Similarly, the rationale for choosing a cohort of students needs to be justified. The Sultan Qaboos University, the only state university in the country, draws students from all regions and sub-cultural groupings in Oman. This group of young adults

reflects the population structure of Oman since 70% of the Omani population is aged under 20 years [*19*]. Epidemiological surveys from other parts of the world suggest that this age group is more conducive to health promotion campaigns and the young in a population are effective transmitters of health messages [*20*]. TB predominantly affects a similar age group. In addition, such a cohort constitutes a cadre of the new generation to have grown up during a 2-decade period of immense development in Oman.

Conclusion

If non-experts could be used as a reference for comparison, then this study lends support to the view that health care professionals in Oman have a good basic awareness of TB. However, item-by-item analysis suggests that the gap in the knowledge of TB is small between medic and non-medics. This would suggest that more awareness education is needed in Oman. Although the country has a moderate annual incidence rate of TB, health education is the first line of defence in an era of proliferating and treatment-resistant infectious diseases.

Acknowledgements

The data for this project was part of the baseline survey for the impact evaluation of health promotion initiatives for infectious disease, Sultan Qaboos University (Grant No. IG/MED/MICR/01/01; 20).

References

1. Raviglione MC. The TB epidemic from 1992 to 2002. Tuberculosis, 2002, 83:4–14.
2. Doline PJ, Raviglione MC, Kochi A. Global tuberculosis incidence and mortality during 1990–2000. Bulletin of the World Health Organization, 1994, 72:213–20.
3. Jeffe DB et al. Does clinical experience affect medical students' knowledge, attitudes, and compliance with universal precautions? Infection control and hospital epidemiology, 1998, 19:767–71.
4. Webster C. Tuberculosis. In: Seale C, Pattison S, Davey B, eds. Medical knowledge: doubt and certainty. Buckingham, Open University Press, 2001:54–85.
5. Godfrey-Faussett P, Ayles H. Can we control tuberculosis in high HIV prevalence settings? Tuberculosis, 2003, 83:68–76.
6. Elshafie SS, Rafay AM. Chloramphenicol-resistant typhoid fever: an emerging problem in Oman. Scandinavian journal of infectious diseases, 1992, 24:819–20.
7. Singh J et al. Epidemiology of endemic viral hepatitis in an urban area of India: a retrospective community study in Alwar. Bulletin of the World Health Organization, 1997, 75:463–68.
8. Scrimgeour EM. Scope of infectious and tropical diseases in the Middle East. Acta tropica, 2001, 80:117–8.
9. Al-Adawi S et al. Perception of and attitude towards mental illness in Oman. International journal of social psychiatry, 2002, 48:305–17.
10. Long NH et al. Fear and social isolation as consequences of tuberculosis in Vietnam: a gender analysis. Health policy, 2001, 58:69–81.
11. Diekema DJ et al. Universal precautions training of preclinical students: impact on knowledge, attitudes, and compliance. Preventive medicine, 1995, 24:580–85.
12. Mullan Z. New class of drugs provides hope for future of tuberculosis treatment. Lancet, 2000, 355:2223.

13. Young DB. Ten years of research progress and what's to come. Tuberculosis, 2003, 83:77–81.

14. Broekmans JF et al. European framework for tuberculosis control and elimination in countries with a low incidence. Recommendations of the World Health Organization (WHO), International Union Against Tuberculosis and Lung Disease (IUATLD) and Royal Netherlands Tuberculosis Association (KNCV) Working Group. European journal of respiratory diseases, 2002, 19:765–75.

15. TB advocacy—a practical guide 1999. Geneva, World Health Organization, 1998 (WHO/TB/98.239).

16. Singla N et al. Survey of knowledge, attitudes and practices for tuberculosis among general practitioners in Delhi, India. 1. International journal of tuberculosis and lung disease, 1998, 2:384–9.

17. Kilicaslan Z et al. Evaluation of undergraduate training on tuberculosis at Istanbul Medical School. International journal of tuberculosis and lung disease, 2003, 7:159–64.

18. Underwood H, Underwood Z. New spells for old: expectations and realities of Western medicine in a remote society in Yemen, Arabia. In: Stanley NF, Joske RA, eds. Changing diseases patterns and human behavior. London, Academic Press, 1980. 271–97.

19. United Nations Children's Fund. The state of the world's children 1997. Oxford, Oxford University Press, 1997.

20. Orrett FA, Shurland SM. Knowledge and awareness of tuberculosis among preuniversity students in Trinidad. Journal of community health, 2001, 26:479–85.

Clinical characteristics of pulmonary tuberculosis in adult Pakistani patients with co-existing diabetes mellitus

A. Jabbar,[1] S.F. Hussain[1] and A.A. Khan[1]

الجوانب السريرية للسل الرئوي المترافق بالسكَّري لدى البالغين الباكستانيِّين

عبد الجبار، سيد فياض حسين، عارف أنيس خان

الخلاصة: أجرى الباحثون مراجعة لسجلات جميع مرضى السل الرئوي والسكَّري ممن أدخلوا المستشفى التعليمي في كراتشي، باكستان، خلال فترة 5 سنوات. فوجدا أنه من بين 358 42 مريضاً، كان هناك 173 مصاباً بكلٍّ من السل والسكري معاً، وكان معدل انتشار السل بين السكريين يعادل عشرة أضعاف ما هو عليه لدى غير السكريين، وكان معدل الانتشار يزداد بازدياد مدة الإصابة بالسكري. وقد كان القسم السفلي من الرئتين هو الأكثر إصابةً يتلوه القسم العلوي والمتوسط. كما شوهدت إصابات ثنائية الجانب في نصف المرضى، وترافقت مع انصباب جنبي في ثلث المرضى، وشوهدت الكهوف في 32٪ من الرجال وفي 15٪ من النساء.

ABSTRACT A review was made of the records of all patients with pulmonary tuberculosis and diabetes mellitus admitted over a 5-year period to a teaching hospital in Karachi, Pakistan. Among 42 358 patients, the total number with both tuberculosis and diabetes was 173. The prevalence of tuberculosis in diabetic patients was 10-times higher than in non-diabetic patients and prevalence increased with duration of diabetes. The lower lung field was most frequently involved, followed by the upper and middle. Bilateral involvement was seen in half and an associated pleural effusion in one-third of the patients. Cavitating lesions were seen in 32% of men and 15% of women.

Caractéristiques cliniques de la tuberculose pulmonaire chez des patients adultes pakistanais présentant une comorbidité de diabète sucré

RÉSUMÉ On a procédé à un examen des dossiers de tous les patients atteints de tuberculose pulmonaire et de diabète sucré qui ont été admis dans un hôpital universitaire de Karachi (Pakistan) sur une période de 5 ans. Sur les 42 358 patients, le nombre total de patients atteints à la fois de tuberculose et de diabète s'élevait à 173. La prévalence de la tuberculose chez les patients diabétiques était 10 fois plus élevée que chez les patients non diabétiques et la prévalence augmentait avec la durée du diabète. Le champ pulmonaire inférieur était le plus fréquemment atteint, suivi par le champ supérieur et moyen. On a noté une atteinte bilatérale chez la moitié des patients et un épanchement pleural associé chez un tiers des patients. Des lésions cavitaires ont été observées chez 32 % des hommes et 15 % des femmes.

[1]Department of Medicine, The Aga Khan University Hospital, Karachi, Pakistan (Correspondence to A. Jabbar: abdul.jabbar@akunet.org).

Introduction

Pulmonary tuberculosis (TB) and diabetes mellitus (DM) may coexist frequently, particularly in a population at high risk of acquiring TB. DM has been reported to modify the clinical features of TB. Comparative studies of TB in diabetics have provided conflicting results. In a recent study from Mexico, diabetic patients were older, had more lower lung field lesions and had more multiple cavities [*1*]. In a Turkish study, DM did not affect the presenting features of pulmonary TB and was only associated with more lower lung field disease in females and in older patients [*2*]. Another study from Saudi Arabia showed similar symptoms, radiographic distribution and cavitary disease in diabetic and non-diabetic patients with pulmonary TB [*3*].

Pulmonary TB may adversely affect glycaemic control. TB infection has been shown to produce glucose intolerance that improves or normalizes with anti-TB treatment [*4*]. This association is not specific to TB but is seen in other respiratory infections such as pneumonia [*5*]. Asian patients from the Indian subcontinent have a higher incidence of insulin resistance and associated complications [*6*]. There is little information on whether DM affects the presentation, radiographic manifestations and clinical course of pulmonary TB for Asian patients from the Indian subcontinent.

The aims of this study were to determine whether DM alters the clinical and radiographic manifestations of pulmonary TB in Pakistani patients and to compare the prevalence of TB in hospitalized patients with and without DM.

Methods

The study was a retrospective descriptive study conducted at The Aga Khan University Hospital, a 450-bed teaching hospital in Karachi, Pakistan. The medical records were reviewed for all adult patients (aged 14 years and above) with a diagnosis of both pulmonary TB and DM, admitted from January 1992 to December 1996. Information about demographic data, clinical features, laboratory investigations and outcome of treatment were recorded.

Patients with diabetes were included if they had a previous history of DM and were receiving anti-diabetic therapy at the time of hospital admission or were later found to have 2 or more fasting blood glucose levels greater than 140 mg/dL and started on anti-diabetic treatment. An age- and sex-matched group of non-diabetic patients, who were hospitalized during the same time period, were used as the control group to estimate the prevalence of TB in non-diabetics.

The diagnosis of TB was based on a positive culture or histopathology, a suggestive serosal fluid report or typical radiographic findings with high clinical probability of TB. The data on radiographic findings were collected using the posterior–anterior roentgenograms obtained at the time of diagnosis. In compliance with the usual clinical approach, the upper, mid and lower zones were defined by theoretical horizontal lines passing at the level of the anterior ends of the second and fourth ribs, respectively.

Statistical analysis (including prevalence rates) was performed using *Epi-Info* statistical software, version 6.0. Student's *t*-test or chi-squared test were performed where applicable.

Results

A total of 42 358 patients were admitted to The Aga Khan University Hospital, between 1992 and 1996. The number of patients discharged with a diagnosis of DM was 1458

and with a diagnosis of TB was 691. The total number of patients with both TB and DM were 173. The prevalence of TB in diabetic patients was 173/1458 (11.9%) and in non-diabetic patients was 691/40 900 (1.7%) ($P < 0.5$).

Data on 93 of the 173 patients (56 males, 37 females) with both TB and DM was available for analysis. The clinical characteristics of these patients are presented in Table 1. The majority of the patients (82%) were 40–70 years of age, with only 6% below 40 years and 12% above 70 years of age. The prevalence of TB increased progressively with the duration of DM (Table 1).

The highest prevalence was in those with DM of more than 10 years duration. Most of the patients (80%) required oral hypoglycaemic agents and hence were classified as type 2 diabetics; about 9% required insulin and the remainder were diet-controlled.

Fever was the commonest presenting symptom of TB in this group, being high grade (> 38 ºC) in 55% of patients and of more than 3-months duration in 10% of patients. Positive auscultatory findings on chest examination were found in 84%, with bronchial breathing in 13%. We found 43.0% of lower lobe, 20.3% upper lobe and only 15.0% middle lobe involvement on clinical examination.

Chest radiograph findings are presented in Table 2 for the 77 patients for whom chest X-rays were available (some X-rays were unavailable for analysis as patients had been allowed to take the films). The lower lung fields were most frequently involved, followed by the upper and middle fields. Cavitating lesions were significantly more common in males (32%) than in females (15%). Erythrocyte sedimentation

Table 1 Clinical characteristics of pulmonary tuberculosis (TB) patients with diabetes mellitus (n = 93)

Characteristic	Value	
Patient characteristics		
Male: female ratio	3:2	
Mean (range) age (years)	46.1	(20–90)
Mean (range) duration of diabetes (years)	13.8	(1–17)
	No.	%
Duration of diabetes (years)		
< 2	6	7
2–5	14	15
5–10	26	28
>10	47	51
Family history of tuberculosis		
Yes	10	11
Presenting symptoms of TB		
Fever	67	72
Cough	61	66
Dyspnoea	22	24
Haemoptysis	17	18
Weight loss	8	9

Table 2 Chest radiograph findings in pulmonary tuberculosis patients with diabetes mellitus (n = 77)

Variable	No.	%
Side affected		
Right	31	40
Left	10	13
Bilateral	36	47
Lung field affected		
Upper only	12	18
Middle only	10	15
Lower only	24	36
Upper and middle	9	13
Upper, middle and lower	1	1
Upper and lower	5	7
Middle and lower	6	9
Associated features		
Effusion	25	32
Cavity	20	26
Hilar lymphadenopathy	4	5

rate (ESR) was checked in 61 patients and was < 100 mm/h in only 13 patients. Pleural biopsy was performed in 13/25 patients with pleural effusion and was diagnostic in 11 patients.

The number of patients who died was 10 overall, giving a mortality rate in these 93 patients with DM and TB of 11%. Mortality was not influenced by the radiographic appearance. A high ESR (> 50 mm/h) was associated with a better outcome. The mean ESR for patients who died was 46 mm/h compared with 76 mm/h for patients who were cured.

The outcome of anti-TB therapy was better in type 1 DM, when compared with type 2 DM with early clearance of bacilli and improvement in cavities: after 6 months 5/9 (56%) patients with type 1 DM showed clearance of bacilli compared with 32/84 (40%) patients with type 2 DM.

Discussion

Our study describes the characteristics of pulmonary TB in Pakistani adult diabetics with a diagnosis of both TB and DM. In our hospitalized patients, TB prevalence was 11.9% in patients with DM, 10-times more common than in those without DM. In a large cohort of Korean diabetic patients (over 8000) the relative risk of developing bacteriological confirmed pulmonary TB was 5 times higher in diabetics than in matched controls [*6*]. In a random sample of 100 Indian diabetic patients, TB was diagnosed by a positive sputum result in 6% and by radiological examination in 27% [*7*]. In a 1–7 year follow-up study of 1250 African diabetic patients, 5.4% developed pulmonary TB [*8*]. The prevalence was higher in those with a lower body mass index, in type 1 DM compared with type 2 DM and in those whose diabetes was poorly controlled.

The majority of our patients who developed TB were middle-aged (30–60 years), similar to other studies. In the Indian study, a majority of patients were above 40 years of age [*7*]. In both the Korean [*6*] and Japanese [*9*] studies, the prevalence was particularly high in the age groups 40–50 years compared to the other age groups. In our study, the prevalence of TB increased progressively with duration of diabetes. The highest prevalence was seen in those who had been diagnosed with DM for more than 10 years. Comparative studies of type 1 DM and type 2 DM have shown that the prevalence of type 1 DM was 8-times higher in TB patients than in the general population, whereas the prevalence of type 2 DM was similar [*10*]. TB patients with type 1 DM have a more acute course of TB, rapid progression, and formation of extensive lesions with multiple cavities [*11*]. There was early clearance of bacilli and improvement in cavities in type 1 DM compared with type 2 DM.

The reason for increased susceptibility of diabetics to TB may be multifactorial. Alveolar macrophages play a critical role in eliminating mycobacterial infection in collaboration with lymphocytes. Alveolar macrophages have been found to be less activated in TB patients complicated with DM which may contribute to increased susceptibility [*12*]. In a study of 64 TB patients with DM a higher depression of cellular immunity was evidenced by fewer T lymphocytes and their decreased capacity for blast-cell transformation than those with TB alone [*13*]. Differences in cytokine production have also been observed. Interferon (IFN)-gamma production by CD4+ T-cell was reduced in patients with TB but those with poor diabetic control produced significantly less IFN-gamma than did patients with good diabetic control. In a longitudinal study, IFN-gamma production returned to normal

by 6 months in patients with TB alone and in well controlled diabetic TB patients but remained suppressed in poorly controlled diabetic TB patients [*8*]. Changes in pulmonary vasculature and alveolar oxygen pressure may also be contributory. Histological features of disseminated microangiopathy were observed in the lung preparations of 47 patients with destructive TB and DM [*14*].

The presence of DM does not seem to modify the presenting symptoms of pulmonary TB [*2,3*]. Fever with cough and sputum remain the common presenting features. Tuberculin reaction was found to be similar [*2*]. Data on bacteriological results are variable. Some studies showed no difference in bacteriology results, bacilli negative conversion rate or TB relapse rate in diabetic patients [*14*]. Other studies have shown that in diabetic patients the proportion of smear positive cases was higher, the culture-negative conversion period was longer [*15*], relapse rates were higher [*16*] and TB relapses were frequently associated with resistant strains [*14*]. In a case–control study from New York the relative risk of multi-drug resistant TB was found to be 8.6 (confidence interval, 3.1 to 23.6) in the diabetic group compared with the control group [*17*]. In patients with pulmonary TB, the most common underlying disease was DM [*15*]. In an inner-city cohort, presence of underlying illness (DM, chronic obstructive pulmonary disease, renal failure) and immunosuppression were important predictors of survival for patients with pulmonary TB [*18*].

Upper zone involvement and presence of cavitations are typical features of active pulmonary TB. In patients with DM and other systemic diseases, chest radiograph changes may be atypical. In our study, lower lung field involvement was the most frequent change, with upper and middle changes less common. Bilateral changes were present in half of the patients and an associated effusion was present in one-third. In a comparative study of pulmonary TB patients with and without DM, being a diabetic was found to be the most important factor determining lower lung field lesions [*1*]. In a second study, lower lung field TB was only seen in older diabetic patients (above 40 years) and female sex [*2*]. Other studies have, however, failed to show any differences in localization of TB lesions [*3,19*]. Cavitation was seen in only 26% of our patients. A higher rate of multiple cavitation has been reported in many studies [*1,2,19*] but not in others [*3*]. Among diabetics, patients with type 1 diabetes were found to have more extensive lesions with multiple cavities [*11*].

In conclusion, pulmonary TB may occur more often among patients with diabetics than those without, mostly between 40 and 70 years of age. Fever and cough are the common presenting symptoms. Lower lung field and bilateral or multi-lobar involvement is common. An associated effusion may be present. The mortality rate was 10% but was not associated with a particular radiographic appearance.

References

1. Perez-Guzman C et al. Atypical radiological images of pulmonary tuberculosis in 192 diabetic patients: a comparative study. International journal of tuberculosis and lung disease, 2001, 5(5):455–61.

2. Bacakoglu F et al. Pulmonary tuberculosis in patients with diabetes mellitus. Respiration, 2001, 68(6):595–600.

3. Al Wabel AH et al. Symptomatology and chest roentgenographic changes of pulmonary tuberculosis among diabetics. East African medical journal, 1997, 74(2):62–4.

4. Jawad F et al. Glucose intolerance in pulmonary tuberculosis. Journal of the Pakistan Medical Association, 1995, 45(9):237–8.

5. Basoglu OK et al. The oral glucose tolerance test in patients with respiratory infections. Monaldi archives for chest diseases, 1999, 54(4):307–10.

6. Kim HJ et al. Ambulatory treatment of multidrug-resistant pulmonary tuberculosis patients at a chest clinic. International journal of tuberculosis and lung diseases, 2001, 5(12):1129–36.

7. Ezung T et al. Pulmonary tuberculosis and diabetes mellitus––a study. Journal of the Indian Medical Association, 2002, 100(6):376–9.

8. Tsukaguchi K et al. [Longitudinal assessment of IFN-gamma production in patients with pulmonary tuberculosis complicated with diabetes mellitus]. Kekkaku, 2002, 77(5):409–13 [in Japanese].

9. Yamagishi F et al. [Prevalence of coexisting diabetes mellitus among patients with active pulmonary tuberculosis]. Kekkaku, 1996, 71(10):569–72 [in Japanese].

10. Chukanova VP et al. [Epidemiological and immunogenetic analysis of tuberculosis and diabetes mellitus association]. Problemy tuberkuleza, 2000, 4:11–4 [in Russian].

11. Kossii I et al. [Pulmonary tuberculosis in patients with different types of diabetes mellitus]. Problemy tuberkuleza, 2002, 5:21–4 [in Russian].

12. Wang CH et al. Hypodense alveolar macrophages in patients with diabetes mellitus and active pulmonary tuberculosis. Tuberculosis and lung diseases, 1999, 79(4):235–42.

13. Karachunskii MA, Komliakova EG, Pospelov LE. [Specific features of pulmonary tuberculosis course in patients with insulin-dependent diabetes mellitus in relation to a varying HLA phenotype]. Problemy tuberkuleza, 1997, 5:23–5 [in Russian].

14. Kameda K, Kawabata S. [The chemotherapy of pulmonary tuberculosis complicated by diabetes mellitus]. Kekkaku, 1986, 61(8):413–23 [in Japanese].

15. Tamura M et al. [A study on relation between active pulmonary tuberculosis and underlying diseases]. Kekkaku, 2001, 76(9):619–24 [in Japanese].

16. Wada M. [The effectiveness of pyrazinamide-containing six-month short course chemotherapy]. Kekkaku, 2000, 75(11):665–73 [in Japanese].

17. Bashar M et al. Increased incidence of multidrug-resistant tuberculosis in diabetic patients on the Bellevue Chest Service, 1987 to 1997. Chest, 2001, 120(5):1514–9.

18. Oursler KK et al. Survival of patients with pulmonary tuberculosis: clinical and molecular epidemiologic factors. Clinical infectious diseases, 2002, 34(6):752–9.

19. Ikezoe J et al. CT appearance of pulmonary tuberculosis in diabetic and immunocompromised patients: comparison with patients who had no underlying disease. American journal of roentgenology, 1992, 159(6):1175–9.

Seroprevalence of hepatitis B in Nahavand, Islamic Republic of Iran

A.H.M. Alizadeh,[1] M. Ranjbar,[2] S. Ansari,[1] A. MirArab,[2] S.M. Alavian,[3] K. Mohammad,[4] P. Adibi,[5] GhH. Sadri,[2] F. Keramat,[2] A. Ardalan,[1] M.Arabi[1], S. Gharekhani,[2] A. Ataei,[2] GhR. Amraei,[2] M. Hosseinzadeh,[2] S. Hatami[2] and M. Zali[1]

معدل الانتشار المصلي لالتهاب الكبد البائي في نهاوند، جمهورية إيران الإسلامية

أمير هوشنك محمد عليزاده، ميترا رنجبر، شاهين أنصاري، أكبر مير عرب، سيد مؤيد علويان، كاظم محمد، بيمان أديبي، غلا محسين صدري، فريبا كرامت، علي أردلان، مهدي أعرابي، شاهين قاره خاني، علي عطايي، غلا مرضا امرايي، محمد حسين زاده، سعيد حاتمي، محمد رضا زالي

الخلاصة: قام الباحثون بتحديد معدل الانتشار المصلي لالتهاب الكبد البائي في نهاوند في عيِّنة ضمت 1824 شخصاً فوق سن الخامسة في عام 2002. وأُجريت لقاءات شخصية معهم كما أخذت عينات دم منهم. وتم تقييم الترابط بين عوامل الاختطار وبين التهاب الكبد البائي باستخدام التحوُّف اللوجيستي. ووجد أن معدل انتشار الحالات الإيجابية لمستضد التهاب الكبد G هو 2.3٪؛ وتم استفراد الضد اللبي لالتهاب الكبد البائي لدى 11.6٪ من المشاركين والضد السطحي لدى 7.8٪. وكان 11.9 من المشاركين إيجابيين لكلا الضدَّيْن السطحي واللبي. وتبيَّن أن سابقة إجراء عملية جراحية أو التواجد في السجون تمثِّل أهم عوامل اختطار العدوى بنسبة أرجحية 2.14 (95٪ فترة الثقة 1.22 — 3.05) للأولى و3.5 (95٪ فترة الثقة 1.68 — 5.4) للثنائية.

ABSTRACT We determined the seroprevalence of hepatitis B in Nahavand in a sample of 1824 subjects > 5 years in 2002. Face-to-face interviews were conducted and blood samples taken. The association between risk factor and hepatitis B was assessed using logistic regression. The prevalence of HBsAg positive cases was 2.3%, and HBcAb and HBsAb were isolated in 7.8% and 11.6% of the participants respectively; 11.9% were positive for both HBcAb and HBsAb. History of surgery and imprisonment were the major risk factors for infection with odds ratios of 2.14 (95% CI: 1.22–3.05) and 3.57 (95% CI: 1.68–5.4) respectively.

Séroprévalence de l'hépatite B à Nahavand (République islamique d'Iran)
RÉSUMÉ Nous avons déterminé la séroprévalence de l'hépatite B à Nahavand dans un échantillon de 1824 sujets âgés de plus de 5 ans en 2002. Des entretiens face à face ont été menés et des prélèvements sanguins ont été effectués. L'association entre le facteur de risque et l'hépatite B a été évaluée au moyen de la régression logistique. La prévalence des cas Ag HBs positifs était de 2,3 % ; des anticorps anti-HBc et des anticorps anti-HBs ont été isolés chez 7,8 % et 11,6 % des participants respectivement ; 11,9 % étaient positifs à la fois pour les anticorps anti-HBc et les anticorps anti-HBs. Des antécédents de chirurgie et d'emprisonnement étaient les principaux facteurs de risque d'infection, avec un odds ratio de 2,14 (IC 95 % : 1,22 - 3,05) et 3,57 % (IC 95 % : 1,68 - 5,4) respectivement.

[1]Research Centre of Gastroenterology and Liver Diseases, Shaheed Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran (Correspondence to A.H.M. Alizadeh: ahmaliver@yahoo.com).
[2]Hamedan University of Medical Sciences, Hamedan, Islamic Republic of Iran.
[3]Baghiataleh University of Medical Sciences, Tehran, Islamic Republic of Iran.
[4]Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran.
[5]Isfahan University of Medical Sciences, Isfahan, Islamic Republic of Iran.
Received: 19/05/04; accepted: 11/01/05

Introduction

The prevalence of hepatitis B worldwide is 5%, which makes it one of the most prevalent infectious diseases. It is estimated that 400 million people in the world are carriers of hepatitis B virus (HBV) with 75% to 80% living in Asia and Eastern Europe [*1*]. Middle East countries have an intermediate prevalence with 2%–7% infection in the general population and a 20%–60% lifetime risk of infection. Chronic hepatitis B accounts for about 1 million deaths each year and is a major risk factor for cirrhosis and hepatocellular carcinoma [*1,2*].

In an epidemiological study in the Islamic Republic of Iran, hepatitis B prevalence has been reported to be as low as 1.07% in Shiraz to as high as 8.96% (in Toicerkan). The prevalence in provinces ranges from 1.7% in Fars to 5% in Sistan-o-Baluchestan. In Tehran 3.6% of men and 1.6% of women were reported to be hepatitis B surface antigen (HBsAg) positive [*3*].

The main route of HBV transmission, like hepatitis C virus (HCV) and human immunodeficiency virus (HIV) is via blood and blood products. In hyperendemic regions in the world vertical transmission from mother to newborn infant and horizontal transmission among children play an important role in intra-familial transmission of HBV [*4–6*]. In North America and Western Europe, however, the main route of transmission is intimate sexual contact [*1*]. Needle-stick injuries in health personnel, haemodialysis, shared needles in drug abusers, dental surgery, receiving blood or blood products, blood letting, ear and nose piercing practices, tattooing, and contact with body fluid or mucosa of HBV carriers (e.g. workers in clinical laboratories) have been associated with increased risk of transmission [*1*].

In the Islamic Republic of Iran, 46% of patients with hepatocellular carcinoma and 51% of those with cirrhosis are reported to be HBsAg positive [*7*]. HBV is also recognized as the most frequent cause (70%–80%) of chronic hepatitis in the country.

Of all measures to control the disease in the Islamic Republic of Iran, vaccination of all newborns from 1993 onwards has been the most significant. In order to devise any further measures to control this disease more exact epidemiological information is required.

There has been no definitive study about prevalence of hepatitis B in the city of Nahavand in Hamedan province in the western part of the Islamic republic of Iran. Therefore, in this study, we aimed to determine the prevalence of hepatitis B in Nahavand and its associated risk factors.

Methods

This cross-sectional study was conducted during a 2-month period (February–March 2003) on people aged 6 years and over in the city of Nahavand (72 000 population). We used lot quality assurance sampling (LQAS) to select individuals from the general population of Nahavand. Of the 6 urban areas from the health administrative system map in Nahavand, 5 (amounting to over 61 000 people) were included in the study and 1824 participants were recruited through systematic random sampling (approximately 365 participants in each area as a stratum) [*8*]. The area excluded covered mostly suburban populations. Based on data extracted from the 1999 census registry, the number of potential candidates and their contact address and phone numbers were determined by the family health official of each health care centre.

A questionnaire including demographic and socioeconomic data and risk factors of hepatitis B was developed by gastroenterol-

ogists and epidemiologists at the Research Centre. After taking the approval of health authorities of the city and the city council, training of data collection teams and directors of health care centres was held to train them on conducting the interview, filling the questionnaire and blood sampling.

The selected participants were contacted and interviewed at their homes. If the chosen family was not available due to change of address, refusal or some other reason, another family was selected to replace them using the same sampling procedure. Every participant signed an informed consent form before the interview. For those between 5 and 15 years the consent form was signed by one of the parents. The blood samples and completed questionnaires were gathered at the end of each day. The serum samples were sent to the Research Centre in Tehran to be assessed for hepatitis B serologic markers.

The virologic markers of hepatitis B were measured. HBsAg detection was carried out with a DiaSorin kit (No. 0370790/1A) (DiaSorin, Saluggia, Italy) through sandwiched enzyme-linked immunosorbent assay (ELISA). Levels of antibodies to hepatitis B surface antigen (HBsAb) and hepatitis B core antigen (HBcAb) were measured by DiaSorin kit (No. 9230320/A) through sandwiched non-competitive ELISA and DiaSorin kit (No. 8540480/1B) through competitive ELISA respectively. Hepatitis Be antigen (HBeAg) detection was carried out with a DiaSorin kit (No. 3120128) through sandwiched non-competitive ELISA. HBsAb titres over 10 U/mL were considered positive.

All data were analysed with *SPSS*, version 11. Bivariate and multivariate associations of seropositivity (as binary dependent variable) with other independent variables were examined by logistic regression model, and odds ratios (OR) and corresponding 95% confidence intervals (CI) were calculated.

Results

Of all the selected individuals, 85 (4.6%) did not participate due to change of address or refusal, and were replaced by others who were eligible. The total number of participants over 5 years in the chosen families was 7682. As regards sex, 1025 (56.2%) of the participants were male and 799 (43.8%) were female. Mean age (standard deviation) was 34.8 (SD 19.6) years, range 6–93 years. The age distribution of the participants is shown in Figure 1. The most frequent age group was 15–20 years. The age distribution of our sample was compared with that of the Health Surveillance Study carried out in April 1998 to March 1999 by the National Centre for Medical Research for the whole country [*7*] (Figure 2).

As regards demographic data, 1005 (55.1%) of the participants were married. The mean size of households was 4.8 (SD 1.9) members, range 1–13 members. The mean number of members over 5 years of age per family was 4.2 (SD 1.9).

The frequency distribution of hepatitis B serological markers in the study participants is shown in Table 1. Of the 1824 participants, 42 (2.3%) were positive for HBsAg. Only 2 of these 42 (4.8%) were aware of having hepatitis B before the results of blood sample tests were revealed. Of the 42 HBsAg positive participants, 4 (9.5%) were also HBeAg positive, indicating wild type condition in these subjects. Among the sample, 13 (7.8%) were positive for HBcAb and 211 (11.6%) were positive for HBsAb; 217 (11.9%) were positive for both HBsAb and HBcAb.

Age frequency distribution of participants with hepatitis B showed that the fre-

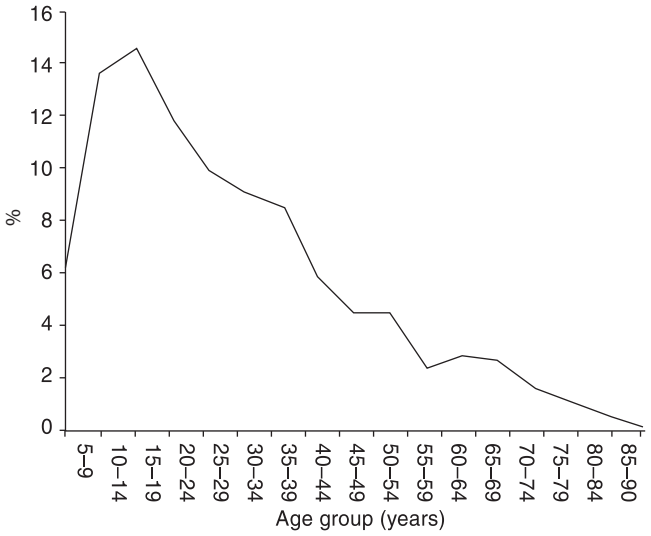


Figure 1 Age distribution of the participants of the Nahavand study (n = 1824)

quency of the disease increased with age with age groups of 55–59 years and 80–84 years having the highest rates of the disease. The disease was not observed in 5–9-year-old participants (Figure 3).

Logistic regression analysis was used to find the risk factors most strongly associated with the disease (Table 2). History of surgery and imprisonment had the greatest risk with OR of 2.14 and 3.57 respectively.

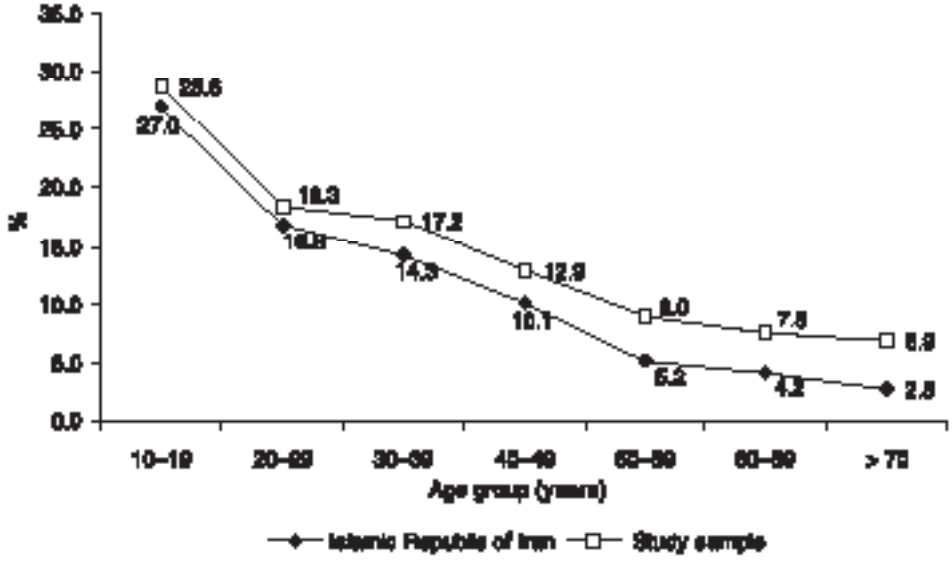


Figure 2 Age distribution of the participants compared with that of the Health Surveillance Study [7]

Table 1 Frequency distribution of hepatitis B serologic markers among the participants of the Nahavand study by demographic variables (n = 1824)

	Positive for HBsAg	Positive for isolated HBcAb	Positive for isolated HBsAb	Positive for HBcAb & HBsAb
No. (%)	42 (2.3)	143 (7.8)	212 (11.6)	217 (11.9)
% male	54.8	44.1	41.5	53.9
Mean age (SD) (years)	40.2 (18)	55.2 (16)	37.3 (22)	52.8 (17)
% married	66.7	71.3	51.4	80.2

SD = standard deviation.

Of all the participants, 5 had thalassaemia major, 6 had renal failure and were undergoing haemodialysis, 2 had haemophilia and 16 had diabetes. However, of these, only 1 diabetic patient had hepatitis B. Being affected with these diseases was not considered in the regression analysis of risk factors to allow a more exact calculation of attributable risk.

Figure 4 shows the proportion of study participants positive for HBsAb according to age group. In the 5–9 years age group, only 33.6% of the subjects had an acceptable level of HBsAb. The proportion of individuals with adequate HBsAb levels increased with age.

Figure 5 shows the proportion of participants positive for HBcAb according to

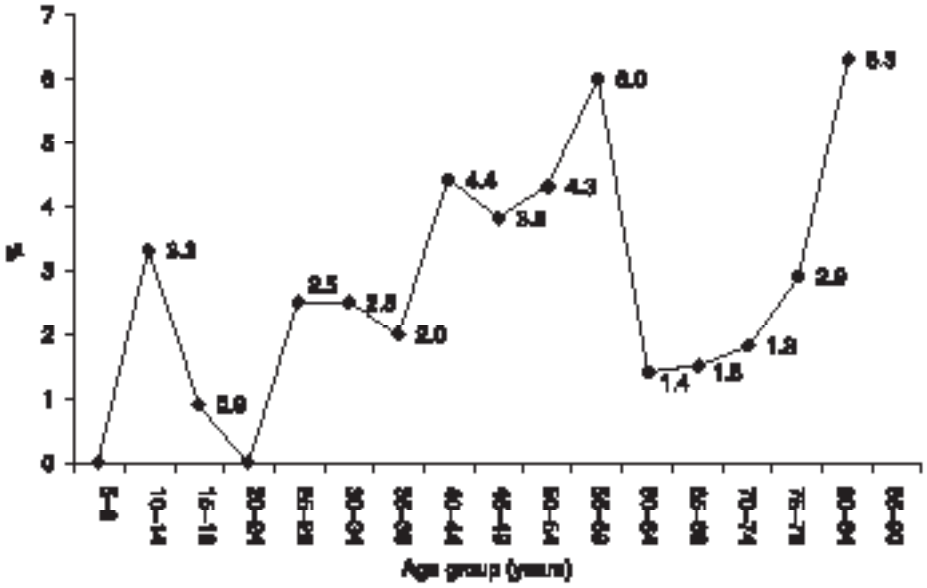


Figure 3 Distribution of HBsAg positive cases among participants according to age group

Table 2 Logistic regression analysis of risk factors for hepatitis B in the study sample

Variable	ββ coefficient	Odds ratio	Confidence interval	P-value
Sex	0.53	1.71	0.820–2.950	0.1
Age	0.022	1.022	0.900–1.040	0.01
Blood transfusion	0.656	1.92	0.870–3.040	0.399
Tattoo	0.55	1.74	0.930–2.100	0.99
Cupping	–0.28	0.75	0.490–1.510	0.57
Outpatient surgery	0.231	1.26	0.750–1.690	0.54
Smoking	–0.57	0.56	0.300–1.020	0.311
High-risk job	–0.435	0.013	0.003–0.027	0.74
History of jaundice	–0.07	0.92	0.840–1.120	0.94
History of hospitalization	–1.74	0.17	0.006–0.032	0.01
Surgery	1.27	3.57	1.680–5.400	0.062
History of imprisonment	0.76	2.14	1.220–3.050	0.32
History of liver disease in family	0.53	1.71	0.970–2.360	0.21

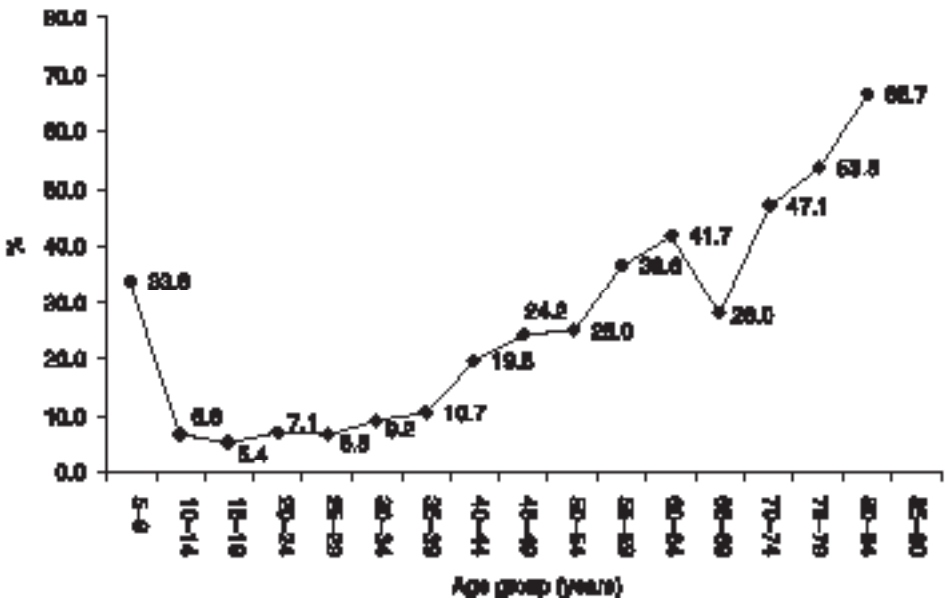


Figure 4 Proportion of subjects positive for HBsAb according to age group

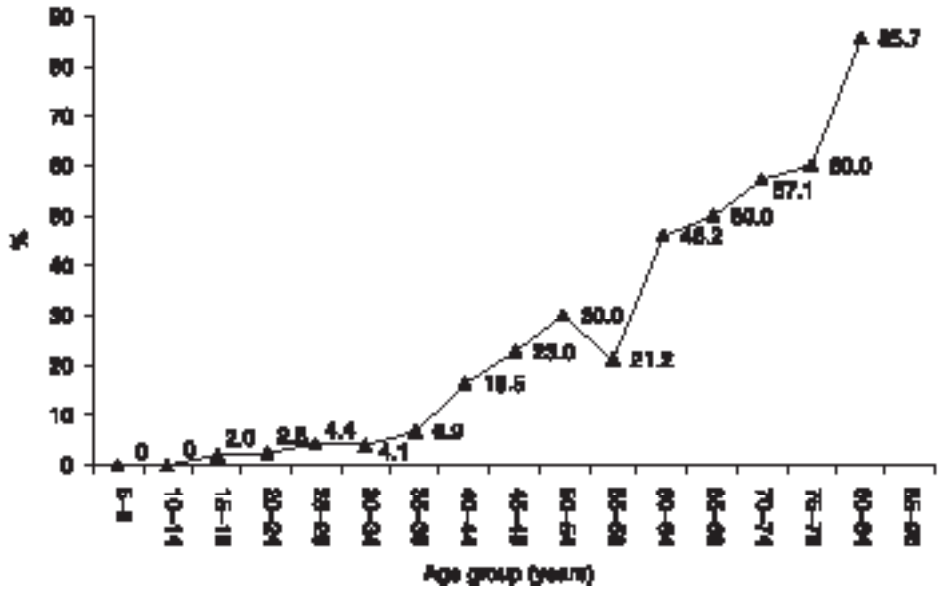


Figure 5 Proportion of subjects positive for HBcAb according to age group

age group. This group represents those who were still affected by the disease. The proportion of participants positive for HBcAb increased with age.

Standardized morbidity rate (SMR) for hepatitis B was 1.3 (95% CI: 0.81–1.53).

Discussion

A comparison of age frequency distribution of the sample and that of National Health Surveillance [*7*] showed no significant difference which suggests the sample was representative of the respective society.

The prevalence of HBsAg among our sample in Nahavand was 2.3%. Comparing this with national norms of hepatitis B prevalence [*7*] showed that the standardized morbidity rate (SMR) was 1.3 (95% CI: 0.81–1.53). Based on the calculated SMR and respective CI, there was no significant difference between the prevalence of hepatitis B in Nahavand and national norms.

In a study in 1989 in Hamedan province, 4930 people (1649 men and 3281 women) were tested for hepatitis B risk factors and markers and 3.49% were found HBsAg positive [*9*]. Of those with HBsAg, 13.8% were also HBcAg positive. The lowest prevalence was observed in children and young adults under 19 years and in those over 60 years. There was no difference between men and women. This study suggested that horizontal transmission of the disease may be the major form of transmission in children and young adults [*9*]. In our study, the frequency of HBeAg positive cases was 9.5%, clearly lower than that reported by other studies [*10,11*].

In a study on 11 455 blood donor medical records at a blood transfusion organization of Hamedan in 1995–1996, 1.9% of donors were HBsAg positive [*10*]. The highest rates (8.69%) were reported from Toicerkan and the lowest from Gharveh (1.3%) and Hamedan (1.36%). The lowest rate

(0.96%) was observed in 58–68 years age group. In another study of 104 236 blood donor records in Hamedan in 1981–1993 (12 years), the overall HBsAg prevalence was 2.96%. Of the HBsAg positive cases, 164 were examined for HBeAg and HBeAb with 82.3% HBeAb positive, 11% HBeAg positive and 6.7% positive for both markers. The disease was most prevalent in farmers, with Nahavand having the highest rate in Hamedan province [*11*]. In a recent study in Khorasan province, hepatitis B prevalence was 3.6% [*12*].

In other countries variable prevalence rates of hepatitis B have been reported [*13–16*]. A study in Bangkok reported a prevalence of 4.6% for HBsAg positive cases with 20% also being positive for HBeAg [*14*]. Croatia has less than 2% of HBsAg carriers in the general population [*15*] and a study in Pakistan revealed 2.56% of individuals in the general population were positive for HBsAg [*16*].

Our results show that there were no cases of hepatitis B in the 5–9 years age group. This suggests that the national vaccination programme has reduced the hepatitis B prevalence, so improving the coverage of vaccination seems necessary. The fact that the rate of HBsAg positive cases increased with age, suggests the critical role of horizontal transmission.

The results of our study show a lower prevalence for hepatitis B in Nahavand than previously reported [*10,11*]. It is important to note that in the previous studies, the prevalence of hepatitis B was assessed in blood donors who may not be representative of the community. However, in our study the sample was representative of the community.

HBsAb was isolated in 11.6% of our participants, which is likely to be the result of hepatitis B vaccination. A study in 1989 found HBsAb and HBcAb prevalence rates in Hamedan of 18.09% and 5.13% respectively [*9*], which are different from our results. The differences could be due to the different times of these studies, different locations and differences in compliance with vaccination.

As regards vaccination status, 44% of the participants reported previous vaccination and 30% were not aware of their vaccination status. HBV vaccination of all newborns began 10 years before our study. So, the subjects under 10 years old must have received HBV vaccine through the national immunization programme. Given the 95% coverage of hepatitis B vaccination and 33.6% prevalence of isolated HBsAb in the 5–9 years age group, the antibody response in children seems inconsistent. A booster dose of hepatitis B vaccine should, therefore, be carefully evaluated. A number of studies have reported antibody response rates. Goldenberg et al. reported a lack of response in up to 14% of adults [*17*]. In another study on 1–3-year-old Turkish children, 96.7% had an antibody titre of more than 10 U/mL [*18*].

In our study, 11.9% of the participants were positive for both HBcAb and HBsAb. In a study carried out on 1000 blood donors in Brazil in 2003, 120 had HBcAb; 10 (8.3%) of whom also had HBsAg [*19*]. All the individuals with HBcAb were positive for HBV DNA, confirmed by polymerase chain reaction (PCR); 2 had HBsAb [*19*]. In a German study, HBcAb and HBsAb were detected in 1.5% of HBsAg-negative cases; HBV DNA was confirmed by PCR [*20*]. In another study of Chinese blood donors, no cases of HBV DNA were detected in individuals positive for HBsAb and HBcAb [*21*]. In a study on 9006 Swiss women, 1.2% had HBcAb and 5.1% had both HBcAb and HBsAb [*22*]. This is lower than our results.

A history of imprisonment and surgery had the highest attributable risks for hepati-

tis B infection. In the study on blood donors of Hamedan, a history of surgery had the greatest risk (OR = 3.11) for hepatitis B [*10*]. The risk factors identified in our study are similar to studies carried out in other countries [*23*].

Nahavand can be classified intermediate in terms of HBsAg prevalence in its population. Given the result of this study, public health education and vaccination programmes should be continued progressively. We recommend further investigation into the relation between surgery and increased risk of hepatitis B to find effective intervention for reducing the risk of hepatitis B transmission.

References

1. Nair S, Perillo RP. Hepatitis B and D. In: Zakim D, Boyer TD, eds. Hepatology, 4th ed. Philadelphia, WB Saunders, 2003:959–1016.
2. Alter M. Epidemiology of hepatitis B infection in the Western Pacific and South-East Asia. Gut, 1976, 38(suppl. 2):S18–23.
3. Zali MR et al. Epidemiology of hepatitis B in the Islamic Republic of Iran. Eastern Mediterranean health journal, 1996, 2(2):290–8.
4. Joshi N, Yr NK, Kumar B. Age-related seroprevalence of antibodies to hepatitis A virus in Hyderabad, India. Tropical gastroenterology, 2000, 21(2):63–5.
5. Werner GT, Frosner GG, Fresenius K. Prevalence of serological hepatitis A and B markers in a rural area of northern Zaire. American journal of tropical medicine and hygiene, 1985, 34:620–4.
6. Lionis C et al. Prevalence of hepatitis A, B and C markers in school children of a rural area of Crete, Greece. European journal of epidemiology, 1997, 13:417–20.
7. Iran's health and disease surveillance report, 2001. Tehran, National Medical Research Centre, 2001 [In Farsi].
8. Levy PS, Lemeshow S. Selected topics in sample design and estimation methodology. In: Levy PS, Lemeshow S, eds. Sampling of population: Methods and applications, 3rd ed. New York, John Wiley & Sons, 1999:427–30.
9. Amini S et al. Seroepidemiology of hepatitis B, delta and human immunodeficiency virus infections in Hamadan province, Iran: a population-based study. Journal of tropical medicine and hygiene, 1993, 96(5):277–87.
10. Saboori Ghanad M, Ghasemi G. [Frequency distribution of HBsAg in Hamedan province blood donors, February to December 1995.] Journal of Hamedan University of Medical Sciences and Health Services, 1997, 4(2):76–81 [In Farsi].
11. Mojtahedzadeh SM et al. [Prevalence of HBsAg and VDRL positive cases in Hamedan province blood donors.] Journal of research in medicine, Shaheed Beheshti University of Medical Sciences, 1995, (3,4):74 [In Farsi].
12. Farhat A, Khademi G, Mazouman SJ. The prevalence of hepatitis B carrier state in Khorasan province of Iran. Saudi medical journal, 2003, 24(5):549–51.
13. Hernandez MT et al. Hepatitis B prevalence in young women living in low-income areas: the population-based San Francisco Bay area's Young Women's Survey. Sexually transmitted diseases, 2000, 27(9):539–44.
14. Luksamijarulkul P, Maneesri P, Kittigul L. Hepatitis B seroprevalence and risk factors among school-age children in a low socioeconomic community, Bangkok. Asia-Pacific journal of public health, 1995, 8(3):158–61.

15. Lesnikar V. Epidemiology of hepatitis B and C in Croatia. Acta medica Croatica, 2005, 59(5):377–81.

16. Khokhar N, Gill ML, Malik GJ. General seroprevalence of hepatitis C and hepatitis B virus infections in population. Journal of the College of Physicians and Surgeons—Pakistan, 2004, 14(9):534–6.

17. Goldenberg R et al. Antibody titers to hepatitis B surface antigen among vaccinated emergency physicians: three years' experience with a wellness booth. Annals of emergency medicine, 1999, 33(2):156–9.

18. Karaoglu L et al. Evaluation of the immune response to hepatitis B vaccination in children aged 1–3 years in Malatya, Turkey. New microbiologica, 2003, 26(4):311–9.

19. Arraes LC et al. The biological meaning of anti-HBC positive result in blood donors: relation to HBV-DNA and to other serological markers. Revista do Instituto de Medicina Tropical de São Paulo, 2003, 45(3):137–40.

20. Hennig H et al. Frequency and load of hepatitis B virus DNA in first-time blood donors with antibodies to hepatitis B core antigen. Blood, 2002, 100(7):2637–41.

21. Ren F, Li H, Zhao H. Studies on hepatitis B virus infection in blood donors with positive anti-HBc and negative HBsAg. Zhonghua Yu Fang Yi Xue Za Zhil, 1998, 32(1):7–9.

22. Bart PA et al. Seroprevalence of HBV (anti-HBc, HBsAg and anti-HBs) and HDV infections among 9006 women at delivery. Liver, 1996, 16(2):110–6.

23. Beier FJ. Risk of endangering patients by hepatitis B infected surgeons: monitoring the health of medical personnel in hospitals must be evaluated. Gesundheitswesen, 2000, 62(2):64–70.

Connaissances sur les virus des hépatites B et C et le VIH chez des donneurs de sang à Casablanca

H. Boutayeb,[1] A. Aamoum[1] et N. Benchemsi[1]

معارف المتبرعين بالدم حول فيروسَيْ التهاب الكبد « بي » و« سي » في الدار البيضاء

هدى بو طيِّب، عبد اللطيف أعموم، نفيسة بن شمسي

الخلاصة: أُجري مسح في مركز نقل الدم الإقليمي في الدار البيضاء خلال المدة من شباط/فبراير إلى أيار/مايو 2002. وتم إعطاء استبيان لنحو 1750 متطوِّعاً بالدم من مختلف فئات المجتمع بُغْيَة تقييم معارف الجمهور حول التهاب الكبد« بي » و«سي» وفيروسات العَوَز المناعي البشري. ودلَّت الإجابات المقدَّمة على معرفة الجمهور بآليات سراية فيروس الإيدز: فقد أعطى 85٪ إجابات صحيحة. أما معدل الدراية بفيروسَيْ التهاب الكبد « بي » و« سي » فهو أقل حيث كان 60٪ من الإجابات عن فيروس التهاب الكبد « بي » و54٪ من الإجابات عن فيروس التهاب الكبد « سي » صحيحة. وتدلُّ هذه الدراسة على أهمية توعية الجمهور بسراية فيروسَيْ الكبد « بي » و« سي » بشكل أفضل.

RÉSUMÉ Une enquête a été réalisée au niveau du Centre régional de Transfusion sanguine de Casablanca de février à mai 2002 auprès de 1750 donneurs de sang. Un questionnaire a été soumis à chaque donneur de sang. Son objectif était d'évaluer les connaissances sur les modes de transmission des virus des hépatites B et C et de l'immunodéficience humaine. Les modes de transmission du VIH semblent mieux connus que ceux de l'hépatite B avec respectivement 85 % et 60 % de réponses justes. Les modes de transmission du virus de l'hépatite C sont les moins bien connus avec 54 % de réponses exactes, et ce même au sein des groupes informés comme le personnel paramédical et les étudiants en médecine. Des efforts doivent être faits en matière d'information sur les modes de transmission des virus des hépatites B et C pour une meilleure prévention.

Knowledge about hepatitis B and C viruses and HIV among blood donors in Casablanca

ABSTRACT A survey was conducted in the Casablanca Regional Blood Transfusion Centre from February to May 2002. A questionnaire was given to 1750 blood donors from different groups of society to asses the knowledge of the public about hepatitis B and C and human immunodeficiency viruses. The responses indicated that the mechanism of HIV transmission was well known to the public: 85% gave correct answers. Hepatitis B and hepatitis C viruses were less well understood: 60% and 54% gave correct answers respectively. Our study suggests that the public needs to be better informed about hepatitis B and C virus transmission.

[1]Centre régional de Transfusion sanguine (Maroc) (Correspondance à adresser à H. Boutayeb : drboutayebh@yahoo.fr ; khairhouda@caramail.com).

Reçu : 26/12/04 ; accepté : 04/04/05

Introduction

Les hépatites B et C, ainsi que le SIDA, constituent un nouvel enjeu de santé publique de par l'importance du nombre des personnes contaminées, la gravité des formes évolutives de l'infection et le coût élevé de la prise en charge des patients. En effet, on estime à 2 milliards le nombre de personnes infectées par le virus de l'hépatite B (VHB), dont plus de 350 millions deviennent des porteurs chroniques, et à 170 millions le nombre de porteurs chroniques du virus de l'hépatite C (VHC) avec 3 à 4 millions de nouveaux cas infectés chaque année [*1,2*]. Par ailleurs, d'après le rapport du Programme commun des Nations Unies sur le VIH/SIDA et de l'Organisation mondiale de la Santé en 2004, 39,4 millions de personnes vivent aujourd'hui avec le virus de l'immunodéficience humaine (VIH) [*3*].

Au Maroc, les taux élevés d'analphabétisation et de pauvreté représentent une des causes majeures de l'augmentation de l'incidence de ces affections du fait de l'ignorance des modes de transmission et de prévention de ces virus par la population marocaine. Ainsi, et selon les données du Centre régional de Transfusion sanguine de Casablanca (CRTS), l'incidence des hépatites B et C et du SIDA était respectivement de 2,4 % , 0,54 % et 0,06 % en 2002.
Ce travail se propose d'évaluer l'état des connaissances de la population marocaine de différents niveaux d'instruction concernant les causes, les modes de transmission, les manifestations cliniques ainsi que les moyens thérapeutiques et préventifs de ces affections afin de cerner la nécessité d'informer, et si besoin est, le type d'information à donner.

Méthodes

L'enquête a été réalisée au Centre régional de Transfusion sanguine de Casablanca de février à mai 2002. Un questionnaire a été distribué lors des collectes mobiles de sang ou dans la salle de prélèvement du CRTS à 2000 donneurs de sang.

Le choix de la taille de l'échantillon étudié a été basé sur le désir d'inclure des groupes de niveaux d'instruction différents et de taille statistiquement interprétable.

Un questionnaire a été établi par les médecins du CRTS. Il teste les connaissances concernant les modes de transmission des virus des hépatites B et C et du VIH, et les possibilités de prévention et de traitement de ces maladies. Il a été tiré en 2000 exemplaires. Mille questionnaires ont été rédigés en arabe et 1000 en français. Les questions étaient courtes et simples sous forme de questions à choix multiples. Les réponses ont également été rédigées en arabe et en français, sur une feuille à part, et ont été distribuées à chaque participant après qu'il ait répondu au questionnaire, l'objectif étant également de donner une information si nécessaire.

Les formulaires ont été distribués à 2000 personnes par un médecin ou un assistant social lors des collectes de sang. Pour le groupe des lycéens dont l'âge ne permettait pas un don de sang, le questionnaire a été distribué dans les classes. Pour les sujets analphabètes, le formulaire a été lu et rempli par un médecin ; pour les autres, il a été remis et rempli avant le don de sang par chaque donneur de sang.

L'analyse des questionnaires a été faite par le médecin responsable de l'enquête.

Résultats

Après étude des 2000 questionnaires, seuls 1750 ont pu être exploités, avec un taux de compliance de 87,5 %. L'âge moyen était de 27 ans pour tous les groupes confondus, avec des extrêmes allant de 16 à 38,5 ans (Tableau 1).

Après analyse des dossiers, les participants ont été répartis en 8 groupes selon leur niveau d'instruction et/ou leur profession.

- Groupe 1 : lycéens du lycée Moulay Abdellah de Casablanca (n = 100)
- Groupe 2 : étudiants en 1re année à la faculté de médecine de Casablanca (n = 200)
- Groupe 3 : étudiants en 5e année à la faculté de médecine de Casablanca (n = 150)
- Groupe 4 : étudiants des différentes facultés de droit, d'économie et des sciences-techniques de l'université Hassan II de Casablanca (n = 450)
- Groupe 5 : ouvriers (n = 100)
- Groupe 6 : cadres (n = 100)
- Groupe 7 : techniciens de laboratoire et infirmiers du Centre hospitalier universitaire Ibn Rochd de Casablanca (n = 100)
- Groupe 8 : donneurs de sang, volontaires ou parents de malades, se présentant au CRTS de Casablanca (n = 550).

Sur les 7 questions posées sur les modes de transmission du VIH, 85 % des réponses étaient exactes. Les transmissions sexuelle et materno-fœtale de la maladie étaient connues de la majorité des groupes. La notion de contamination par piqûre de moustique, dans les toilettes publiques ou en buvant dans le verre d'une personne contaminée existait chez 14 % des participants, dont 24 % étaient des étudiants en première année de médecine, 7 % des étudiants en cinquième année et 10 % du personnel de santé (Tableau 2). Les moyens de prévention étaient connus et la nécessité d'isoler le malade était notée chez 83 % des lycéens, 10 % des étudiants en médecine en 5e année et 15 % du personnel paramédical (Tableau 2). L'absence de vaccin efficace était connue de 79 % des participants.

Sur les 7 questions posées sur les modes de transmission du VHB, on a noté 64 % de réponses justes. La transmission sexuelle de la maladie était connue de 23 à 52 % des donneurs de sang ne faisant pas partie du corps médical contre 60 à 84 % du personnel médical (Tableau 3). Soixante-deux pour cent (62 %) des étudiants en 1re année de médecine, 70 % des lycéens et 30 % des étudiants en 5e année de médecine pensaient que l'hépatite B se transmettait par les mains sales, la salive ou l'eau du robinet (Tableau 3).

Tableau 1 Âge moyen et sexe

Groupes	1	2	3	4	5	6	7	8
Âge moyen (ans)	16	18,5	23,5	21	38,5	36,3	35	32
Sexe féminin (%)	70	80	72	53	20,7	33,3	77	19

Groupes 1 : lycéens ; 2 : étudiants en 1re année de médecine ; 3 : étudiants en 5e année de médecine ; 4 : étudiants de différentes facultés ; 5 : ouvriers ; 6 : cadres ; 7 : personnel paramédical ; 8 : donneurs de sang vus au CRTS de Casablanca.

Tableau 2 État des connaissances sur le VIH : contamination, signes cliniques, prévention

Item	Groupes															
	1 (n = 100)		2 (n = 200)		3 (n = 150)		4 (n = 450)		5 (n = 100)		6 (n = 100)		7 (n = 100)		8 (n = 550)	
	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%
Contamination en buvant dans le verre d'une personne contaminée, dans les toilettes publiques ou par piqûre de moustique	27	27	48	24	11	7	90	20	25	25	16	16	10	10	99	18
Contamination lors d'un rapport sexuel	86	86	192	96	139	93	405	90	90	90	92	92	96	96	478	87
Transmission de la mère à son nouveau-né	73	73	192	96	139	93	387	86	69	69	70	70	91	91	269	49
Connaissance d'au moins 2 signes cliniques	49	49	196	98	135	90	315	70	50	50	47	47	85	85	253	46
L'infection par le VIH peut exister sans donner de signes	73	73	184	92	130	87	373	83	52	52	75	75	79	79	330	60
Modes de protection																
Éducation	46	46	200	100	135	90	337	75	65	65	70	70	87	87	247	45
Préservatif	83	83	200	100	135	90	324	72	81	81	72	72	89	89	335	61
Non-réutilisation du matériel à usage unique	83	83	180	90	135	90	337	75	64	64	72	72	87	87	242	44
Isolement du malade	83	83	44	22	15	10	85	19	40	40	15	15	15	15	132	24
Inexistence de traitement efficace	52	52	200	100	148	99	369	82	78	78	81	81	85	85	379	368
Inexistence de vaccin	75	75	192	96	150	100	355	79	70	70	85	85	90	90	69	67

Groupes 1 : lycéens ; 2 : étudiants en 1re année de médecine ; 3 : étudiants en 5e année de médecine ; 4 : étudiants de différentes facultés ; 5 : ouvriers ; 6 : cadres ; 7 : personnel paramédical ; 8 : donneurs de sang vus au CRTS de Casablanca.

Tableau 3 État des connaissances sur le virus de l'hépatite B : contamination, signes cliniques, prévention

Item	Groupes															
	1 (n = 100)		2 (n = 200)		3 (n = 150)		4 (n = 450)		5 (n = 100)		6 (n = 100)		7 (n = 100)		8 (n = 550)	
	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%
Contamination par le sang	67	67	196	98	144	96	297	66	53	53	75	75	95	95	390	71
Contamination par les rapports sexuels	52	52	162	81	126	84	207	46	23	23	37	37	60	60	132	24
Contamination par les mains sales, la salive, l'eau du robinet	70	70	124	62	45	30	171	38	35	35	23	23	23	23	143	26
Connaissance d'au moins 2 signes cliniques	90	90	200	100	150	100	283	63	40	40	75	75	45	45	137	2
L'infection par le VHB peut exister sans donner de signes	65	65	160	80	150	100	256	57	48	48	77	77	83	83	341	62
Modes de protection																
Préservatif	45	45	172	86	144	96	193	43	23	23	38	38	53	53	82	15
Seringues à usage unique, en évitant de partager les rasoirs	45	45	172	86	144	96	189	42	33	33	49	49	73	73	242	44
Existence d'un vaccin	55	55	144	72	120	80	238	79	70	70	73	73	85	85	418	76

Groupes 1 : lycéens ; 2 : étudiants en 1re année de médecine ; 3 : étudiants en 5e année de médecine ; 4 : étudiants de différentes facultés ; 5 : ouvriers ; 6 : cadres ; 7 : personnel paramédical ; 8 : donneurs de sang vus au CRTS de Casablanca.

Les signes cliniques de la maladie étaient connus des jeunes (groupes 1, 2, 3) et ignorés de plus de 60 % du personnel paramédical (Tableau 3).

La possibilité de recourir à une vaccination pour se protéger de l'hépatite B était connue de 68,7 % des participants, dont 55 % étaient des lycéens et étudiants des facultés de droit et 80 % des étudiants en 5e année (Tableau 3).

Sur les 6 questions posées sur les modes de transmission du VHC, on a observé 55 % de réponses exactes. Pour 75 % des étudiants en 5e année de médecine, le VHC était un virus sexuellement transmissible (Tableau 4). Les autres modes de transmission de ce virus étaient bien connus de ces derniers (Tableau 4). Les taux de réponses justes chez les cadres et les ouvriers étaient similaires : 25 % d'entre eux savaient que la contamination pouvait se faire par les instruments du dentiste et 33 % par l'intermédiaire de la brosse à dents (Tableau 4). Douze pour cent (12 %) des étudiants en première année de médecine et 10 % des étudiants en 5e année ne savaient pas que le VHC se transmettait par la brosse à dents, les seringues mal stérilisées et les instruments dentaires mal stérilisés.

À la question d'absence de vaccin contre le VHC, seul le groupe représentant le personnel de santé a répondu correctement, avec 75 % de réponses justes (Tableau 4). Les autres groupes, notamment les étudiants en médecine, ignoraient dans 80 % des cas l'inexistence de ce vaccin.

Hormis 80 % des étudiants en 5e année et 68 % du personnel paramédical, les donneurs de sang des autres groupes ignoraient pour la plupart l'existence d'un traitement.

Discussion

Le virus responsable du SIDA semble le mieux connu du public. En effet, une enquête faite à Nancy révèle que les modes de transmission du VIH sont les mieux connus, avec 92,5 % de réponses justes [*4*]. Une autre étude réalisée au Yémen montre que la population générale a de bonnes connaissances générales sur le VIH/SIDA [*5*]. Cette étude révèle un taux de réponses justes de 85 %.

Cependant, certaines idées fausses persistent, telles que la contamination par piqûre de moustique (14 % Casablanca vs 68 % Yémen), en buvant dans le verre d'une personne contaminée (14 % Casablanca vs 41 % Yémen) ou la nécessité d'isoler le malade (14 % Casablanca vs 65 % Yémen) [*5*]. L'analyse des résultats par groupe montre que ces fausses idées sont plus importantes dans la population générale comparée au personnel de santé. Ainsi, 83 % des lycéens pensent que l'isolement du malade est un moyen de protection contre le SIDA contre 10 % des étudiants en 5e année de médecine et 15 % du personnel paramédical ($p < 0,0001$).

L'information doit être maintenue dans ce domaine, essentiellement chez les personnes non informées et chez les groupes à risque. En effet, des études réalisées chez des prisonniers [*6,7*], des chauffeurs de bus longues distances, etc. [*8*] ont montré la présence de lacunes concernant les connaissances sur le SIDA.

Il est vrai que le SIDA a été vulgarisé par les médias. Mais la psychose de 1985 a disparu et actuellement le SIDA est considéré comme la maladie des autres [*9*]. Entre 1994 et 1998, en France, on observe une diminution du sentiment de crainte associé aux maladies infectieuses, notamment aux hépatites et particulièrement au SIDA. En 1998, 69 % des Franciliens déclaraient craindre peu le SIDA contre 59 % en 1994 [*9*].

La sensibilisation du public et l'éducation sanitaire des groupes à risque sont

Tableau 4 État des connaissances sur le virus de l'hépatite C : contamination, signes cliniques, prévention

Item	Groupes															
	1 (n = 100)		2 (n = 200)		3 (n = 150)		4 (n = 450)		5 (n = 100)		6 (n = 100)		7 (n = 100)		8 (n = 550)	
	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%
Contamination par les rapports sexuels	32	32	164	82	112	75	180	40	16	16	38	38	34	34	192	35
Contamination par la brosse à dents	57	57	176	88	135	90	261	58	33	33	33	33	87	87	170	31
Contamination par les seringues mal stérilisées	57	57	176	88	135	90	216	48	33	33	49	49	91	91	236	43
Contamination par les instruments du dentiste mal stérilisés	57	57	176	80	135	90	153	34	26	26	25	25	79	79	159	29
L'infection par le VHC peut exister sans donner de signes	60	60	156	78	120	80	252	56	47	47	65	65	90	90	258	47
Inexistence de vaccin contre le VHC	40	40	52	26	30	20	225	50	25	25	37	37	75	75	121	22
Protection par le respect des règles de stérilisation	60	60	196	98	135	90	256	57	48	48	65	65	90	90	220	40
Inexistence de traitement efficace	46	46	120	60	30	20	162	36	36	36	40	40	32	32	308	56
Le risque persiste malgré les mesures préventives	57	57	136	68	130	87	202	45	30	30	43	43	51	51	126	23

Groupes 1 : lycéens ; 2 : étudiants en 1re année de médecine ; 3 : étudiants en 5e année de médecine ; 4 : étudiants de différentes facultés ; 5 : ouvriers ; 6 : cadres ; 7 : personnel paramédical ; 8 : donneurs de sang vus au CRTS de Casablanca.

recommandées pour faciliter la mise en place de moyens d'intervention, combattre les préjugés et assurer les prestations aux personnes atteintes.

En ce qui concerne les modes de transmission du VHB, les résultats de cette enquête sont comparables à ceux de l'étude de Nancy (64 % de réponses exactes vs 77 %) [*4*].

Cependant, 65 % des Français connaissaient le risque de transmission sexuelle de la maladie contre seuls 34,5 % des participants marocains (en excluant les étudiants en médecine et le personnel de santé) [*4*]. Une enquête réalisée à Karachi a montré que la transmission sexuelle de la maladie était connue de 34,6 % des hommes et de 48,7 % des femmes interrogés [*10*].

Par ailleurs, certaines idées fausses persistent, même chez les étudiants en 5e année de médecine, qui pensent dans 30 % des cas que la transmission du virus peut se faire par les mains sales ou l'eau du robinet.

La possibilité de recourir à une vaccination contre l'hépatite B est connue de 68,7 % des marocains de cette enquête contre 78 % des Français, 67,6 % des hommes et 80,9 % des femmes à Karachi [*4,10*]. Seuls 55 % des lycéens marocains et 80 % des étudiants en 5e année de médecine connaissent l'existence du vaccin alors que ce dernier fait partie intégrante du programme national de vaccination de l'enfant depuis juillet 1999.

Ainsi, une information sur les modes de prévention et la vaccination s'avère nécessaire, et ce d'autant plus que l'incidence de la maladie chez les donneurs de sang est estimée à 2,4 % à Casablanca (année 2002).

Les modes de transmission du VHC restent les moins bien connus aussi bien au niveau de cette étude que de celle de Nancy (55 % de réponses justes vs 63 %) [*4*]. Soixante-quinze pour cent (75 %) des étudiants en 5e année de médecine croient que le VHC se transmet par voie sexuelle. Or l'hépatite C fait partie du programme d'enseignement de 4e année de médecine. Ces fausses réponses sont très probablement dues à des confusions entre les différents virus B et C.

Selon une étude rurale réalisée en Égypte pour la prévention de l'hépatite C, seuls 39 % des infirmiers et 70 % des médecins savaient que les seringues mal stérilisées pouvaient être à l'origine d'une contamination. Mais les médecins ont donné plus que les infirmiers de fausses réponses concernant le mode de transmission et les moyens de prévention de l'hépatite C, avec au moins une mauvaise réponse chez 27 % des infirmiers contre 41 % des médecins [*11*]. À Casablanca, 91 % du personnel de santé sait que la contamination peut se faire par les seringues mal stérilisées. Il semble, à première vue, que le personnel médical au Maroc soit plus informé qu'en Égypte. En fait, le questionnaire de l'étude de Casablanca, donnant des réponses à choix multiples, est beaucoup plus suggestif que le questionnaire à réponses ouvertes proposé dans l'étude égyptienne ; ainsi les résultats de l'étude faite à Casablanca sont biaisés.

Soixante pour cent (60 %) des Français savent qu'il n'existe pas de vaccin pour se protéger de l'hépatite C contre seuls 23 % des participants marocains et 38,9 % des hommes et 30,4 % des femmes à Karachi [*4,10*]. Par ailleurs, des études ont montré le rôle important joué par les représentations culturelles et les idées reçues fausses dans l'attitude des patients infectés par le virus de l'hépatite C face à la maladie [*12*].

Ainsi, il est important de faire une information sur les modes de transmission de l'hépatite C qui a une incidence de 0,54 % chez les donneurs de sang marocains en 2002.

La forte prévalence de ces maladies virales, notée au Maroc sur les chiffres rapportés par le Centre national de Transfusion sanguine, et la gravité de l'évolution des hépatites B et C ont conduit le ministère de la Santé à rendre obligatoire la vaccination contre l'hépatite B. Mais d'autres mesures préventives restent indispensables. Ainsi, il a été décidé de mener une campagne d'information sur les modes de transmission des hépatites B et C et du SIDA et d'inciter à l'utilisation de seringues à usage unique, les seringues étant les sources principales de contamination du fait de leur réutilisation. L'accompagnement médiatique de ces mesures est indispensable car il permet l'amélioration des connaissances de la population et sa sensibilisation. En effet, actuellement une campagne médiatique concernant les modes de transmission et attitudes vis-à-vis du SIDA est diffusée à la radio-télévision marocaine. Par ailleurs, le ministère de la Santé a décidé de renforcer le système de surveillance des hépatites à travers la réactivation de la déclaration obligatoire (Discours de Monsieur Thami El Khiari, Ministre de la Santé. Présentation de la stratégie nationale de lutte contre les hépatites, Rabat, le 20 février 2002).

Conclusion

Cette étude permet de disposer « d'un état des lieux » des connaissances de la population. Des efforts doivent être faits en matière d'information de la population sur les modes de transmission des hépatites B et C et du SIDA. Au terme de cette information, un nouveau questionnaire identique ou mieux, sous forme de questions ouvertes, permettra d'évaluer l'impact de celle-ci. L'impact pourra également être évalué sur le pourcentage de contamination des donneurs de sang. Ainsi, en Égypte la campagne d'information qui a suivi l'enquête a permis une diminution remarquable du taux de contamination de la population par le virus de l'hépatite C [*11*].

Références

1 Hépatite B. Genève, Organisation mondiale de la Santé, 2000 (Aide-mémoire N° 204) (http://www.who.int/mediacentre/factsheets/fs204/fr, consulté le 17 avril 2006).

2 Hépatite C. Genève, Organisation mondiale de la Santé, 2000 (Aide-mémoire N° 164) (http://www.who.int/mediacentre/factsheets/fs164/fr, consulté le 17 avril 2006).

3 Rapport sur l'épidémie mondiale de SIDA 2004. 4e Rapport mondial. Genève, ONUSIDA, 2004. (http://www.unaids.org/bangkok2004/GAR2004_pdf_fr/UNAIDS-GlobalReport2004_fr.pdf, consulté le 17 avril 2006).

4 Boyer L et al. Prévention des risques de transmission VIH, VHB, VHC : Année 2000, quel message pour quel public ? Médecine et maladies infectieuses, 2000, 50(6).

5 Al-Serouri AW et al. Knowledge, attitudes and beliefs about HIV/AIDS in Sana'a, Yemen. Eastern Mediterranean health journal, 2002, 8(6):706–15.

6 Nakhaee F.H. Prisoners knowledge of HIV/AIDS and its prevention in Kerman, Islamic Republic of Iran. Eastern Mediterranean health journal, 2002, 8(6):725–31.

7 Delorme C et al. Connaissances, croyances et attitudes des détenus face au Sida :

une enquête au centre pénitentiaire de Marseille. Revue d'épidémiologie et de Santé publique, 1999, 47(3):229–38.

8 Abdelmoneim I et al. Knowledge and attitudes towards AIDS among Saudi and non-Saudi bus drivers. Eastern Mediterranean health journal, 2002, 8(6):716–24.

9 Halfen S et al. Hépatites B et C : Aspects épidémiologiques et prévention en Île-de France. Bulletin de santé, 2001, 4.

10 Khuwaja AK, Qureshi R, Fatmi Z. Knowledge about hepatitis B and C among patients attending family medicine clinics in Karachi. Eastern Mediterranean health journal, 2002, 8(6):787–93.

11 El Katcha S et al. Education for health providers in the prevention of the transmission of hepatitis C virus: a case study in rural Egypt. Promotion and education, 2002, 9(1):16–21.

12 Castera L et al. Études des représentations culturelles et des idées reçues concernant l'hépatite C chez des patients suivis dans un pôle de référence. Gastroentérologie clinique et biologique, 2003, 27(HS1):8319–20.

Albendazole versus metronidazole in the treatment of patients with giardiasis in the Islamic Republic of Iran

A.Alizadeh,[1] M. Ranjbar,[2] K.M.Kashani,[3] M.M. Taheri[4] and M. Bodaghi[4]

مقارنة بين الألبيندازول والمترونيدازول في معالجة المصابين بداء الجيارديات في جمهورية إيران الإسلامية

أمير عليزاده، ميترا رنجبر، خسرو ماني كاشاني، محمد طاهري، معصومة بداغي

الخلاصة: قام الباحثون في إطار هذه الدراسة بتقييم التأثيرات العلاجية للألبيندازول بالمقارنة مع المترونيدازول لدى 120 من المرضى بداء الجيارديات في مدينة همدان. وقُسِّم المرض عشوائياً لتلقّي الألبيندازول (بمعدل 400 مغ مرة واحدة لمدة 5 أيام)، أو لتلقّي المترونيدازول (بمعدل 250 مغ، ثلاث مرات يومياً لمدة 5 أيام). وتم تسجيل المعطيات الديمغرافية للمرضى، ونتائج فحص البراز لتحرِّي الدور النشيط من دورة حياة طفيلي الجيارديا، قبل المعالجة وبعدها، وكذلك التأثيرات الجانبية للأدوية. وتبيَّن بعد المعالجة أن ستة من فئة المرضى الذين تلقّوا الألبيندازول (نسبة 10٪) كان لديهم الطور النشيط للطفيلي، بالمقارنة مع 14 مريضاً (نسبة 23.3٪) من الفئة التي أُعطيت المترونيدازول ($P < 0.05$). ولوحظت تأثيرات جانبية أقل لدى فئة الألبيندازول، في حين عانى 43.3٪ من فئة المعالجين بالمترونيدازول من مذاق معدني، وعانى 35٪ منهم من نقص الشهية للطعام. واستنتجت الدراسة أن الألبيندازول علاج سهل ومأمون وفعَّال للجارديات.

ABSTRACT We examined the therapeutic effects of albendazole compared to metronidazole in 120 patients with giardiasis in Hamdan. Patients were randomized to receive albendazole (400 mg, once daily for 5 days) or metronidazole (250 mg, 3 times a day for 5 days). Demographic data of the patients, results of stool examination for Giardia trophozoites before and after treatment, and drug side-effects were recorded. After treatment 6 (10.0%) of the albendazole group had trophozoites compared with 14 (23.3%) of metronidazole group ($P < 0.05$). Patients in the albendazole group had fewer side-effects while 43.3% of the metronidazole group experienced a metallic taste and 35.0% experienced loss of appetite. Albendazole is an easy, safe and effective treatment for giardiasis.

Comparaison entre albendazole et métronidazole dans le traitement des patients atteints de giardiase en République islamique d'Iran

RÉSUMÉ Nous avons examiné les effets thérapeutiques de l'albendazole par rapport au métronidazole chez 120 patients atteints de giardiase à Hamdan. Les patients ont été randomisés pour recevoir de l'albendazole (400 mg une fois par jour pendant 5 jours) ou du métronidazole (250 mg 3 fois par jour pendant 5 jours). Les données démographiques des patients, les résultats de l'examen coprologique à la recherche de trophozoïtes de Giardia avant et après le traitement, et les effets secondaires des médicaments ont été notés. Après le traitement, 6 patients (10,0 %) du groupe albendazole avaient des trophozoïtes contre 14 (23,3 %) dans le groupe métronidazole ($p < 0,05$). Les patients du groupe albendazole avaient moins d'effets secondaires tandis que 43,3 % des patients du groupe métronidazole ressentaient un goût métallique et 35,0 % présentaient une perte d'appétit. L'albendazole constitue un traitement facile, sûr et efficace pour la giardiase.

[1]Research Centre for Gastroenterology and Liver Disease, Shaheed Beheshti University of Medical Sciences and Health Services, Tehran, Islamic Republic of Iran (Correspondence to A. Alizadeh: ahmaliver@yahoo.com).
[2]Department of Infectious Disease; [3]Department of Community Medicine; [4]Hamadan University of Medical Sciences and Health Services, Hamadan, Islamic Republic of Iran.
Received: 02/03/04; accepted: 30/11/04

Introduction

Giardia lamblia, also known as *Giardia duodenalis* or *Giardia intestinalis*, is one of the most common intestinal parasites worldwide and is a frequent cause of diarrhoeal illness [*1–4*]. It is estimated that about 300 million people annually are affected with the parasite all around the world [*3*] and it is an important cause of morbidity in the developing world [*5*]. *G. lamblia* causes both epidemic and sporadic disease and is an important cause of waterborne and foodborne diarrhoea, day-care centre outbreaks, and diarrhoea in international travellers [*1*]. Waterborne, foodborne and direct contact are 3 important patterns of potential transmission of the pathogen [*5*]. The infection may be asymptomatic or present with a variety of symptoms such as diarrhoea, weight loss, abdominal cramps and failure to thrive [*1*]. The incubation period is 1 to 2 weeks following ingestion and the acute stage of the disease lasts from 3 to 4 days but can go on for much longer [*6*]. Severe symptoms of diarrhoea and sickness can be persistent and even life-threatening in immunocompromized individuals, infants and in the aged, although the disease is self-limiting in the majority of patients [*3*]. Diagnosis of infection is by stool examination, which may also eliminate other possible infectious agents [*2*].

Many drugs, including metronidazole and albendazole, are used for the treatment of the disease. For the treatment of giardiasis, metronidazole is the drug of choice [*7*] but in cases of resistance, drugs such albendazole have been said to be effective [*1*]. Review of the literature shows that there have been few clinical trials to compare albendazole with other effective anti-giardial drugs [*2,4,8*]. As albendazole is an available and safe antiprotozoal medicine in the Islamic Republic of Iran and perhaps in other parts of the world, we conducted a clinical trial in order to assess the anti-giardial effects compared to metronidazole.

Methods

The study was conducted in Hamadan, a city in the north-west of the Islamic Republic of Iran over a period of 1 year (2001). Cases were selected from among patients attending 4 pre-defined private outpatient clinics in 4 different parts of the city. Due to difficulty in coordination, patients of medical centres of the health administration network were not entered in the study. Based on biostatistical calculations (alpha level of 0.05 and beta level of 0.2), the sample size needed was calculated to be 120 documented cases of the disease. Before starting the study one number was assigned for each case. All the numbers were assigned in 2 groups (60 cases in each) at random and a physician was assigned to give the needed numbers to the clinics. The physician was also responsible for following up the cases. Referral with acute symptoms of giardiasis and a positive stool examination report for trophozoites of the pathogen were considered as the inclusion criteria. One parasitologist who was blinded to the treatment received was responsible for detecting the trophozoites in the samples and checked all iodine-stained wet stool preparations before and after treatment.

The first group received the standard treatment with albendazole (400 mg daily as a single dose for 5 days) and the second group received metronidazole (250 mg 3 times a day for 5 days). Patients received the specified dosages daily and they were asked whether they had taken the complete dose of the drugs. A week after starting the treatment, stool examination to detect trophozoites of *G. lamblia* was performed 3 times

in 3 consecutive days for all the patients. Response to treatment was determined as negative stool examination for trophozoites and cysts. Those who continued to be positive for trophozoites and/or cysts despite completing the course of treatment were considered non-responders. Demographic data, the results of stool examination for *Giardia* trophozoites before and after treatment, and any side-effects experienced were recorded.

All the cases signed an informed consent form before starting treatment. For cases under 16 years, one of the parents signed the consent form. The Ethics Committee of Hamadan University of Medical Sciences approved the study.

We used protocol-based analysis instead of intention-to-treat analysis because, according to the primary design of the trial, patients who refused to participate in the study were replaced by new patients to reach the desired number of cases in each group. However, in the follow-up period we sought the reasons why the patients refused to participate. Although protocol-based analysis tends to bias the interpretation of the results, concerning the main cause of the patients' drop-out, it was possible to get similar results by using each kind of analysis. Descriptive statistics for both groups were reported. Using the chi-squared and independent Student *t*-tests, statistical analysis of the data was performed with *SPSS*, version 9.01. The level of significance was set at $P < 0.05$.

Results

The mean and standard deviation (SD) of the patients' age was 22.3 (SD 11) years (range 2–53 years). Table 1 shows the characteristics of patients in the 2 groups. Male to female ratio was 61:59. Mean (SD) of duration of the symptoms in the first group

Table 1 Characteristics of patients in the groups receiving albendazole and metronidazole in the treatment of giardiasis

Characteristic	Albendazole group (n = 60)	Metronidazole group (n = 60)
Mean age (SD) (years)	21.3 (8.9)	22.9 (12.1)
Male/female	30/30	31/29
Mean duration of symptoms (SD) (days)	3.4 (0.6)	4.2 (0.7)
Education[a]		
Illiterate (No.)	4	5
Educated (No.)	44	32
Highly educated (No.)	12	13
Quit treatment	15	9
Response to treatment		
All patients, No. (%)	54/60 (90.0)	46/60 (76.7)
Male, No. (%)	26/30 (86.7)	22/31 (71.0)
Female, No. (%)	28/30 (93.3)	24/29 (82.8)

SD = standard deviation.

[a]Illiterate: no schooling/not able to read or write; educated: able to read or write up to high-school diploma; highly educated: attended university.

was 3.4 (0.6) days and in the second it was 4.2 (0.7) days. Independent Student *t*-test showed a significant difference between the 2 groups in terms of duration of the symptoms ($P < 0.01$). None of patients in the 2 groups had a history of immune deficiency or disabling disease. As regards compliance, 15 patients from the albendazole group and 9 patients from the metronidazole group failed to complete the course of medication. In follow-up of these patients, we found it was due to difficulty in revisiting the clinic, not to continuation of symptoms or side-effects of the drugs.

After the whole course of treatment, 6 patients in the albendazole group were found still to have trophozoites in the stool while 14 (23.3%) in the metronidazole group still had the pathogen, giving a significant difference in non-responder rate between the 2 groups ($P < 0.05$). The difference in response rate between the 2 groups was statistically significant (Yates corrected χ^2, $P < 0.05$). There was no significant difference between males and females in response of treatment of each group. Table 2 shows the side-effects of the treatment with the 2 drugs. Metallic taste, vertigo and loss of appetite were significantly higher in the patients who had taken metronidazole. Transient abdominal pain was only observed in the albendazole group. Participants taking metronidazole reported more side-effects than those taking albendazole, metallic taste being the commonest side-effect (43.3%), followed by loss of appetite (35.0%).

Discussion

In human giardiasis, therapeutic failure is occurring more and more frequently due to low compliance with drug therapy, re-infestation or parasite resistance to metronidazole and/or the nitroimidazole-related compounds like tinidazole [*9*]; hence examining alternative treatments is always valuable. In this study we found that albendazole was more effective than metronidazole in the treatment of acute giardial infection. As all the cases were followed for a fairly acceptable period (1 week) after the start of treatment and no significant side-effects of the drugs were documented, prescription of albendazole not only in cases of drug resistance but also as an alternative first-line therapy is advised. Nevertheless, it must be considered that it could increase the risk of

Table 2 Frequency of side-effects of metronidazole and albendazole in the treatment of patients with giardiasis

Side-effect	Metronidazole (n = 60)		Albendazole (n = 60)		P-value
	No.	%	No.	%	
Metallic taste	26	43.3	–	–	< 0.0001
Vertigo	14	23.3	4	6.6	0.01
Nausea/vomiting	11	18.3	12	2.0	NS
Loss of appetite	21	35.0	–	–	< 0.0001
Urticaria	2	3.3	–	–	NS
Transient abdominal pain	–		11	18.3	< 0.0001

NS = not significant.

developing resistance to albendazole. The lack of sensitivity in the diagnostic test applied in this study [*10*] cannot be considered a serious limitation as the probability of obtaining a false negative result was the same for both groups.

Review of the literature shows that some controversy exists about the efficacy of albendazole compared to metronidazole in the treatment of giardial infection. As metronidazole is a well-established antigiardial medicine and has generally remained the first-line chemotherapeutic agent against this microorganism [*7*], we sought data indicating the therapeutic effects of albendazole rather than metronidazole on giardiasis. In most studies, albendazole was as good as metronidazole or better [*8,11–19*]: only a few studies reported that albendazole was inferior to metronidazole in treatment of giardiasis. Chan Del Pino et al. indicated that albendazole is as effective as furazolidone, tinidazole and secnidazole but faster at eradicating the *G. lamblia* in children and is better tolerated than metronidazole [*11*]. In a study performed in France, the researchers found that in some cases of metronidazole resistance, albendazole was an effective drug [*12*]. After performing a randomized clinical trial, Pengsaa et al. indicated that albendazole appeared to be safe and produced a moderate cure rate for *G. intestinalis* infection when a 3-day anti-helminthic regimen was given [*13*]. Reynoldson et al. examined the efficacy of albendazole at a dose rate of 400 mg daily for 5 days on eradicating giardial and hookworm infections and concluded that the drug was highly effective in reducing hookworm egg numbers and both *Giardia* antigen and cysts [*16*]. In a randomized trial Romero-Cabello et al. concluded that albendazole and metronidazole were equally effective in a 5-day treatment period, but some undesirable side-effects may occur with metronidazole [*17*]. Albendazole has been proved to be effective in *in vitro* settings and asserted to be the most effective antihelminthic benzimidazole [*18*]. In a clinical trial in children in the Islamic Republic of Iran, Sadjjadi, Alborzi and Mostovfi showed that mebendazole was as effective as metronidazole with fewer side-effects [*19*].

In a systematic review done by Zaat Mank and Assendelft it was shown that most of the clinical trials on drug therapy for giardiasis had some methodological flaws; a single dose of tinidazole appeared to give the highest clinical cure rate for giardiasis with relatively few adverse side-effects [*20*]. It has been reported that albendazole was inferior to other known antigiardial drugs [*21*]. However the study was conducted as an open pilot trial in travellers returning from the tropics, while we used a randomized clinical trial with precise monitoring of patients.

The results of the current study show that albendazole is a safe and effective drug in the treatment of giardiasis and provide further evidence of the usefulness of this drug. However, this will not put an end to the controversies surrounding the treatment of giardiasis. Hence, new evidence about the efficacy of antigiardial medicines is needed. In the future, studies should be designed to better evaluate albendazole in comparison with other new medicines. In addition, we need studies with larger numbers of cases and clinical trials in children and immune-compromised patients, especially patients with humoral abnormalities.

References

1. Lundgren RG Jr et al. Intestinal parasitism in the United States. The American journal of tropical medicine and hygiene, 1994, 50(6):705–13.
2. Vesy CJ, Peterson WL. Review article: the management of giardiasis. Alimentary pharmacology & therapeutics, 1999, 13(7): 843–50.
3. Lane S, Lloyd D. Current trends in research into the waterborne parasite Giardia. Critical reviews in microbiology, 2002, 28(2): 123–47.
4. Nash TE et al. Treatment of patients with refractory giardiasis. Clinical infectious diseases, 2001, 33(1):22–8.
5. Curtale F et al. Anaemia and intestinal parasitic infections among school age children in Behera Governorate, Egypt Behera Survey Team. Journal of tropical pediatrics, 1998, 44:323.
6. Adam RD. The biology of Giardia spp. Microbiological reviews, 1991, 55(4):706–32.
7. Hill DR. Giardia lamblia. In: Mandell GL, Bennett IE, Dolin R, eds. Principles and practice of infectious diseases, 5th ed. Philadelphia, Churchill Livingstone, 2000.
8. Hall A, Nahar Q. Albendazole as a treatment for infections with Giardia duodenalis in children in Bangladesh. Transactions of the Royal Society of Tropical Medicine and Hygiene, 1993, 87(1):84–6.
9. Hill DR Nash TE. Intestinal flagellate and ciliate infections. In: Guerrant RL, Walker DH, Weller PF, eds. Tropical infectious diseases: principles, pathogens, & practice. Philadelphia, Churchill Livingstone, 1999.
10. Christopher D, Huston CD, Guerrant RL. Intestinal protozoa. In: Feldman M, Friedman LS, Sleisenger MH eds. Gastrointestinal and liver disease. Pathophysiology/diagnosis/management, 7th ed. Philadelphia, WB Saunders, 2002.
11. Chan Del Pino M, Cueva Cornejo L, Troyes Rivera L. Comparación de Albendazol con nitrofuranos y nitroimidazoles en el tratamiento de giardiasis en niños [Comparative study of albendazole versus nitrofurazones and nitroimidazoles in the treatment of giardiasis in children.] Revista de gastroenterología del Perú, 1999, 19(2):95–108.
12. Lemee V et al. Metronidazole and albendazole susceptibility of 11 clinical isolates of Giardia duodenalis from France. Journal of antimicrobial chemotherapy, 2000, 46:819–21.
13. Pengsaa K et al. Albendazole treatment for Giardia intestinalis infections in school children. Southeast Asian journal of tropical medicine and public health, 1999, 30(1):78–83.
14. Misra PK et al. A comparative clinical trial of albendazole versus metronidazole in children with giardiasis. Indian pediatrics, 1995, 32(7):779–82.
15. Dutta AK et al. A randomised multi centre study to compare the safety and efficacy of albendazole and metronidazole in the treatment of giardiasis in children. Indian journal of pediatrics, 1994, 61 (6): 689–93.
16. Reynoldson JA et al. Efficacy of albendazole against Giardia and hookworm in a remote Aboriginal community in the north of Western Australia. Acta tropica, 1998, 71(1):27–44.
17. Romero-Cabello R et al. Estudio aleatorio para comparar seguridad y eficacia de albendazol y metronidazol en el tratamiento de giardiasis en niños. [Randomized study comparing the safety and efficacy

of albendazole and metronidazole in the treatment of giardiasis in children.] Revista latinoamericana de microbiologia, 1995, 37(4):315–23.

18. Edlind TD, Hang TL, Chakraborty PR. Activity of the anthelmintic benzimidazoles against Giardia lamblia in vitro. Journal of infectious diseases, 1990, 162:1408–1411.

19. Sadjjadi SM, Alborzi AW, Mostovfi H. Comparative clinical trial of mebendazole and metronidazole in giardiasis of children. Journal of tropical pediatrics, 2001, 47(3):176–8.

20. Zaat JO, Mank T, Assendelft WJ. Drugs for treating giardiasis. The Cochrane database of systematic reviews, 1998, Issue 3. Art. No.: CD000217. DOI: 10.1002/14651858.

21. Kollaritsch R, Jeschko E, Wiedermann G. Albendazole is highly effective against cutaneous larva migrans but not against Giardia infection: results of an open pilot trial in travellers returning from the tropics. Transactions of the Royal Society of Tropical Medicine and Hygiene, 1993, 87:689.

Frequency of Giardia lamblia among children in Dohuk, northern Iraq

A.T. Al-Saeed[1] and S.H. Issa[1]

دراسة انتشار الجيارديةاللامبلية بين الأطفال في مدينة دهوك، في شمال العراق

عادل طالب السعيد، سوزان حسين عيسى

الخلاصة: تم فحص 1261 نموذجاً من عيِّنات البراز التي أُخذت من الأطفال في مدينة دهوك، شمال العراق، حيث بلغ معدل انتشار الإصابة بالجيارديةاللامبلية 38.5٪. وقد بلغت أعلى معدلات العدوى في دور رعاية الأيتام (48.1٪) وأدنى المعدلات في مستشفيات الأطفال (31.3٪). ولوحظت أعلى نسبة للإصابة في الفئة العمرية (10–12 عاماً) بمعدّل (81.2٪)، وأدنى نسبة في الفئة العمرية (7–9 أعوام) بمعدّل (22.9٪)، وكانت معدلات إصابة الذكور أعلى من الإناث. وقد أظهرت بعض العينات المصابة (70/486) عدوى مزدوجة أو ثلاثية، إ كانت الجيارديةاللامبلية مصحوبة بالمحرشفة القزمة، والمتبرعمة الكيسية البشرية، والمتحوّلة الحالة للنسج، واليُودَميبة البوتشلية.

ABSTRACT Out of 1261 stool specimens collected from children in Dohuk city, northern Iraq, the prevalence of Giardia lamblia infection was 38.5%. The highest rate of infection was in orphan care centres (48.1%) and the lowest in the paediatric hospital (31.3%). The age group 10–12 years had the highest rate (81.2%) and 7–9 years the lowest (22.9%); boys had a higher rate than girls. Some infected samples (70/486) showed double or triple infections and G. lamblia was combined with Hymenolepis nana, Blastocystis hominis, Entamoeba histolytica and Iodamoeba buetschlii.

Fréquence de Giardia lamblia chez des enfants à Dohuk (Iraq septentrional)
RÉSUMÉ Dans les 1261 échantillons de selles prélevés chez des enfants de la ville de Dohuk (Iraq septentrional), la prévalence de l'infection à Giardia lamblia était de 38,5 %. Le taux d'infection le plus élevé se trouvait dans les centres d'accueil pour orphelins (48,1 %) et le plus faible à l'hôpital pédiatrique (31,3 %). Le groupe d'âge des 10-12 ans avait le taux le plus élevé (81,2 %) et celui des 7-9 ans le plus faible (22,9 %) ; le taux était plus élevé chez les garçons que chez les filles. Certains échantillons infectés (70/486) présentaient une double ou une triple infection et G. lamblia était associé à Hymenolepis nana, Blastocystis hominis, Entamoeba histolytica et Iodamoeba buetschlii.

[1]Department of Microbiology, College of Medicine, University of Dohuk, Dohuk, Iraq (Correspondence to A.T. Al-Saeed: safa_adel97@yahoo.com).
Received: 13/04/03; accepted: 24/08/04

Introduction

Giardia lamblia is a protozoan parasite which has worldwide distribution and is common in warm and moist climates throughout the world. Giardiasis is an important unresolved health problem in developing countries, as it is related to poor sanitation and management of supplied water, a problem that is exacerbated by the absence of a simple reliable diagnostic test [*1*]. The prevalence of *G. lamblia* ranges from 2%–7% in industrialized countries and 20%–60% in developing countries [*2*]. The majority of infections are probably asymptomatic but some are associated with subacute or chronic diarrhoea and intestinal irritation [*3*], which contribute to malabsorption and nutritional deficiency especially in children [*4*,*5*].

Giardiasis is transmitted by the faecal–oral route and direct person-to-person spread. In most cases it is associated with contaminated drinking water but also occasionally by recreational activity in still water [*6,7*]. *G. lamblia* is more common in children but all age groups are affected in epidemic areas [*8*]. Infants under 1 year old are less likely to be infected than the older children [*9*]. It is particularly common in children's institutions such as day care centres, primary schools and big families [*10,11*].

Several surveys of intestinal parasitosis in Iraq have shown a high incidence of giardiasis among children [*12*,*13*]. The present study was conducted because little information is available about *G. lamblia* infection among children in northern Iraq.

The aim of this study in Dohuk city was directed to determine the frequency of *G. lamblia* in different age groups of children, the incidence of *G. lamblia* throughout the year and the association of *G. lamblia* with other intestinal parasites.

Methods

This study was conducted from 1 October 2001 to 31 July 2002 on children living in Dohuk city.

Sample

Stool samples were collected from boys and girls aged 3 months to 12 years attending day care centres, kindergartens, primary schools and the local paediatric hospital. With the assistance of the children's parents and supervisors of centres, a fresh stool specimen was collected from each child into a disposable plastic container. The stool samples were taken immediately to the laboratory of the Microbiology Department at the University of Dohuk College of Medicine for examination. Those with negative results had 2 other samples taken at different times for examination.

Laboratory methods

The stool samples were examined with the naked eye for colour, consistency and the presence of any adult helminths. They were then examined microscopically by direct and concentration methods for presence of *Giardia* trophozoite and cyst stages and for detection of other parasites stages. The concentration method used in this study was the zinc sulphate floatation method [*14*]. Two types of direct wet film preparation were done for each sample at the same time, 1 slide by using normal saline 0.85% for detecting the motility of trophozoites and Lugol's iodine 5% slide for demonstrating structures [*14*].

Data about age, sex and residence were recorded for each child on a special form, together with the stool examination results (type of stool, direct and concentration test results), stage of *Giardia lamblia* and associated parasites.

The results were analysed statistically using the F-test.

Results

A total of 1261 stool samples were collected and examined: 833 samples were from children in schools and care centres (451 attending primary schools, 261 attending kindergartens, 94 day attending care centres and 27 attending orphan care centres) and 428 samples were from children presenting at the paediatric hospital with a complaint of gastroenteritis.

The total infection rate with *G. lamblia* among the examined samples was 38.5% (standard error range 38.49%–38.51%).

The distribution of *G. lamblia* according to the children's institute and schools is summarized in Table 1. The highest rates of giardiasis were from the orphan care centres (48.1%) and kindergartens (45.6%), whereas the rates were lower in the primary schools, day care centres and the paediatric hospital) (41.2%, 36.2% and 31.3% respectively). The statistical analysis revealed a highly significant difference in infection rate between primary schools and other children's institutes ($P < 0.01$).

The rate of infection varied across different age groups of children (Table 2). The age group 10–12 years showed the highest rate of infection (81.1%), and the lowest rate was in children 7–9 years (22.9%). There was a highly significant difference among different age groups ($P < 0.01$). The infection rate was higher among boys (41.6%) than girls (35.6%).

The distribution of *G. lamblia* according to the months of the year is shown in Table 3. Although more samples were collected in the summer months, the rate of *G. lamblia* infection as a proportion of the number of stools examined was lowest in June (28.4%). Fewer sample were collected in the colder months but the highest infection rate of samples was in December (49.2%) followed by November (44.8%), April (43.5%) and May (43.4%). The difference in the rates of infection during the months was significant ($P < 0.05$).

Overall, 70 out of 486 infected samples showed double and triple infections with other intestinal parasites combined with *G. lamblia* (Table 4). *G. lamblia* was combined with *Hymenolepis nana* (46.4%), with *Blastocystis hominis* (39.4%) and each of *Entamoeba histolytica* and *Iodamoeba*

Table 1 Distribution of Giardia lamblia infection among children attending different institutions in Dohuk city

Institution (number)	Age group (years)	No. of samples examined	No. positive	% positive
Primary school (18)	6–8	451	186	41.2
Kindergarten school (3)	3–6	261	119	45.6
Day care centre (2)	< 1–3	94	34	36.2
Orphan care centre (2)	< 1–12	27	13	48.1
Paediatric hospital (1)	< 1–12	428	134	31.3
Total	< 1–12	1261	486	38.5

$\chi^2 = 17.6$, df = 4, P < 0.01.

Table 2 Distribution of Giardia lamblia infection among children in Dohuk city according to age and sex

Variable	No. of samples examined	No. positive	% positive
Age (years)			
< 1	235	60	25.5
1–3	235	118	50.2
4–6	389	157	40.4
7–9	301	69	22.9
10–12	101	82	81.2
	$\chi^2 = 141.3$, df = 4, P < 0.01		
Sex			
Male	618	257	41.6
Female	643	229	35.6
	$\chi^2 = 4.7$, df = 1, P < 0.05		
Total	1261	486	38.5

buetschlii (7.1%). These results indicated that the infection with *G. lamblia* was usually more associated with the intestinal cestode *H. nana*. As triple infections, *G. lamblia* was combined with *H. nana* and *B. hominis* in 61.9% of samples, and combined with *H. nana* and *Ent. coli* in 38.1%.

Table 3 Distribution of Giardia lamblia infection among children in Dohuk city according to months of the study 2001–02

Month	No. of samples examined	No. positive	% positive
October	40	16	40.0
November	67	30	44.8
December	65	32	49.2
January	102	40	39.2
February	86	30	34.9
March	91	38	41.8
April	184	80	43.5
May	198	86	43.4
June	211	60	28.4
July	217	74	34.1
Total	1261	486	38.5

$\chi^2 = 20.0$, df = 9, P < 0.05.

Discussion

The infection rate with *G. lamblia* in stool samples from children in Dohuk city was very high (38.5%). The narrow standard error range in the samples is due to the large number of samples analysed.

The rate of infection in the present study is similar to other studies in Iraq [*12,15–17*]. The results are also in agreement with studies in other parts of the world [*4,18,19*]. This high rate of infection among children could be related to a number of factors such as poor health hygiene and toilet training, overcrowding, low education of children, low socioeconomic status and climatic conditions [*20*]. *Giardia lamblia* was isolated from stool samples of children in all primary schools but the highest rate of infection was reported from children in a primary school which is located in a low socioeconomic area (Serheldan region).

Another important factor which affects the rate of giardiasis is the presence of asymptomatic patients in the community who can be considered as the main source of infection through continuously excreting the cysts stages with their stools [*21*]. Most of the cases in this study were infected with cysts. Regarding the life-cycle of these parasites, those carrier patients act as a source of infection by continuously excreting the cyst stage with their stool [*22*]. Although carrier persons are asymptomatic, the infection may be converted to acute infection through excystation of cysts inside the intestine resulting in the main complaints of giardiasis such as abdominal pain, steatorrhoea and loss of weight [*23*].

Table 4 Distribution of other intestinal parasites associated with Giardia lamblia infection among children in Dohuk city

Organism	No. of samples infected	% positive
Double infections		
G. lamblia + Hymenolepis nana	13	46.4
G. lamblia + Blastocystis hominis	11	39.4
G. lamblia + Entamoeba histolytica	2	7.1
G. lamblia + Iodamoeba buetschlii	2	7.1
Triple infections		
G. lamblia + Blastocystis hominis + Hymenolepis nana	26	61.9
G. lamblia + Hymenolepis nana + Entamoeba coli	16	38.1
Total	70	100.0

The higher rate of infection with *G. lamblia* among children in orphan care centres, kindergartens and primary schools might be related to bad personal hygiene or overcrowding. On the other hand, the lower rate of infection among children in day care centres and the hospital might be an indication of good care taken by the supervisors of these centres [*24*].

Regarding the results of *G. lamblia* infection among different age groups, the < 1 year old group had a low rate of infection, perhaps because parents are responsible for their hygiene [*25*]. The infection rate was highest in the age group 10–12 years. This may be because this group of children are fully independent in toilet use and are more involved in outdoor activities which might lead to *Giardia* transmission [*26*]. The present results are similar to studies of intestinal parasitosis in Saudi Arabia and Senegal [*27,28*].

Higher numbers of samples were collected during the summer months when the maximum temperature in Dohuk is about 40–45 ºC. Cold weather kills the infective cysts [*29,30*]. The unfavourable temperature of *G. lamblia* cyst is less than 5 ºC and the cysts usually die at more than 62 ºC [*31*]. In Dohuk city the temperature in winter is 0 ºC or less to 5 ºC [*32*]. Other behavioural factors could be involved, for example there is greater consumption of drinks and food, e.g. ice cream, in summer which may be sources of infection [*33*].

The present study revealed that the intestinal cestode *H. nana* was the most common intestinal parasite associated with *G. lamblia* infection. Although other studies have demonstrated the same results [*34*], there was no clear reason for this association. However, it may be related to the infective stage of both parasites being resistant to various environmental conditions and remaining viable for a long time [*35*]. The other important pathogenic intestinal parasites recorded were *B. hominis* and *Ent. histolytica.*

References

1. Addiss DG et al. Evaluation of a commercially available enzyme-linked immunosorbent assay for Giardia lamblia antigen in stool. Journal of clinical microbiology, 1991, 29(6):1137–42.
2. Thompson RCA et al. Genetic variation in Giardia, Kunstler 1882: taxonomic and epidemiological significance. Protozoology abstracts, 1990, 14:1–28.
3. Reitmeyer M, Robertson S. Giardiasis. Chief Medical Resident's Clinical Medicine Conferences 1996–97. Charlottesville, Virginia, University of Virginia, 1997.
4. Brown HW, Neva FA. Basic clinical parasitology, 5th ed. Appleton Century Croft, New York, 1983:43–6.
5. Dubey R et al. Intestinal giardiasis: an unusual cause for hypoproteinemia. Indian journal of gastroenterology, 2000, 19(1):365–73.
6. Gillin FD, Reiner DS. Cell biology of the primitive eukaryote Giardia lamblia. Annual review of microbiology, 1996, 50:679–705.
7. Thompson RCA. The future impact of societal and cultural factors on parasitic disease—some emerging issues. International journal for parasitology, 2001, 31:949–59.
8. Norhayati M et al. Prevalence and risk factors of Giardia duodenalis infection in a rural community. Southeast Asian journal of tropical medicine and public health, 1998, 29(4):735–8.
9. Thompson RCA. Giardia as a re-emerging infection disease and its zoonotic potential. International journal for parasitology, 2000, 30:1259–67.
10. Yaeger GR. Protozoa: structure, classification, growth and development. In: Baron S, ed. Medical microbiology, 4th ed. Galveston, Texas, University of Texas Medical Branch, 1996.
11. Beaver PC, Jung RC, eds. Animal agent and vectors of human diseases, 5th ed. Philadelphia, Leaf and Febiger, 1985:13–4.
12. Al-Dabagh MA et al. Giardiasis in a group of preschool age children in Iraq. Journal of the Faculty of Medicine Baghdad, 1967, 9:73–83.
13. Al-Jeboori T, Shafiq MA. Intestinal parasites in Baghdad: a survey in two districts. Journal of the Faculty of Medicine Baghdad, 1976, 18:161–70.
14. Cheesbrough M, ed. District laboratory practice in tropical countries. Part 1. Cambridge, Cambridge University Press, 1998:192–205.
15. Mahdi NK, Jassim AH. Intestinal parasitic infections of primary school children in three regions of southern Iraq. Medical journal of Basra University, 1987, 6:55–61.
16. Al-Rahaley IMK. Some aspects of enteropathogenic Escherichia coli from diarrheic children in hospitals and normal children in nurseries [MSc thesis]. Mosul, Iraq, University of Mosul, 1988.
17. Molan AL, Farag AM. Prevalence of intestinal parasites in school children of Erbil, Northern Iraq. Saudi medical journal, 1989, 10:107–10.
18. Gharbi T et al. Etude de l'anémie au cours de la giardiase chez des enfants Tunisiens d'âge préscolaire [Study of anemia in giardiasis intestinalis in Tunisian preschool children]. La Tunisie medicale, 1999, 77(11):558–61.
19. Boia MN et al. Cross sectional study of intestinal parasites and chaga's disease in the municipality of Nova Airao, State of Amazonaz, Brazil. Cadernos de saúde pública, 1999, 15(3):497–504.
20. Hellard ME et al. Prevalence of enteric pathogens among community based

asymptomatic individuals. Journal of gastroenterology and hepatology, 2000, 15(3):290–3.

21. Al-Sa'eed ATM, Saeed AY, Mohammed JB. Prevalence of gastrointestinal parasites among the population in Dohuk–Kurdistan region Iraq. Zanco—journal for medical sciences (special issue), 2001, 5:14–9.

22. Swadi AA. Epidemiological study on giardiasis in dogs in Baghdad province [MSc Thesis]. Baghdad, Iraq, Veterinary Medicine College University of Baghdad, 2000.

23. Farag AM. Intestinal infection with Entamoeba histolytica and Giardia lamblia regular patients to Yafrin general hospital, Libya. Journal of Dohuk University, 1999, 2(2):407–13.

24. Markell EK, John DT, Krotoski WA, eds. Markell and Voge's medical parasitology, 8th ed. Philadelphia, Saunders, 1999, 55–62.

25. Yassin MM et al. Prevalence of intestinal parasites among school children in Gaza City, Gaza strip. Journal of the Egyptian Society of Parasitology, 1999, 29(2):365–73.

26. Mercado R, Otto JP, Perez M. Variacion estacional de las infecciones por protozoos intestinales en pacientes ambulatorios del sector norte de Santiago, Chile, 1995-1996 [Seasonal variation of intestinal protozoa infection in outpatients of the north section of Santiago, Chile, 1995–1996]. Boletin chileno de parasitologia, 1999, 54(1–2):41–4.

27. Bolbol AH, Mahmoud AA. Laboratory and clinical study of intestinal pathogenic parasites among the Riyadh population. Saudi medical journal, 1984, 5:159–66.

28. Dieng Y et al. Les parasitoses intestinales chez des habitants d'une zone periurbaine a nappe phreatique polluee par les nitrates d'origine fecale (Yeumbeul, Senegal) [Intestinal parasitosis in the inhabitants of a suburban zone in which the groundwater is polluted by nitrates of fecal origin (Yeumbeul, Senegal)]. Sante, 1999, 9(6):351–6.

29. Belding DL. Textbook of parasitology, 3rd ed. New York, Appleton Century Crofts, 1965:123–6.

30. Faust EC, Beaver PC, Jung RC, eds. Animal agents and vectors of human disease, 4th ed. Philadelphia, Lea and Febiger, 1978:25–7.

31. Meyer EA, Radulescu S. Giardia and giardiasis. Advances in parasitology, 1979, 17:1–47.

32. Agro-Meteorological Sub-Sector. Monthly bulletins (October 2001–July 2002). Duhok, Food and Agriculture Organization Coordination Office for Northern Iraq, 2001/2.

33. Al-Barzanjy RKA. Epidemiological study of Giardia spp. in Erbil Governorate [MSc thesis]. Erbil, Iraq, College of Science, University of Salahaddin, 1992.

34. Craun GF. Waterborne giardiasis in the United States: a review. American journal of public health, 1979, 69:817–9.

35. Farthing MJ. Giardiasis as a disease. In: Thompson RCA, Reynoldson JA, Lymbery AJ, eds. Giardia: from molecules to disease and beyond. Wallingford, CAB International, 1994:15–57.

Prevalence of helminth ova in soil samples from public places in Shiraz

H. Motazedian,[1] D. Mehrabani,[2] S.H.R. Tabatabaee,[3] A. Pakniat[1] and M. Tavalali[1]

معدل انتشار بيوض الديدان الطفيلية في عيِّنات التربة المأخوذة من الأماكن العامة في شيراز

محمد حسين معتضديان، داوود مهرباني، سيد حميد رضا طباطبايي، أحمد باك نيت، مهرزاد توللي

الخلاصة: تم أخذ 112 عيِّنة من تربة 26 موقعاً في شيراز في جنوب جمهورية إيران الإسلامية، بُغْيَة تحديد معدل انتشار بيوض الديدان الطفيلية في الأماكن العامة وملاعب الأطفال، وذلك خلال المدة من أيلول/سبتمبر 2002 حتى أيلول/سبتمبر 2003. فوجدت السهمية الهريَّة في 7 عينات (6.3٪) وبيوض الصَّفَر الخراطيني (الأسكاريس) في عيِّنَتَيْن، ويرقات تشبه الاسطوانيَّة البرازية مورفولوجياً في 3 عينات، كما لوحظ وجود أُكريَّات البيضيَّة المتكيِّسة في 4 عينات. و لم يُلاحَظ أي تلوث في موسم الجفاف.

ABSTRACT To determine the prevalence of helminth eggs in public places and children's playgrounds, 112 soil samples were collected in 26 sites in Shiraz, southern Islamic Republic of Iran, during September 2002–September 2003. Toxocara cati ova were found in 7 (6.3%) samples, 2 had Ascaris lumbricoides ova, 3 had larvae morphologically similar to Strongyloides stercoralis. Coccidia oocysts were also observed in 4 samples. No contamination was observed during the dry season.

Prévalence des œufs d'helminthes dans des échantillons de sol prélevés dans des lieux publics à Chiraz

RÉSUMÉ Afin de déterminer la prévalence des œufs d'helminthes dans des lieux publics et des aires de jeux pour enfants, 112 échantillons de sol ont été prélevés sur 26 sites à Chiraz (sud de la République islamique d'Iran) entre septembre 2002 et septembre 2003. Des œufs de Toxocara cati ont été trouvés dans 7 échantillons (6,3 %), 2 échantillons avaient des œufs d'Ascaris lumbricoides, 3 avaient des larves morphologiquement similaires à celles de Strongyloides stercoralis. Des oocytes de coccidies ont été également observés dans 4 échantillons. Aucune contamination n'a été notée pendant la saison sèche.

[1]Department of Parasitology and Mycology, School of Medicine; [3]School of Public Health, Shiraz University of Medical Sciences, Shiraz, Islamic Republic of Iran (Correspondence to H. Motazedian: motazedm@sums.ac.ir).
[2]Razi Vaccine and Serum Research Institute, Shiraz University, Shiraz, Islamic Republic of Iran.
Received: 28/06/04; accepted: 24/11/04

Introduction

Toxocara cati and *T. canis* are cosmopolitan parasites of cats and dogs and have been most commonly incriminated as the cause of visceral larvae migrans and ocular larvae migrans [*1–3*]. Direct contact with animals that harbour adult *Toxocara* worms is unlikely to give rise to infection in humans; the ova must undergo a period of development in the environment before they can become infective [*1*].

Previous reports have noted the presence of *Toxocara* in stray cats, stray dogs and primary-school children in Shiraz [*2–4*]; in addition, *Toxoplasma* oocysts were found in stray cats and antibody response to *Toxoplasma* in primary-school children [*5,6*]. These findings indicate that contact with soil in public places is a potential source of contamination. Stray dogs and cats roam freely in residential areas and public places in Shiraz, and the soil in these places is easily contaminated with their faeces.

As there is a large population of stray dogs and cats in Shiraz and no studies have been made on the extent of contamination of the environment with helminth eggs, this study was undertaken to determine the prevalence of helminth eggs in public places and playgrounds.

Methods

From September 2002 to September 2003, 112 soil samples were collected by cluster random sampling from the uppermost centimetre (15×12 cm^2) of soil in 26 public places and children's playgrounds in 4 regions of Shiraz, Southern Iran. Sampling was carried out in all 4 seasons of the year.

Selection of collecting areas was confined to 4 divisions, south-western (region 1), north-western (region 4), south-eastern (region 3) and north-eastern (region 2) Shiraz. These are the divisions used by the Education and Culture Organization of Shiraz.

The samples were first washed with running tap water, using a set of 3 sieves of mesh width 250 µm, 120 µm and 30 µm. The residue remaining in the 30 µm sieve was flushed into a 250 mL graduated cylinder. The liquid was decanted after 15 minutes sedimentation then the sediment was transferred to a centrifuge tube, shaken with saline solution (specific gravity 1.19) and concentrated by zinc sulfate centrifugation–flotation (centrifugation for 5 minutes at 2500 rpm), and then identified microscopically. All samples were processed twice and recorded as positive if eggs or larvae were found at least once.

Results

Table 1 shows the distribution of soil samples from 26 sites in Shiraz. Helminth eggs were recovered from 12 of the 112 soil samples. The results during the whole year and the wet (autumn/winter) seasons are also summarized in Table 1. No contamination was observed during the dry season.

Eggs of *T. cati* were recovered from 7 samples (Table 1), *Ascaris lumbricoides* ova from 2 and larvae morphologically similar to *Strongyloides stercoralis* from 3. In addition, 4 samples contained oocysts of coccidia.

The burden of *T. cati* ova during the wet season and the whole year is shown in Table 1. The highest contamination rate was in downtown public places in the 3rd (22.2%) and the 4th (20.0%) regions. No contamination was observed during the dry season.

Table 1 Parasitic burden of Toxocara cati and helminth ova in the soil in public places in four regions of Shiraz during the whole year and the wet season, 2002

Region	No. of samples[a]	Contaminated with helminth ova				Contaminated with Toxocara cati ova			
		All year		Wet season[b]		All year		Wet season[b]	
		No.	%	No.	%	No.	%	No.	%
1	36	0	–	0	–	0	–	0	–
2	28	4	14.4	4	28.6	2	7.1	2	14.3
3	18	3	16.7	3	33.2	2	11.1	2	22.3
4	30	5	16.7	5	33.2	3	10.0	3	20.0
Total	112	12	10.7	12	21.4	7	6.3	7	12.5

[a]No. of samples varies in accordance with the area of the region.
[b]Wet season is autumn and winter. No contamination was found during the dry season.

Discussion

Toxocara cati eggs were recovered from 6.3% of soil samples tested. Earlier studies in Shiraz indicated an infection rate of 52.8% in stray cats [*2*] and 2.9% in stray dogs [*4*]; around 25% of sera samples from primary-school children were positive for *Toxocara* [*5*]. In other studies, 10.78% of stray cats were infected and seropositivity for *Toxoplasma gondi* was 23.39% in primary-school children [*3,6*].

Our findings indicate that there is a possibility of human infection from the environment in public places and playgrounds in Shiraz. Embryonated ova can remain viable for a considerable length of time in soil [*1*]. Small children are considered at risk from geohelminth contamination because of their lifestyle and their playing environment, especially those children with a history of pica [*7*]. Public parks, particularly playgrounds, may be an important source of contamination [*8*].

Our findings on the prevalence of *T. cati* eggs corroborate those of other researchers: contamination with *Toxocara* eggs is widespread in the soil in public places [*9–11*].

The high prevalence of *T. cati* ova in the soil samples from downtown parks in the 3rd and 4th regions of Shiraz is evidence that stray dogs and cats were infected and defecate in these areas. These findings are consistent with the parasite burden in children and stray cats in these areas [*2,5*]. The presence of *Toxocara* eggs and larvae in these places emphasizes the risk to children who play there of visceral larvae migrans. Similar findings have been reported previously from Iraq and Jordan [*12,13*].

As humans are the final host for *Ascaris lumbricoides*, the presence of this parasite probably reflects the lack of public latrines. The study demonstrates that the soil in public places and playgrounds in Shiraz is a potential source of contamination. Despite the high temperatures prevalent in Shiraz in summer, clearly identifiable ova were present in many of the specimens collected. The results are of public health importance for this area. Because of the mild temperatures in winter and spring, people often spend their time in public places, especially at night.

For this reason, preventive measures should be implemented. These could include health education of the public, hygienic waste disposal, good personal hygiene practices, control of stray dogs and cats and exclusion of dogs and cats from public places and children's playgrounds by fencing.

Acknowledgements

We would like to thank the Office of the Vice Chancellor for Research of Shiraz University of Medical Sciences for financial support and the Centre for Development of Clinical Research for typing and editorial assistance.

References

1. Glickman LT, Schantz PM. Epidemiology and pathogenesis of zoonotic toxocariasis. Epidemiologic reviews, 1981, 3:230–50.
2. Sadjjadi SM et al. Prevalence and intensity of infestation with Toxocara cati in stray cats in Shiraz, Iran. Veterinarski arhiv, 2001, 7(3):149–57.
3. Tahamtan Y et al. Prevalence of Toxoplasma gondii in stray cats in Shiraz, Southern Iran. Paper presented at the 26th World Veterinary Congress, 23–26 September 1999, Lyon, France.
4. Mehrabani D, Sadjjadi SM, Oryan A. Prevalence of gastrointestinal nematode parasites in stray dogs in Shiraz, Southern Iran. Journal of applied animal research, 2002, 22(1):157–60.
5. Sadjjadi SM et al. Seroprevalence of Toxocara infection in school children in Shiraz, Southern Iran. Journal of tropical pediatrics, 2000, 46(6):327–30.
6. Tahamtan Y et al. Prevalence of Toxoplasma gondii in primary-school children in Shiraz, Southern Iran. Paper presented at the 5th International Epidemiological Association Eastern Mediterranean Regional Scientific Meeting, Bahrain, 23–25 October 2000.
7. Duwel D. The prevalence of Toxocara eggs in the sand in children's playgrounds in Frankfurt/M. Annals of tropical medicine and parasitology, 1984, 7(6)8:633–6.
8. Gillespie SH, Pereira M, Ramsay A. The prevalence of Toxocara canis ova in soil samples from parks and gardens in the London area. Public health, 1991, 105(4):335–9.
9. Gunaseelan L et al. Incidence of Toxocara ova in the environment. Indian veterinary journal, 1992, 69:308–9.
10. O'Lorcain P. Prevalence of Toxocara canis ova in public playgrounds in the Dublin area of Ireland. Journal of helminthology, 1994, 68(3):237–41.
11. Collins GH, Moore J. Soil survey of eggs of Toxocara species. Annals of tropical medicine and parasitology, 1982, 76(5):579–80.
12. Abo-Shehada MN. Prevalence of Toxocara in some schools and public grounds in northern and central Jordan. Annals of tropical medicine and parasitology, 1989, 83(1):73–5.
13. Woodruff AW et al. Toxocara ova in soil in the Mosul District, Iraq, and their relevance to public health measures in the Middle East. Annals of tropical medicine and parasitology, 1981, 75(5):555–7.

Rapid assessment of trachoma in 9 governorates and Socotra Island in Yemen

T.K. Al-Khatib,[1] A.S. Hamid,[1] A.M. Al-Kuhlany,[2] M.H. Al-Jabal[2] and Y.A. Raja'a[1]

التقييم السريع للتراخوما في تسع محافظات وفي جزيرة سُقُطرَى في الجمهورية اليمنية

توفيق قائد الخطيب، عزيز شاهر حميد، عبد الله محمد الكحلاني، محمد حسن الجبل، يحيى أحمد رجاء

الخلاصة: استعرضت هذه الدراسة أنماط تبارز الأهداب داخل الجفن واحتكاكها مع القرنية، والتراخوما النشطة، وعوامل اختطار التراخوما في 9 محافظات بالجمهورية اليمنية وفي جزيرة سُقُطرَى، باستخدام تقييم سريع خلال شهرَيْ تشرين الأول/أكتوبر وشباط/فبراير 2004. وتم فحص 3169 طفلاً تتراوح أعمارهم بين سنة وتسع سنوات في نقطة التقاء مركزية أو بالمنزل. وقد ظهر وجود تراخوما نشطة لدى نسبة كبيرة من الأطفال في محافظات الجوف، ومأرب، وشبوة، مما يجعل من الضروري توجيه استراتيجية SAFE أي جراحة انقلاب الجفن، والمعالجة بالمضادات الحيوية، ونظافة الوجه، وتحسين البيئة إلى هذه المحافظات. كما وجدت حالات تبارز الأهداب داخل الجفن واحتكاكها مع القرنية في حضرموت وتعز، مما يشير إلى أهمية توفير جراحات انقلاب الجفن في هذه المحافظات.

ABSTRACT This study described the pattern of trichiasis, active trachoma and trachoma risk factors in 9 governorates of Yemen plus Socotra Island, using a rapid assessment during October and February 2004. A total of 3169 children aged 1–9 years were examined in a central meeting point or at home. Active trachoma was found in a high percentage of children in Al-Jawf, Mareb and Shabwah governorates and the SAFE strategy (Surgery, Antibiotic treatment, Facial cleanliness, Environmental improvement) should be directed toward these governorates. Trichiasis cases were also found in Hadramout and Taiz, suggesting that eyelid surgery should be provided in these governorates.

Évaluation rapide du trachome dans 9 gouvernorats et dans l'Île de Socotra au Yémen

RÉSUMÉ La présente étude décrit les caractéristiques du trichiasis et du trachome évolutif ainsi que les facteurs de risque de trachome dans 9 gouvernorats du Yémen et dans l'Île de Socotra, à partir d'une évaluation rapide effectuée durant les mois de février et d'octobre 2004. Au total, 3169 enfants âgés de 1 à 9 ans ont été examinés dans un point de rencontre central ou à domicile. Un trachome évolutif a été observé chez un fort pourcentage d'enfants dans les gouvernorats d'Al-Jawf, de Mareb et Shabwah et la stratégie CHANCE (Chirurgie, Antiobiothérapie, Nettoyage du visage et Changement de l'Environnement) devrait donc être focalisée sur ces gouvernorats. Des cas de trichiasis ont également été trouvés à Hadramout et Taiz, ce qui semble indiquer que la chirurgie des paupières devrait être assurée dans ces gouvernorats.

[1]Faculty of Medicine and Health Sciences, University of Sana'a, Sana'a, Yemen (Correspondence to T.A. Al-Khatib: tawfik234@yahoo.com).
[2]Ministry of Public Health and Population, Sana'a, Yemen.
Received: 20/10/04; accepted: 31/01/05

Introduction

Today, trachoma is still found in underprivileged communities with poor living conditions. The World Health Organization (WHO) calculated that blinding trachoma is still present in 46 countries, encompassing 150 million people. Yemen is one of these countries [*1*]. It is estimated that 15% of the blindness in the world is caused by trachoma [*2*]. The disease is found mainly in remote rural areas of most African countries and in several Eastern Mediterranean Region countries such as Saudi Arabia [*3*], Egypt [*4*], Sudan [*5*], Oman [*6*] and Yemen [*7*]. The Egyptian study revealed a prevalence of active trachoma of 36.5% among preschool children [*4*]. In Yemen, a seroprevalence study of *Chlamydia trachomatis* infection among schoolchildren in rural and urban Sana'a revealed a rate of 45.9%. The rate was higher among rural (73.2%) than urban children (23.1%) [*7*].

The risk factors that predispose to infection are mostly environmental and poor hygiene practices. The major risk factors are overcrowding, absence of a latrine [*8*], a home of wood and earth [*9*], poor personal hygiene and keeping animals within the dwelling [*10*]. When assessing trachoma at the community level, it is important to consider both the inflammatory disease in children and the potentially blinding complications (i.e. trichiasis) in adults.

Several rapid assessments have been carried out in different countries. An assessment conducted in Ethiopia showed that more than half (51.1%) of the children aged 10 years or less had active trachoma [*11*]. On the other hand, active trachoma and trachomatous trichiasis each were found in 5.5% of individuals older than 10 years of age. Most of the households (97.6%) had no latrine and of the few that had one, only two-thirds of the occupants used it. In Burkina Faso, the presence of flies on children's face and dirty faces were strongly associated with the rate of trachoma [*12*].

No national trachoma assessment survey has previously been reported in Yemen. Therefore, the need for a country-wide rapid assessment in order to control for the disease is evident. Our study aimed to prioritize governorates by the rate of active trachoma and to describe the pattern of trichiasis, active trachoma and trachoma risk factors.

Methods

A survey of trachoma using rapid assessment methodology was conducted during October 2003 to February 2004 in 9 out of the 22 governorates of Yemen. Data about environmental factors were collected from households, while demographic and clinical data were collected from children and elderly people.

Sample selection

The selected governorates were: Mareb, Shabwah, Hadramout, Ibb, Taiz, Al-Jawf, Al-Hodiedah, Abyan, Lahj and Socotra Island. The selection of the governorates was the outcome of a 3-day workshop during September 2004. Reports of the Ministry of Public Health and judgements of senior experienced ophthalmologists were reviewed and discussed by the assessment team together with a WHO expert. The selection involved all 5 governorates where cases of active trachoma are frequently reported, plus another 4 governorates selected randomly from the list of governorates where active trachoma is rarely reported, plus Socotra Island. The selection technique was made according to the guidelines for rapid assessment for blinding trachoma [*13*].

In each governorate, communities/villages were selected when at least 1 of the following criteria applied:

1. Uncertain situation or suspicion of trachoma, based on a previous review or analysis.
2. Evidence of trachoma from previous reports or from key informants (using the field visit to validate the information derived from the previous review).
3. Isolated community of less than 500 people, with special attention to minorities and marginalized mobile or migrant population groups or tribes.
4. No easy or permanent access to water.
5. Primary health care services are weak, irregular or non-existent.
6. No school present in the community.

Children included in the rapid clinical assessment were aged 1–9 years old and selected from at least 15–20 households/compounds. In areas where villages consisted of continuous households with a well-structured neighbourhood, we surveyed 15–20 households in one section or in each neighbourhood. In areas where villages consisted of widely spaced households, scattered households were assessed until the required sample size of 50 children was reached. If a selected village did not have enough children to reach the sample size, we examined all the children present. At least half of the 50 children were pre-school children.

Data collection and analysis

A total of 3169 children between the ages of 1–9 years were examined for the signs of active trachoma. The examination was conducted in a central meeting point or at home and each eye was examined separately. The assessment of active trachoma and trichiasis was made according to the WHO simplified trachoma grading system [*13*] by a team consisting of an ophthalmic consultant, ophthalmologist and a candidate for the diploma in ophthalmology. The team used a binocular loupe with × 2.5 magnification.

Elderly people with trichiasis, entropion and corneal opacities were also searched for and recorded when encountered.

Environmental risk factors were operationally defined as: absence of latrine, presence of solid waste within the dwelling and inaccessible water supply (more than 30 minutes walk). Personal hygiene was operationally defined by unclean face; that is, if flies were observed on the face or discharges were seen on the eye or the nose. Both environmental factors and unclean faces were identified by observation.

Data were processed using *SPSS* to calculate frequencies and percentages.

Results

Active trachoma was found to affect a high percentage of children in 3 of the governorates: Al-Jawf (48.0%), Mareb (25.0%) and Shabwah (17.0%). The trachoma rates were much lower in Ibb (6.0%), Hadramout (5.0%) and Al-Hodeidah (4.0%), where some districts were also affected by active trachoma: Sayon, Al-Makhader, Al-Udain and Al-Doraihemi. Tachoma rates were very low in Abyan (0.9%), Lahj (0.9%), Taiz (0.9%) and Socotra (0.7%) (Table 1).

The percentage of children with unclean faces followed a similar pattern to the governorates with active trachoma: Al-Jawf (41.7%), Mareb (37.7%) and Shabwah (30.3%) had the highest rates, followed by Al-Hodiedah, Abyan, Taiz, Ibb, Lahj, Socotra Island and Hadramout (Table 1). The percentage of children with unclean faces was found to correlate positively with the percentage with active trachoma ($r = 0.92$).

Table 1 Clinical and environmental rapid assessment of trachoma in 9 governorates of Yemen plus Socotra Island

Governorate	Clinical assessment				Environmental assessment			
	Total children examined	Children with active trachoma	Children with unclean faces	Trichiasis cases in community	Total households visited	Absence of latrine	Solid waste	Water > 30 min. walk
	No.	%	%	No.	No.	%	%	%
Al-Jawf	302	48.0	41.7	5	143	88.1	19.6	18.9
Mareb	313	25.0	37.7	14	148	1.4	87.2	0.0
Shabwah	333	17.0	30.3	5	242	72.3	76.4	81.9
Ibb	313	5.8	13.2	0	133	18.8	0.0	29.3
Hadramout	315	5.0	10.5	9	94	65.4	81.9	0.0
Al-Hodiedah	319	4.0	22.9	0	129	88.4	76.7	0.0
Abyan	322	0.9	16.5	2	203	20.7	58.2	36.0
Lahj	313	0.9	11.2	1	168	50.6	74.5	0.0
Taiz	332	0.9	15.1	7	171	32.8	73.7	0.0
Socotra	300	0.7	10.7	0	116	71.7	8.3	0.0

Cases of trichiasis among older people were found in the 3 governorates with high rates of active trachoma (Jawf, Mareb and Shabwah) but also in governorates with low rates of trachoma (Hadramout and Taiz), and to some extent in Abyan and Lahj. No trichiasis cases were found in Al-Hodiedah, Ibb or Socotra Island (Table 1).

The risk factors of trachoma such as presence of solid waste and houses with no latrines were found in a higher proportion of households in the endemic governorates of Al-Jawf, Mareb and Shabwah (Table 1). For example, in Al-Jawf latrines were not available for 88.1% of the population, in Mareb 87.2% of household had solid waste from animals, while the situation in Shabwah was worse with latrines lacking in 72.3% and solid waste seen in 76.4% of households. These 3 governorates also had the highest proportion of children with unclean faces.

Discussion

The assessment showed that Al-Jawf, Mareb and Shabwah had the highest rates of active trachoma and are thus high priority governorates for application of the "SAFE" control strategy among the investigated governorates. The SAFE strategy for trachoma control comprises Surgery, Antibiotics, Facial cleanliness and Environmental hygiene [*14*]. Some districts in Hadramout, Ibb and Al-Hodiedah were also affected by active trachoma and therefore treatment with topical tetracycline or systemic azithromycin (the "A" component of the SAFE strategy) can be recommended in these areas.

It was expected during the deskwork phase that Hadramout and Al-Hodiedah would rank among the highly affected areas, as Hadramout governorate lies on the desert line and Al-Hodiedah has reported a very high rate of active trachoma and trichiasis cases. The rapid assessment found, however, that there is better coverage with standpipe water in the 2 governorates than in other governorates. As findings from the field sometimes revealed that our predictions were not reliable, the situation in the other governorates need to be assessed in the field, especially Sa'da and Al-Mahara, where environmental conditions are suitable for transmission.

The number of trichiasis cases was found to be high in Hadramout, Mareb, Taiz, Al-Jawf and Shabwah. In view of the rate of active trachoma it is clear that Mareb, Al-Jawf and Shabwah governorates have suffered and are still suffering from this health problem. This confirms the need for focusing the full SAFE control programmes in these 3 governorates. However, while the rate of active trachoma is not so high in Hadramout and Taiz governorates, the high number of trichiasis cases found in these 2 governorates suggest that surgery (the "S" component of the SAFE strategy) should also be directed to these governorates.

The current assessment revealed a very high positive correlation between the rate of unclean faces and the rate of active trachoma. Unclean faces were observed in Al-Jawf, Mareb, Shabwah, Al-Hodiedah, Abyan and Taiz in descending order. The control programme in these areas should focus on health education about cleanliness and availability of safe water sources within a suitable distance (the "F" and "E" component of the SAFE strategy).

Community risk factors, i.e. unavailability of a water source within a suitable distance and deficiency in functioning latrines, were predominant in the governorates most affected by active trachoma. However, there were anomalies. For example, while Mareb governorate currently enjoys good water access and presence of latrines, it still has a

high share of the burden of active trachoma. This could be attributed to the continuous contact with animals in the houses. Therefore, the control strategy in this governorate should focus on health education, drug availability and surgery.

Recommendations

- To assess the situation in the other governorates which have environmental and social similarities with the endemic areas investigated here (e.g. Al-Mahara and Sa'da governorates).
- To implement the SAFE control strategy in the 3 high priority governorates: Al-Jawf, Mareb and Shabwah. To consider applying SAFE to some districts in Hadramout, Ibb, Taiz and Al-Hodiedah.
- To focus on health education about cleanliness in Mareb.
- To provide access to eyelid surgery in Hadramout and Taiz governorates as these were high transmission areas in the past.

Acknowledgements

The researchers acknowledge with thanks the technical and financial support given by the WHO Sana'a Office and the WHO EMRO expert Dr AbdulHannan Chaudry who participated in the preparation workshop. The participation of the new graduates of Diploma in Ophthalmology is appreciated. Special words of appreciation are due to Dr M. Al-Mansoob for data analysis.

References

1. Taylor HR. A trachoma perspective. Ophthalmic epidemiology, 2001, 8(2–3):69–72.
2. Thylefors B et al. Global data on blindness. Bulletin of the World Health Organization, 1995, 73:115–21.
3. Tabbara KF. Trachoma: a review. Journal of chemotherapy, 2001, 13: S18–22.
4. Ezz al Arab G et al. The burden of trachoma in the rural Nile delta of Egypt: a survey of Menofiya governorate. British journal of ophthalmology, 2001, 85:1406–10.
5. Salim AR, Sheikh HA. Trachoma in the Sudan. An epidemiological study. British journal of ophthalmology, 1975, 10: 600–4.
6. Khandekar R, Mohammed AJ, Courtright P. Recurrence of trichiasis: a long-term follow-up study in the Sultanate of Oman. Ophthalmic epidemiology, 2001, 8(2–3):155–61.
7. Sallam TA et al. Chlamydia trachomatis infection among Yemeni school pupils in relation to environmental conditions. Saudi medical journal, 2003, 24(1):84–7.
8. Courtright P et al. Latrine ownership as a protective factor in inflammatory trachoma in Egypt. British journal of ophthalmology, 1991, 75:322–5.
9. Turner VM et al. Risk factors for trichiasis in women in Kongwa, Tanzania: a case–control study. International journal of epidemiology, 1993, 22:341–7.
10. West S et al. Impact of face-washing on trachoma in Kongwa, Tanzania. Lancet, 1995, 345:155–8.
11. Bejiga A, Alemayehu W. Prevalence of trachoma and its determinants in Dalocha District, Central Ethiopia. Ophthalmic epidemiology, 2001, 8(2–3):119–25.
12. Schemann JF et al. Trachoma, flies and environmental factors in Burkina Faso.

Transactions of the Royal Society of Tropical Medicine and Hygiene, 2003, 97 (1):63–8.

13. Negrel AD, Taylor HR, West S. Guidelines for the rapid assessment for blinding trachoma. Geneva, World Health Organization, 2001.

14. Paxton A, Singida Trachoma Study Team. Rapid assessment of trachoma prevalence—Singida, Tanzania. A study to compare assessment methods. Ophthalmic epidemiology, 2001, 8(2–3):87–96.

Strategy to eliminate blinding trachoma

Trachoma is one of the oldest infectious diseases known to mankind. It is caused by Chlamydia trachomatis which spreads through contact with eye discharge from the infected person (on towels, handkerchiefs, fingers, etc.) and through transmission by eye-seeking flies. After years of repeated infection, the inside of the eyelid may be scarred so severely that the eyelid turns inward and the lashes rub on the eyeball, scarring the cornea. If untreated, this condition leads to the formation of irreversible corneal opacities and blindness.

Blinding trachoma is avoidable. The strategy to eliminate the disease is based on: eyelid surgery, antibiotics to treat the infection, education about facial cleanliness and personal hygiene and environmental improvements.

Community development and intensified action by WHO's Global Alliance for the Elimination of Blinding Trachoma by 2020, has reduced the number of people with blinding trachoma. The estimated number of people affected has fallen from 360 million people in 1985 to approximately 80 million people in 2006.

Documents and publications from the Global Alliance for the Elimination of Trachoma can be accessed at: http://www.who.int/blindness/publications/get2020/en/index.html.

Measles seroepidemiology among adolescents and young adults: response to revaccination

M.J Saffar,[1] M. Alraza-Amiri,[1] A. Ajami,[1] F. Baba-Mahmoodi,[1] A.R. Khalilian,[1] C. Vahidshahi[1] and A. Shamsizadeh[1]

وبائيات سيرولوجيا الحصبة بين المراهقين واليافعين: الاستجابة لإعادة التطعيم

محمد جعفر صفار، مهدي آل رضا أميري، أبو القاسم أعجمي، فرحناك بابا محمودي، علي رضا خليليان، كوروش وحيد شاهي، أحمد شمسي زاده

الخلاصة: قام الباحثون بتقييم معدل الانتشار المصلي لمستضدات الحصبة والاستجابة لإعادة التمنيع ضد الحصبة لدى 590 مراهقاً ويافعاً سبق تطعيمهم؛ فثبت أن 263 منهم سلبي المصل. وللتفرقة بين فشل اللقاح الأوَّلي والثانوي، تم تقييم عيار الغلوبولين المناعي G والغلوبولين المناعي M بعد مضي 2–4 أسابيع من إعادة التطعيم لدى 144 فرداً، (فوجد أن 105 كانوا سلبيِّي المصل و39 إيجابيِّي المصل). وقد استجاب 75 من سلبيِّي المصل لإعادة التطعيم الإذكاري ($P < 0.001$) وظهرت لديهم المناعة، بينما أظهر 11 شخصاً استجابة للغلوبولين المناعي M (مما يشير غالباً إلى فشل اللقاح الأوَّلي)؛ بينما ظلت الحماية المصلية متوافرة لنحو 38 من المشاركين إيجابيِّي المصل دون زيادة ملموسة في عيار المستضد ($P=0.577$). وقد كان معدل الإخفاق الأوَّلي 4.7٪، والثانوي 27.1٪. أما بعد إعادة التطعيم فقد أصبح 87.3٪ محميِّين مصلياً.

ABSTRACT We evaluated the seroprevalence of measles antibody and response to measles reimmunization in 590 previously vaccinated adolescents and young adults; 263 were seronegative. To differentiate between primary and secondary vaccine failure, anti-measles IgM and IgG titres were assessed again 2–4 weeks after revaccination in 144 (105 seronegative, 39 seropositive) individuals: 75 seronegative participants responded to revaccination anamnestically ($P < 0.001$) and developed immunity, 11 also showed IgM response (probably primary vaccine failure); 38 seropositive participants remained seroprotected without significant increase in antibody titre ($P = 0.577$). Primary vaccine failure was 4.7%; secondary vaccine failure was 27.1%. After revaccination, 87.3% were seroprotected.

Séroépidémiologie de la rougeole chez des adolescents et de jeunes adultes : réponse à la revaccination

RÉSUMÉ Nous avons évalué la séroprévalence des anticorps antirougeoleux et la réponse à la revaccination contre la rougeole chez 590 adolescents et jeunes adultes ayant déjà été vaccinés ; 263 étaient séronégatifs. Pour faire la distinction entre l'échec vaccinal primaire et secondaire, le titre des anticorps IgM et IgG antirougeoleux a été réévalué 2-4 semaines après la revaccination chez 144 sujets (105 séronégatifs, 39 séropositifs) : 75 participants séronégatifs ont présenté une réponse anamnestique à la revaccination ($p < 0,001$) et ont développé une immunité, 11 ont également montré une réponse en IgM (probablement un échec vaccinal primaire) ; chez 38 participants séropositifs la séroprotection persistait sans augmentation significative du titre des anticorps ($p = 0,577$). L'échec vaccinal primaire était de 4,7 % ; l'échec vaccinal secondaire s'élevait à 27,1 %. Après la revaccination, 87,3 % étaient séroprotégés.

[1]Department of Paediatrics, Paediatric Infectious Disease Ward, Bouali-Cina Hospital, Mazandaran University of Medical Sciences, Sari, Islamic Republic of Iran (Correspondence to M.J. Saffar: saffar@softhome.net).

Received: 23/11/04; accepted: 28/02/05

Introduction

Despite the availability of a safe and effective vaccine, measles remains a public health problem worldwide. It has been estimated that 30 million people contract measles every year, and that nearly 1 million die. Many of the cases occur in adolescents and young adults [*1–4*]. Measles-related mortality also accounts for around 10% of all deaths in children < 5 years in developing countries [*5*].

There are only 2 reasons why older children remain susceptible to measles: failure to have been vaccinated and vaccine failure [*6*]. Vaccine failure remains a major obstacle that must be overcome before measles can be controlled [*7*]. Primary vaccine failure (PVF) is failure of immediate seroconversion, with a documented lack of detectable specific antibody. Administration of a second dose of vaccine results in a high proportion undergoing a primary antibody response, with an initial IgM response followed by IgG seroconversion. Secondary vaccine failure (SVF) results when there is initial documented seroconversion in response to vaccination followed by loss of protection, usually linked to waning serum antibody levels [*8*]. On exposure to measles virus, an individual may contract the virus and only show anamnestic type of antibody response, or may become ill. Following a second dose of vaccination, a large boost in IgG antibody levels generally occurs, with little or no IgM response [*8*].

Around 95%–98% of individuals who receive a single dose of measles vaccine after 12 months of age develop measles antibodies [*9*]. Some studies have shown that children vaccinated twice have better protection than single dose recipients [*8,9*]. The measles vaccine is, however, less immunogenic in the presence of maternal antibodies before 12 months of age [*8*], and some studies showed that additional doses of vaccine could not boost the antibodies to a satisfactory level, and that any boosting that did take place was only short-lived [*7,10,11*].

Since 1981, through the Expanded Programme on Immunization, the World Health Organization has recommended a single dose of measles vaccine at 9 months of age in countries where measles is a problem in the first year of life [*12*]. Despite this programme, measles continues to be a major child health problem in developing countries [*6,13*].

The Iranian immunization policy follows the World Health Organization's recommendation for developing countries, and includes a monocomponent vaccine against measles at 9 months of age [*12*]. In addition, the Iranian Ministry of Health recommends that a second dose of the measles vaccine be given at the age of 15 months. After implementing the 2-dose vaccination schedule with high levels of coverage (> 95%), between 1988 and 1998 the incidence of measles decreased markedly in Iran. During recent years, however, the incidence of the disease has been increasing, with some incidences in previously vaccinated individuals among all age groups, mainly adolescents and young adults [*14,15*].

This study was designed to determine the probable causes of this resurgence in measles cases, especially in adolescents and young adults who had been vaccinated against measles according to the Iranian vaccination schedule. We also evaluated the IgM and IgG antibody responses to reimmunization with measles-containing vaccine to differentiate PVF from SVF.

Methods

Participants

This study was carried out from October 2003 to February 2004. Healthy volunteers [with no history of medical problems (e.g. acute respiratory infection, febrile illnesses, skin rash), physician-diagnosed measles or chronic illness] between 15 and 25 years of age were recruited from the student population at Mazandaran University of Medical Sciences and at several secondary schools from different areas of Sari, the capital of Mazandaran province. Medical students were recruited through flyers circulated in the university and volunteers selected based on medical vaccination records (recipients of 1 dose of measles vaccine). High-school students were selected based on medical vaccination records (recipients of 2-dose measles vaccine) and student population density. If a student refused to participate, the next student was substituted. We did not have a substantial refusal rate.

Written informed consent was obtained from all participants. For volunteers under the age of 18 years, informed consent was also obtained from a parent. The protocol was reviewed and approved by the Medical Ethics Committee of the university.

Vaccine histories of the participants were obtained from the primary health centre vaccine records. Up to 1982, measles vaccination policy in the Islamic Republic of Iran was to administer 1 dose of the vaccine after the age of 12 months (Measles vaccine, Bio-Merieux, France). The 1981 recommendations of the Expanded Programme on Immunization for measles vaccination for developing countries have been implemented in the Islamic Republic of Iran since 1983 [*6*], with some modification, i.e. 2 doses of measles vaccine administered at 9 and 15 months of age (Measles vaccine, Razi Institute, Tehran).

Blood sampling

For initial screening, 5 mL of venous blood was drawn from each participant under the supervision of one of the researchers. Samples were taken during October 2003–December 2003 and for the second phase during January 2004–February 2004. Sera were stored at –20 °C until assayed. As part of the measles–rubella mass vaccination programme in the Islamic Republic of Iran (6–31 December 2003), all individuals 5–25 years of age were vaccinated with measles–rubella virus-containing vaccine (Serum Institute of India Ltd, Pune), i.e. all those in the study sample were revaccinated after the first blood sampling. Sera were obtained 2–4 weeks after revaccination to determine the IgM and IgG antibody responses to revaccination.

Serologic assay

Measles IgG and IgM antibodies were detected by enzyme-linked immunosorbent assay (Measles IgM-ELISA and measles IgG-ELISA, IBL, Hamburg). The tests were performed in the university laboratory according to the manufacturer's instructions. Quantitative antibody titres < 10 IU/mL were reported as negative and ≥ 10 IU/mL as positive. All sera (samples obtained before and after revaccination) were tested for IgG measles-specific antibodies; IgM was measured only in blood samples taken after revaccination to differentiate primary and secondary response types.

Statistical analysis

Data were analysed as ordinal and continuous variables. Antibody levels were log-transformed for calculation of geometric mean antibody concentrations. The student *t*-test was used to compare the mean values in the pre- and post-vaccination groups. All statistical analysis was performed using *SPSS*, version 10.

Results

A total of 590 adolescents and young adults (39.7% female), mean age 21.1 years [standard deviation (SD) 5.0; range 15–25 years], were enrolled into the measles seroprevalence study trial and underwent serological screening for measles-specific IgG antibody. All of these individuals had previously received measles vaccine, 2 doses (at 9 months and 15 months) in the 209 participants 15–19 years old and 1 dose (after 12 months) in the 381 participants aged 20 years and older), as part of the routine measles vaccination schedule in the Islamic Republic of Iran.

We found that 263 (44.6%) participants were serologically negative for measles antibody, geometric mean concentration 4.09 (SD 2.6) IU/mL mean age 20.0 (SD 2.9) years, and 327 (55.4%) were seropositive, geometric mean concentration 56.5 (SD 45.3), mean age 22.2 (SD 7.0). The results of the serological assays are summarized in Table 1.

All 590 individuals were revaccinated (as part of the catch-up programme, 6–31 December 2003), and 105 participants identified as seronegative and 39 identified as seropositive agreed to provide blood samples for follow-up studies. Seventy-five of the revaccinated seronegative individuals (71.4%) responded to revaccination and showed significant increase in the levels of IgG measles antibody ($P < 0.001$) (Table 2); 11 (10.5%) also showed IgM response (probably primary vaccine failure). Of the 39 revaccinated seroprotected individuals, 38 remained seropositive with no statistically significant increase in IgG measles antibody. No IgM response was detected in this group.

To understand the effect of vaccine dose at initial immunization on seropositivity, response to reimmunization and amount of time elapsed between initial immunization and revaccination, we compared the seropositivity rates and responses to revaccination in 2 age groups: 15–19 years (previously received 2 doses of measles vaccine) and 20 years and older (previously received 1 dose of measles vaccine). As shown in Table 1, 103 (49.2%) of the 209 people in the younger group and 160 (42.0%) of the 381 in the older group were seronegative, $P = 0.16$.

Also, 65.8% of the revaccinated individuals enrolled in the younger (2 dose) group responded to revaccination compared to 91.3% in the older (single dose) group (Table 3). Based on these results, extrapola-

Table 1 Seroprevalence status of adolescents and young adults before measles revaccination, Sari, Islamic Republic of Iran

Measles seroprevalence	Participants					
	Total (n = 590)		Age 15–19 years (n = 209)		Age 20–25 years (n = 381)	
	No.	%	No.	%	No.	%
Antibody positive[a]	327	55.4	106	50.8	221	58.0
Antibody negative[b]	263	44.6	103	49.2	160	42.0
GMC (SD) (IU/mL)	30.3 (24.0)		59.7 (48.4)		53.3 (42.2)	

GMC = geometric mean antibody concentration.
SD = standard deviation.
[a]GMC 4.09 (SD 2.6).
[b]GMC 56.5 (SD 45.3).

Table 2 Comparison of response to revaccination between seronegative and seroprotected individuals, Sari, Islamic Republic of Iran

Variable	IgG response		IgM response		GMC				P-value
					Pre-vaccination		Post-vaccination		
	No.	%	No.	%	Mean	SD	Mean	SD	
Seronegative (n = 105)	75	71.4	11	10.5	4.2	2.6	37.5	44.2	< 0.001
Seropositive (n = 39)	38	97.4	0	–	68.3	64.4	63.0	56.4	0.577

GMC = geometric mean antibody concentration.
SD = standard deviation.

tions can be made regarding PVF, SVF and efficacy of initial vaccination and revaccination programmes. Thus, PVF was estimated at 4.7% [(263 × 100 × 11)/(590 × 105)] and SVF at 27.1% [(263 × 64 × 100)/(590 × 105)] and total vaccination and revaccination efficacy was estimated at 87.3% [327 + (263 × 75)/(590 × 105)], so community immunity on 95% vaccination coverage would be 82.9% [(87.3 × 95)/100], where 590 = total no. participants in primary screening, 263 = no. seronegative in primary screening, 105 = no. seronegative after revaccination, 75 = no. responding to revaccination (IgM, IgG), 64 = no. seronegative responding with IgG response only (probably SVF), 11 = no. seronegative responding with IgM (probably PVF) and 327 = no. immune in primary screening.

Table 3 Comparison of response to revaccination in seronegative individuals according to number of doses of measles vaccine originally given

Doses	Total (n = 105)	Responded	
		No.	%
2	82	54	65.9
1	23	21	91.3

Discussion

In this study we measured anti-measles IgG antibody titres 15 to 25 years after 1 or 2 doses of measles vaccination to determine the proportion of seropositivity. Of the studied population 44.6% were seronegative, and there was no difference between those who had had 1 dose of vaccine and those who had had 2 doses ($P = 0.16$).

Reinfection and disease seem to occur in individuals who have previously had a measles immunization and when the titre has fallen below a critical level [*16,17*]. Vaccine failure may occur either because the immune response never developed or because it waned over time [*18,19*]. Reported rates of primary vaccine failure vary widely (0–74%) [*8*]. Some studies documented lower rates of seroconversion when the first immunization was given before 12 months of age [*7,10,11*]. Linnemann et al. found that 40% of children who had received 2 doses of measles vaccine (first dose before 12 months of age) were seronegative, and 33% of the seronegative ones did not respond to a third dose of vaccine [*10*]. Studies on seroconversion rates in children after the first and second doses of measles vaccination at 9 and 15 months of age showed seroconversion rates of 77.6% and 69.9% after the first dose and 81.9%

and 90.3% after the second dose of measles vaccine [*20,21*].

The phenomenon of SVF due to waning immunity may become apparent only after the passage of years. There is some indication that antibody titres fall to low or undetectable levels in populations with little re-exposure. This problem may be greater in areas where immunization was introduced early and the initial antibody response was lower [*19,12–26*]. The findings of a study on long-term persistence of antibody titres induced by vaccination and natural infection suggest that vaccine-induced measles antibodies decline with time, and fall below protective levels [*19*]. Results of a study from China indicated that 14 years after primary immunization, around 10% of those vaccinated had lost their protective levels, with antibody titres beginning to convert to negative between the third and sixth year after immunization [*26*].

In our study, after revaccination, 71.4% of 105 people who were seronegative showed IgG antibody response to revaccination. However, no significant increase in antibody level was observed in the 39 seropositive individuals we examined. These results are comparable with the findings of other studies. Cohen et al. demonstrated that 58% of seronegative individuals 10–30 years of age developed measles-specific IgG titres that remained positive at least 1 year after revaccination, and the remainder either developed only a transient response (30%) or never developed a positive titre (12%) [*27*]. Poland et al. showed that 19.2% of people vaccinated were seronegative 4–11 years after the primary series of vaccination and 18.5% of 130 seronegative individuals remained seronegative after revaccination [*28*]. In an investigation on a measles outbreak in a fully vaccinated school population, 18% of 239 sera (26% of those > 17 years) collected from students just before revaccination were negative for measles antibodies, and 7.9% of students were unprotected against illness with rash and 44.8% against measles without rash; 9 to 11 months after revaccination these rates were 3% and 45%, respectively [*29*]. Two other studies showed that people with protective levels of antibodies did not respond to revaccination anamnestically, but seronegative individuals did, although perhaps temporarily [*24,30*].

To determine whether the seronegativity had been induced by PVF or SVF, the IgM antibody responses were assayed. Eleven of 105 (10.47%) seronegative individuals showed IgM antibody response after revaccination, the results suggested that they probably were a result of PVF. The lack of an IgM response in other responders suggests the previous response to vaccination had been lost over time [*7*].

Recent successes in interrupting measles transmission in the World Health Organization Region of the Americas, most other countries in Europe and selected countries in other regions provide evidence for the feasibility of global eradication [*31–35*]. The World Health Organization has developed a global plan for accelerated measles control which calls for implementation of a strategy based on that used to successfully control measles in the Pan American Health Organization (PAHO): a catch-up campaign providing measles vaccine to all children regardless of prior history of immunization or disease, followed by high levels of routine coverage with measles immunization (keep-up) and periodic follow-up campaigns targeting all children 1–4 years of age [*35*].

To interrupt virus transmission in a community, > 95% of a population must be protected. It seems impossible to reach a sufficiently high level of protection by routine vaccination. In this study among adolescents and young adults in Mazandaran 15–25 years after scheduled measles vacci-

nation, PVF and SVF were 4.7% and 27.1% respectively. After revaccination, 87.3% of those vaccinated developed immunity. Considering the vaccine coverage of 95% and efficacy of 87%, only 83% of individuals would be immune, a rate which may not prevent measles outbreaks.

Conclusion

Based on the results of this and previous studies on measles epidemiology in Mazandaran and the rest of the country [*14,15*], and also taking into account experiences on measles control in other parts of the world [*31–34*], we advise the implementation of World Health Organization-recommended strategies to reduce and interrupt indigenous measles virus transmission in the Islamic Republic of Iran. Mass vaccination with a keep-up phase and follow-up cyclic campaigns would reduce the number of susceptible individuals and to prevent new outbreaks.

References

1. Hersh BS et al. Review of regional measles surveillance data in the Americas, 1996–99. Lancet, 2000, 355(9219):1043–8.
2. Study of measles epidemiology in Iran during 1991 to 1998. Annual report of the Minister of Health and Medical Education. Tehran, Ministry of Health and Medical Education, 1998.
3. Miller M, Williams WW, Redd SC. Measles among adults, United States, 1985–1995. American journal of preventive medicine, 1999, 17(2):114–9.
4. Centers for Disease Control and Prevention. Progress toward measles elimination—Region of the Americas, 2002–2003. Morbidity and mortality weekly report, 2004, 53(14):304–6.
5. Chalmers I. Why we need to know whether prophylactic antibiotics can reduce measles related morbidity. Pediatrics, 2002, 109(2):12–5.
6. Rosenthal SR, Clements CJ. Two-dose measles vaccination schedules. Bulletin of the World Health Organization, 1993, 71(3–4):421–8.
7. Wilkins J, Wehrle RF. Additional evidence against measles vaccine administration to infants less than 12 months of age: altered immune response following active/passive immunization. Journal of pediatrics, 1979, 94(6):865–9.
8. Redd SC, Markowitz LE, Katz SL. Measles vaccine. In: Plotkin SA, Orenstein WA, eds. Vaccines, 3rd ed. Philadelphia, WB Saunders, 1999:222–66.
9. Measles. In: Pickering LK, ed. Red book: 2003 Report of the Committee on Infectious Diseases, 26th ed. ELK Grove Village, American Academy of Pediatrics, 2003:419–29.
10. Linnemann CC Jr et al. Measles immunity after revaccination: results in children vaccinated before 10 months of age. Pediatrics, 1982, 69(3):332–5.
11. Stetler HC et al. Impact of revaccinating children who initially received measles vaccine before 10 months of age. Pediatrics, 1986, 77(4):471–6.
12. Expanded Programme on Immunization, Global Advisory Group. Weekly epidemiological record, 1981, 56(2):9–16.
13. Mitchell LA et al. Serologic responses to measles, mumps, and rubella (MMR) vaccine in healthy infants: failure to respond to measles and mumps components may influence decisions on timing of the sec-

ond dose of MMR. Canadian journal of public health, 1998, 89(5):325–8.

14. Azmoodah M. Epidemiology of measles in Iran, year 1998. Paper presented at the 8th Iranian congress of infectious diseases and tropical medicine, Tehran, 16–20 January 2000 (in Farsi).

15. Saffar MJ et al. Epidemiology of measles in Mazandaran province, year 2000–2002. Namah Daneshgah (journal of Mazandaran University of Medical Sciences), 2006, 16(52):48–56 (in Farsi).

16. Gustafson TL et al. Measles outbreak in a fully immunized secondary-school population. New England journal of medicine, 1987, 316(13):771–4.

17. Chen RT et al. Measles antibody: reevaluation of protective titers. Journal of infectious diseases, 1990, 162(5):1036–42.

18. Mathias RC et al. The role of secondary vaccine failure in measles outbreaks. American journal of public health, 1989, 79:475–8.

19. Christensen B, Bottiger M. Measles antibody: comparison of long-term vaccination titres, early vaccination titres and naturally acquired immunity to and booster effects on the measles virus. Vaccine, 1994, 12(2):129–33.

20. Isik N et al. Seroconversion after measles vaccination at nine and fifteen months of age. Pediatric infectious diseases journal, 2003, 22(8):619–25.

21. Ceyhan M et al. Immunogenicity and efficacy of one dose measles-mumps-rubella (MMR) vaccine at twelve months of age as compared to monovalent measles vaccination at nine months followed by MMR revaccination at fifteen months of age. Vaccine, 2001, 19(31):4473–8.

22. Edmonson MB et al. Mild measles and secondary vaccine failure during a sustained outbreak in a highly vaccinated population. Journal of the American Medical Association, 1990, 263(18):2467–71.

23. Markowitz LE et al. Duration of live measles vaccine-induced immunity. Pediatric infectious diseases journal, 1990, 9(2):101–10.

24. Davidkin I, Valle M. Vaccine-induced measles virus antibodies after two doses of combined measles, mumps and rubella vaccine: a 12-year follow-up in two cohorts. Vaccine, 1998, 16(20):2052–7.

25. Whittle HC et al. Effect of subclinical infection on maintaining immunity against measles in vaccinated children in West Africa. Lancet, 1999, 353(9147):98–102.

26. Cai B et al. Duration of immunity following immunization with live measles vaccine: 15 years of observation in Zhejiang province, China. Bulletin of the World Health Organization, 199, 69(4):415–23.

27. Cohn ML et al. Measles vaccine failure: lack of sustained measles-specific immunoglobulin G responses in revaccinated adolescents and young adults. Pediatric infectious diseases journal, 1994, 13(1): 34–8.

28. Poland GA et al. Measles reimmunization in children seronegative after initial immunization. Journal of the American Medical Association, 1997, 277(14):1156–8.

29. Matson DO et al. Investigation of a measles outbreak in a fully vaccinated school population including serum studies before and after revaccination. Pediatric infectious diseases journal, 1993, 12(4): 292–9.

30. Markowitz LE et al. Persistence of measles antibody after revaccination. Journal of infectious diseases, 1992, 166(1):205–8.

31. De Quadros CA et al. Measles eradication: experience in the Americas. Bulletin of the World Health Organization, 1998, 76(suppl. 2):47–52.

32. Biellik R et al. First 5 years of measles elimination in Southern Africa: 1996–2000. Lancet, 2002, 359(9317):1564–8.

33. Uzicanin A et al. Impact of the 1996–1997 supplementary measles vaccination campaigns in South Africa. International journal of epidemiology, 2002, 31(5):968–76.

34. De Quadros CA et al. Measles eradication in the Americas: progress to date. Journal of infectious diseases, 2004, 189(suppl. 1):S227–35.

35. De Quadros CA. Can measles be eradicated globally? Bulletin of the World Health Organization, 2004, 82(2):134–8.

Measles elimination

In 1997, the Regional Office established a goal to eliminate measles by 2010. The regional strategy for measles elimination includes: high routine measles vaccination coverage (> 90%) among children aged 1 year; one-time, nationwide mass immunization campaign or catch-up campaign targeting all children; second opportunity for measles immunization either through periodic follow-up campaigns every 3–5 years targeting all children born since the last campaign or achieving > 95% routine coverage with a second dose of measles vaccine; and optimal case management of children with acute disease.

Raising coverage with ≥ 1 dose of measles-containing vaccine is a key element of the elimination strategy. In 2005, coverage was 82%, leaving an estimated 2.8 million children who were not vaccinated. More than 90% of these children reside in Afghanistan, Iraq, Pakistan, Somalia, Sudan and Yemen. In 2005, Afghanistan, Iraq, Sudan and Yemen made considerable progress in increasing coverage, and it is anticipated that this will continue.

Estimated regional deaths due to measles, 1999–2004

Year	Estimated deaths
1999	102 000
2000	105 000
2001	89 000
2002	59 000
2003	58 000
2004	46 000

Based on campaign results, surveillance data and routine EPI coverage, reduction in measles mortality has been > 50% since 1999.

Source: DCD Newsletter Issue no. 8, June 2006 (http://www.emro.who.int/pdf/dcdnewsletter8.pdf).

Coeliac disease in Sudanese children with clinical features suggestive of the disease

I.M. Mohammed,[1] Z.E.A. Karrar[1] and S.H. El-Safi[2]

الداء البُطاني لدى الأطفال السودانيِّين الذين تبدو عليهم ملامح سريرية (إكلينيكية) توحي بالمرض

إلهام مصطفى محمد، زين العابدين عبد الرحيم كرَّار، سيدة حسن الصافي

الخلاصة: تتناول هذه الدراسة الاستباقية المستشفَوِيَّة المرتكَز، تَوَاتُر وقوع الداء البُطاني celiac وتجلياته السريرية (الإكلينيكية) ومؤشِّراته السيرولوجية التي كانت مترابطة مع نتائج الخزعات المعوية لدى أطفال سودانيِّين مرتفعي الاختطار. وقد بيَّنت الدراسة في 80 طفلاً تتراوح أعمارهم بين 15 شهراً و18 عاماً في الفترة ما بين تموز/يوليو 2001 وتموز/يوليو 2002 أنهم كانوا يعانون من نقص الشهية وفقدان الوزن والشحوب وهزال العضلات الدانية. وقد شخص الباحثون الداء البُطاني لدى 18 طفلاً (22.5٪). وكانت أضداد الغليادين (من الغلوبولينات المناعية A أو G أو من كليهما معاً) مرتفعة لدى 44 طفلاً، كما كانت نتائج إعادة اختبار أضداد غمد الليف العضلي مرتفعة لدى 30 طفلاً. وقد رفض أولياء 12 طفلاً الموافقة على إجراء الخزعات، في حين أجريت الخزعات لدى 18 طفلاً، حيث تبيَّن لدى 5 منهم وجود ضمور كامل في الزغابات، ولدى 8 منهم وجود ضمور غير كامل ولدى 5 منهم وجود ضمور جزئي في الزغابات. وقد تحسنوا جميعاً بنظام غذائي يخلو من الغلوتين، و لم تتعلق درجة ضمور الزغابات بمدة الإسهال أو بشدته أو بشدة فقر الدم أو بالعيارات السيرولوجية.

ABSTRACT Our prospective hospital-based study examined frequency, clinical presentation and serological indicators of coeliac disease that correlated with intestinal biopsy among high-risk Sudanese children. From July 2001 to July 2002, 80 children aged 15 months–18 years presented with poor appetite, weight loss, pallor and proximal muscle wasting. We diagnosed coeliac disease in 18 (22.5%). Antigliadin antibodies (AGA-IgG, AGA-IgA or both) were high in 44; endomysial antibody retest was high in 30. Guardians of 12 children refused consent for biopsy. The other 18 were biopsied: 5 had total villous atrophy, 8 subtotal and 5 partial. All improved with gluten-free diet. Degree of villous atrophy did not correlate with diarrhoea duration or severity, anaemia severity or serological titres.

La maladie cœliaque chez des enfants soudanais présentant des signes cliniques évocateurs de la maladie

RÉSUMÉ Notre étude hospitalière prospective a examiné la fréquence, le tableau clinique et les indicateurs sérologiques de la maladie cœliaque qui sont en corrélation avec la biopsie intestinale chez des enfants soudanais à haut risque. De juillet 2001 à juillet 2002, 80 enfants âgés de 15 mois à 18 ans ont consulté pour manque d'appétit, perte de poids, pâleur et amyotrophie proximale. Nous avons diagnostiqué une maladie cœliaque chez 18 enfants (22,5 %). Les anticorps anti-gliadines (AAG-IgG, AAG-IgA ou les deux) étaient élevés chez 44 enfants ; les anticorps anti-endomysium recherchés par le test de confirmation étaient élevés chez 30 enfants. Les tuteurs de 12 enfants ont refusé de donner leur consentement pour la biopsie. Les 18 autres enfants ont subi une biopsie : 5 avaient une atrophie villositaire totale, 8 subtotale et 5 partielle. Tous ont connu une amélioration avec un régime sans gluten. Il n'y avait pas de corrélation entre le degré d'atrophie villositaire et la durée ou la gravité de la diarrhée, la sévérité de l'anémie ou les titres sérologiques.

[1]Department of Paediatrics and Child Health; [2]Department of Medical Microbiology and Parasitology, Faculty of Medicine, University of Khartoum, Khartoum, Sudan (Correspondence to I.M. Mohamed: awa36ame@Yahoo.com).

Received: 01/07/03; accepted: 29/07/04

Introduction

Coeliac disease has been thought to affect people of European ancestry more often than other ethnic groups [*1*]. Recent studies, however, have revealed increasing global prevalence [*2*].

The disease was first reported in Sudan in 1978 when 7 children were diagnosed [*3*]. Since then, many adult and paediatric cases have also been reported. The disease may in fact be under-diagnosed because of more prevalent conditions such as malnutrition, diarrhoeal diseases and intestinal parasitic infections.

In Sudan diagnosis of coeliac disease has depended upon histological changes of the small bowel biopsy and improvement after withdrawal of gluten from the diet. Serological tests, although non-invasive and reliable, are not yet used routinely [*4*].

Our study aimed to determine the incidence of coeliac disease in Sudanese children who presented with clinical features suggestive of the disease by using serological tests as the initial screening tools. Our study also aimed to identify the sociodemographic and clinical presentation of children with the disease and to correlate serological titres and degree of villous atrophy.

Methods

Our prospective hospital-based study ran from July 2001 to July 2002 in the main paediatric hospitals in Khartoum State (Khartoum Children's Emergency Hospital, Omdurman Children's Emergency Hospital, Ahmed Gasim Teaching Hospital and Khartoum North Teaching Hospital). The study population included 80 children aged 15 months to 18 years who presented with 2 or more of the following: chronic diarrhoea, growth retardation, unexplained iron or folate deficiency anaemia or family history of coeliac disease. Children were excluded if they had systemic illnesses or bloody diarrhoea; were on steroids or on gluten-free diets; or had social and nutritional histories and clinical examinations suggestive of primary protein–energy malnutrition. Verbal consent was obtained from the parents or caregivers.

The data were collected with a predesigned questionnaire. Socioeconomic status was determined by assessing income, literacy, number of family members and lifestyle conditions such as refrigerator and television ownership or internet use.

Each child had a complete clinical assessment with emphasis on anthropometric measurements, signs of nutritional deficiencies and signs suggestive of coeliac disease, such as proximal muscle wasting, abdominal distension, aphthous ulcers or skin lesions of dermatitis herpetiformis. Each child had a complete blood count, total serum protein, serum albumin and stool examination for ova and parasites.

Serological tests, or antigliadin antibodies (AGA) tests, i.e. both AGA-IgA and AGA-IgG, were done for all 80 children using enzyme-linked immunosorbent assay technique (ELISA, binding site MK 035, MK 036) [*5*]. Those with positive AGA tests were retested for endomysial antibodies (EMA) with the indirect immunofluorescence technique; monkey oesophagus was used as a substrate (binding site FK 208) [*6*].

An upper gastrointestinal endoscopy was performed for those with positive AGA and EMA. A second portion duodenal biopsy was taken and the biopsy specimens were fixed in formalin and stained with haematoxylin and eosin. Histological changes specific of coeliac disease were graded as per Levi et al. [*7*]: partial villous atrophy was defined as mild change, subtotal villous atrophy was moderate change and total villous atrophy was severe change with flat mucosa.

Data were analysed with *SPSS*, version 10. Chi-squared test was used to determine 95% significance level.

We diagnosed coeliac disease if a child had 2 or more positive serological markers with biopsy-verified coeliac disease and showed clinical improvement when following a gluten-free diet as per the revised criteria for diagnosis of coeliac disease [*8*]. Haematinics and vitamins were given as needed.

Results

Diagnosis

The study included 80 children (46 boys and 34 girls), of whom 25 (31.3%) had high titres of both AGA-IgA and AGA-IgG. EMA retest was high for 24 of those 25 (96.0%). The parents or caretakers of 11 of these 24 children were among the 12 guardians who refused consent for biopsy. Of the 13 children from this group who underwent biopsy, 4 had total, 6 subtotal and 3 partial villous atrophy.

Three (3.8%) in the study sample had high titre of AGA-IgA, but normal AGA-IgG. EMA titre was high for 2 of these children (66.7%): 1 refused endoscopy and the other had subtotal villous atrophy.

Sixteen children (20.0%) had positive AGA-IgG, but negative AGA-IgA test. EMA titre was high for 4 (25.0%): 1 had total villous atrophy, 1 had subtotal villous atrophy and the remaining 2 had partial villous atrophy.

Thirty-six of the study population (45.0%) were not diagnosed with coeliac disease because they had normal AGA-IgA and AGA-IgG titres.

Twenty-six (32.5%) of the study population probably had the disease but were not confirmed by biopsy. Twelve (46.1%) had high titre of at least 2 serological markers but their caretakers refused to give consent for the biopsy. Five of the 12 responded to gluten-free diet, 1 improved spontaneously after 4 months, and the remaining 6 did not come for follow-up.

Fourteen children had only AGA-IgG positive with negative AGA-IgA and EMA tests, so they were either not coeliac or had coeliac disease associated with IgA deficiency. Two of these followed gluten-free diets, but neither showed improvement. The remaining 12 were not available for follow-up.

Eighteen (22.5%) of the study population had positive AGA and EMA test positives and confirmatory biopsies. When they were put on a restricted gluten-free diet all showed satisfactory clinical improvement; thus, they were confirmed as cases of coeliac disease.

Sociodemographic characteristics

No coeliac child presented during infancy. Of the children diagnosed with the disease, 7 (38.9%) were aged 1–4 years, 5 (27.8%) were aged 5–9 years, 2 (11.1%) were aged 10–14 years and 4 (22.2%) were aged 15 years or older. The mean age at onset of symptoms was 6 years and the mean age at diagnosis was 10 years. The female to male ratio was 1.3:1.

Of the children with the disease, 15 (83.4%) were from north and central Sudan and mainly of Arab ethnic groups, 2 (11.1%) had Egyptian and Turkish ancestry, and only 1 (5.6%) was from southern Sudan from a tribe of pure African ethnicity. Most with the disease were of moderate socioeconomic class (n = 11 or 61.1%), 6 (33.3%) were of low socioeconomic class, and only 1 child was of high socioeconomic class. Among the parents, 9 couples (50%) were first-degree cousins, 4 were second-degree cousins (22.2%) and 5 (27.8%) were not related. There was a family history of coeliac disease for 4 children.

Clinical features

Nine (50%) children who were diagnosed with the disease presented with chronic diarrhoea that was persistent for 6 of the children and intermittent for 3. The frequency was 3–6 motions/day for 6 children and more than 6 motions/day for 3 children. The parents of 3 children described the stool as bulky, pale and offensive. Other significant symptoms were poor appetite (n = 14, 77.8%), abdominal distension (n = 12, 66.7%), vomiting (n = 11, 61.1%) and abdominal pain (n = 7, 38.9%). Pallor was the most common clinical observation (n = 16 patients, 88.9%); 13 children exhibited signs of iron deficiency anaemia. Proximal muscle wasting, abdominal distension and signs of vitamin B_2 (riboflavin) deficiency were common.

Fourteen (77.8%) cases had weight lower than the third centile for age, and 11 (61.1%) had height lower than the third centile for age. Weight-for-height was lower than the third centile for 10 (55.6%). Mid upper arm circumference was less than 12.5 cm for 5 of the 7 coeliac children aged 1–4 years. Six (33.3%) coeliac children had head circumference lower than the third centile for age.

Investigations

One (5.6%) coeliac child had haemoglobin (Hb) less than 5 g/dL and 9 (50.0%) had Hb at 5–9 g/dL. The commonest type of anaemia was iron deficiency (n = 11, 61.1%), followed by combined deficiency anaemia (n = 6, 33.3%); only 1 patient (5.6%) had folate deficiency anaemia. Serum albumin level was low for 5 children with the disease (27.8%). Stool examination for ova and parasites was negative for all 18 children with the disease.

Degree of villous atrophy

Table 1 shows that 6 children had diarrhoea for less than 5 years. Of these, 4 had partial villous atrophy and 2 had subtotal villous atrophy. Three patients had duration of more than 5 years even though 3 had subtotal villous atrophy. This distribution was of no statistical significance (P-value = 0.53).

Table 1 also shows that 1 patient who presented with diarrhoea of more than 6 motions/day had partial villous atrophy. Of those who had subtotal atrophy, 3 had diarrhoea with 3–6 motions/day and 2 had severe diarrhoea with more than 6 motions/day. It is worth noting that all 5 children who displayed total villous atrophy presented without diarrhoea, although this correlation was not significant statistically (P-value = 0.8).

Table 2 shows that 2 of the 5 cases with partial villous atrophy had Hb levels below 9 g/dL, 4 of those who had subtotal villous atrophy had Hb levels at 9–12 g/dL and the

Table 1 Duration and severity of diarrhoea by degree of villous atrophy of 18 coeliac cases

Degree of villous atrophy	Duration (years)						Severity (motions/day)			Total
	No diarrhoea	< 0.5	0.5–2	2–5	5–10	> 10	No diarrhoea	3–6	> 6	
Partial	1	2	2	0	0	0	1	3	1	5
Subtotal	3	0	2	0	1	2	3	3	2	8
Total	5	0	0	0	0	0	5	0	0	5
		Yates corrected $\chi^2 = 0.39$					Yates corrected $\chi^2 = 0.06$			
		P-value = 0.53					P-value = 0.8			

1 child whose anaemia was severe (Hb < 5 g/dL) had subtotal villous atrophy. This correlation was not significant statistically (*P*-value = 0.76).

Villous atrophy and serological titre

Table 3 shows that serological titres for AGA-IgA, AGA-IgG and EMA tests were graded into normal, moderately high, high and very high titre and, when correlated with the degree of villous atrophy (partial, subtotal and total), were not statistically significant (*P*-values = 0.29, 0.35 and 0.54 respectively).

Discussion

Our study was the first in Sudan in which serological tests were used as a screening tool to diagnose coeliac disease. We diagnosed the disease with a high frequency (22.5%) in our high-risk group. Our frequency was higher than in a similar study of Indian children (16.6%) or than among children from north-eastern Libyan Arab Jamarihiya (31.7%) [*9,10*]. In a large sample of unselected Saharan children in western Algeria, the prevalence of EMA positivity was 5.6% [*11*]. The average annual incidence in Kuwait among children was 1:3000 live births and among Jordanian children, 1:2800 live births [*12,13*]. The prevalence of coeliac disease in Israel in the general population was 1:157 [*14*]. In Saudi Arabia, 10 of 48 children (21.0%) who presented with chronic diarrhoea over a 5-year period were diagnosed as coeliac patients [*15*]. The high frequency in our study could be attributed to the genetic background of the Sudanese population, which is a mixture of different ethnic groups, but is primarily Arab and African. Also, Sudanese nutritional habits have changed as cereal-containing meals are now offered early in infancy. Consumption of wheat foodstuffs was not, however, a risk factor for coeliac disease occurrence in Burkina Faso [*16*].

The 4-year delay in diagnosis of the disease in our study might have resulted from the distracting influence of more prevalent conditions in the country that clinically resemble coeliac disease, a lack of awareness of doctors about the occurrence of the disease in Sudan, and the unavailability of serological screening tests.

Coeliac disease affects females more often than males in ratios ranging from 1.3–3:1 [*10,11*]. In our study the ratio was 1.3:1.

Our study partially supports the hypothesis that the disease affects people of middle and high socioeconomic classes more than those of low social class [*17*]. In our study 61.1% of patients were of moderate socioeconomic status and 33.3% of low socioeconomic status, but only 5.6% were of high socioeconomic class. Sudan is

Table 2 Severity of anaemia by degree of villous atrophy of 18 coeliac cases

Degree of villous atrophy	Severity of anaemia				Total
	< 5 g/dL	5–9 g/dL	9–12 g/dL	> 12 g/dL	
Partial villous atrophy	0	2	2	1	5
Subtotal villous atrophy	1	3	4	0	8
Total villous atrophy	1	4	1	0	5
Total	1	9	7	1	18

Yates corrected $\chi^2 = 0.09$; P-value = 0.76.

Table 3 Antigliadin-IgA, antigliadin-IgG and endomysial antibodies titre in relation to degree of villous atrophy in 18 coeliac cases

Degree of villous atrophy	AGA-IgA titre				AGA-IgG titre				EMA titre			Total
	Normal	Moderate	High	Very high	Normal	Moderate	High	Very high	Normal	Moderate	High	Very high	
Partial	2	2	1	0	0	3	2	0	0	3	2	0	5
Subtotal	1	3	3	1	1	1	6	0	0	4	3	1	8
Total	1	0	3	1	0	1	3	1	0	0	4	1	5
	Yates corrected $\chi^2 = 1.11$ P-value = 0.29				Yates corrected $\chi^2 = 0.87$ P-value = 0.35				Yates corrected $\chi^2 = 0.36$ P-value = 0.54				

a developing country in which the low and the middle classes are more prevalent than the higher social class.

Nine coeliac children presented with chronic diarrhoea, i.e. classic presentation, whereas the other 9 had atypical presentation. It has been reported that 50% of newly diagnosed patients have no gastrointestinal problems [*18*].

Signs of vitamin A deficiency and skin lesions of dermatitis herpetiformis were not observed for any child. This could have been due to our small sample size.

In our study, 1 child with type 1 diabetes mellitus was diagnosed with coeliac disease. The association between type 1 diabetes mellitus and coeliac disease has been well established [*19*]. We also diagnosed a child who had features of Down syndrome with probable coeliac disease but for whom biopsy was refused; this association has also been well documented [*20*]. We diagnosed identical twin boys with probable coeliac disease and they showed remarkable improvement with a gluten-free diet. The concordance rate for identical twins is 70%–100% [*18,21*]. An 8-year-old boy presented with signs of myopathy in addition to his coeliac-like condition. He was diagnosed with probable coeliac disease and improved after gluten-free diet. This was similar to a report of a case of coeliac disease associated with rickets and myopathy that was attributed to calcium and vitamin D malabsorption [*22*].

Hb levels ranged from 5 to 12 g/dL in 16 patients and only 1 child had severe anaemia. Severe anaemia is rather uncommon in coeliac disease and should raise the suspicion of a malignant complication [*1*].

Low albumin levels indicated a severe form of the disease for 5 coeliac patients [*18*].

AGA-IgG is very sensitive but less specific and AGA-IgA is less sensitive but

more specific. Their use in combination results in a high detection rate [*23*]. This was borne out by our study as 16 children were IgG positive and IgA negative; when EMA was retested, it was positive for only 4 (25.0%) of them. Furthermore, 25 children had both positive AGA-IgA and AGA-IgG and EMA retest was positive for 24 (96.0%) of them. 28 children had positive AGA-IgA, either alone or in combination with positive AGA-IgG, and 26 (92.8%) of them had positive EMA test. Three children had positive AGA-IgA and negative AGA-IgG; 2 (66.6%) of them had positive EMA tests.

EMA test has been the single most predictive test for coeliac disease [*6,24,25*]. We found that all children with positive EMA test displayed mucosal changes characteristic of the disease.

We expected that duration and severity of diarrhoea and severity of anaemia would correlate with degree of villous atrophy and that serological titres would correlate with degree of villous atrophy. We found no correlation, but these discrepancies could be attributed to our small sample size.

Conclusions

We confirmed that coeliac disease is a cause of malabsorption in Sudanese children. Its frequency in a selected high-risk group was 22.5%. Females were affected more often than males with a ratio 1.3:1. Ages between onset of symptoms and diagnosis were delayed. Children from Arabic tribes and from middle socioeconomic class were affected more often than others. Coeliac children presented with or without frank gastrointestinal symptoms. Pallor and severe weight loss were the predominant signs. The commonest type of anaemia was iron deficiency.

AGA-IgG was very sensitive but less specific, AGA-IgA was less sensitive but more specific, and EMA test was highly specific.

Our study revealed no correlation between severity, duration of diarrhoea and severity of anaemia with degree of villous atrophy. There was no correlation between the serological titres and the degree of villous atrophy.

The majority of parents in our study were apprehensive about intestinal biopsy and many refused permission to perform the procedure.

Acknowledgements

This work was part of a thesis submitted in partial fulfilment of the requirements of a clinical MD in paediatrics and child health at the University of Khartoum.

References

1. Cooke W, Holmes G. Gluten-included enteropathy (celiac disease). In: Berk JE et al. Bockus gastroenterology, 4th ed. Philadelphia, WB Saunders Company, 1985:1719–57.
2. Fasano A. Celiac disease: the past, the present, the future. Pediatrics, 2001, 107(4):768–70.
3. Suliman G. Coeliac disease in Sudanese children. Gut, 1978, 19(2):121–5.
4. Chartrand LJ et al. Effectiveness of antigliadin antibodies as a screening test for coeliac disease in children. Canadian Medical Association journal, 1997, 157:527–33.

5. Burgin-Wolff A et al. Antigliadin and antiendomysium antibody determination for coeliac disease. Archives of disease in childhood, 1991, 66:941–9.

6. Sacchetti L et al. Diagnostic value of various serum antibodies detected by diverse methods in childhood celiac disease. Clinical chemistry, 1996, 42(11):1838–42.

7. Booth CC, Neale G, eds. Disorders of the small intestine. Oxford, Blackwell Scientific Publications, 1985:12–21.

8. Revised criteria for diagnosis of coeliac disease. Report of Working Group of European Society of Paediatric Gastroenterology and Nutrition. Archives of disease in childhood, 1990, 65:909–11.

9. Mohindra S et al. Coeliac disease in Indian children: assessment of clinical, nutritional and pathologic characteristics. Journal of health population and nutrition, 2001, 19(3):204–8.

10. Al-Tawaty AL, Elbargathy SM. Coeliac disease in north-eastern Libya. Annals of tropical paediatrics, 1998, 18(1):27–30.

11. Catassi C et al. Why is coeliac disease endemic in the people of the Sahara? Lancet, 1999, 334(9179):647–8.

12. Khuffash FA et al. Coeliac disease among children in Kuwait: difficulties in diagnosis and management. Gut, 1987, 28(12):1595–9.

13. Rawashdeh MO, Khalil B, Raweily E. Celiac disease in Arabs. Journal of pediatric gastroenterology and nutrition, 1996, 23(4):415–8.

14. Shamir R et al. The use of a single serological marker underestimates the prevalence of celiac disease in Israel: a study of blood donors. American journal of gastroenterology, 2002, 97(10):2589–94.

15. Abdullah AM. Aetiology of chronic diarrhoea in children: experience at King Khalid University Hospital, Riyadh, Saudi Arabia. Annals of tropical paediatrics, 1994, 14(2):111–7.

16. Cataldo F et al. Consumption of wheat foodstuffs is not a risk for celiac disease occurrence in Burkina Faso. Journal of pediatric gastroenterology and nutrition, 2002, 35(2):233–4.

17. Kavin H. Adult coeliac disease in South Africa. An analysis of 20 cases emphasizing atypical presentations. South Africa medical journal, 1981, 59(18):628–32.

18. Ciclitira P. Coeliac disease. In: Yamada T et al., eds. Textbook of gastroenterology, 3rd ed. Philadelphia, Lippincott, Williams and Wilkins, 1999:1660–76.

19. Cronin CC, Shanahan F. Insulin dependent diabetes mellitus and coeliac disease. Lancet, 1997, 349(9058):1096–7.

20. Gale L et al. Down's syndrome is strongly associated with coeliac disease. Gut, 1997, 40(4):492–6.

21. Ulshen M. Malabsorbtive disorders. In: Behrman RE, Kliegman R, Arvin A, eds. Nelson textbook of pediatrics, 15th ed. Philadelphia, WB Saunders, 2000:1159–71.

22. Cimaz R, Bazzi P, Prelle A. Myopathy associated with rickets and celiac disease. Acta paediatrica, 2000, 89:496–7.

23. Misra S, Ament ME. Diagnosis of coeliac sprue in 1994. Gastroenterology clinics of North America, 1995, 24(1):133–43.

24. Feighery C. Coeliac disease. British medical journal, 1999, 319(7204):236–9.

25. Lerner A, Kumar V, Iancu TC. Immunological diagnosis of childhood coeliac disease: comparison between antigliadin, antireticulin and antiendomysial antibodies. Clinical and experimental immunology, 1994, 95:78–82.

Diabetes knowledge, beliefs and practices among people with diabetes attending a university hospital in Karachi, Pakistan

G. Rafique,[1] S.I. Azam[1] and F. White[2]

المعارف والمعتقدات والممارسات لدى السكَّريين الذين يعالجون في أحد المستشفيات الجامعية في كراتشي، باكستان

غزالة رفيق، سيد إقبال عزام، فرانكلين وايت

الخلاصة: أُعِدَّ استبيان منهجي حول المعارف والمعتقدات والممارسات الخاصة بالسكَّري، ووزِّع على 199 من السكريين ممن كان 92.5٪ منهم من النمط الثاني للسكري ويعالجون في مستشفى جامعة أغاخان في كراتشي. وقد كان العمر الوسطي لهم 35 عاماً بانحراف معياري مقداره 11 سنة، وكان متوسط فترة الإصابة بالسكري لدى الرجال 8 سنوات بانحراف معياري مقداره 7 سنوات، وفترة الإصابة بالسكري لدى النساء 9 سنوات بانحراف معياري مقداره 6 سنوات. وقد اتضح أن أحراز الرجال أعلى بالنسبة للمعارف من أحراز النساء (P=0.02)، و لم يكن هناك فارق ملحوظ في أحراز المعتقدات والممارسات. وقد صُنِّفت الأحراز إلى جيدة (أكثر من 60٪) لدى 13.6٪ من المشاركين فقط بالنسبة للمعارف ولدى 17.6٪ من المشاركين فقط بالنسبة للمعتقدات، ولدى 11.2٪ من المشاركين فقط بالنسبة للممارسات. وقد تلقَّى 38٪ من المساهمين التثقيف حول الرعاية في السكري.

ABSTRACT A structured questionnaire on knowledge, beliefs and practices regarding diabetes was administered to 199 persons with diabetes (92.5% type 2) attending the Aga Khan University Hospital, Karachi. Mean age [standard deviation (SD)] was 53 (11) years. Mean duration of diabetes (SD) was 8 (7) years in men and 9 (6) years in women. Men had a significantly better knowledge score than women (P = 0.02); there was no significant difference in the beliefs and practices scores. Scores were classed as good (> 60%) in only 13.6% of participants for knowledge, 17.6% for beliefs and 11.2% for practices. About 38% of the participants had received education on diabetes care.

Connaissances, croyances et pratiques concernant le diabète chez les personnes diabétiques consultant dans un hôpital universitaire à Karachi (Pakistan)

RÉSUMÉ Un questionnaire structuré sur les connaissances, croyances et pratiques concernant le diabète a été administré à 199 personnes diabétiques (92,5 % de type 2) consultant à l'hôpital universitaire Aga Khan de Karachi. L'âge moyen (écart-type [E.T.]) était de 53 ans (11). La durée moyenne du diabète (E.T.) était de 8 ans (7) chez les hommes et de 9 ans (6) chez les femmes. Les hommes avaient un score pour les connaissances significativement meilleur que les femmes (p = 0,02) ; il n'y avait pas de différence significative dans les scores pour les croyances et les pratiques. Les scores étaient classés comme bons (> 60 %) chez seulement 13,6 % des participants pour ce qui concerne les connaissances, 17,6 % pour les croyances et 11,2 % pour les pratiques. Environ 38 % des participants avaient bénéficié d'une éducation en matière de soins du diabète.

[1]Department of Community Health Sciences, Aga Khan University, Karachi, Pakistan (Correspondence to G. Rafique: ghazala.rafique@aku.edu).
[2]Department of Community Health and Epidemiology, Dalhousie University, Canada.
Received: 23/05/04; accepted: 20/02/05

Introduction

With an overall prevalence of over 10% among the adult population of Pakistan, type 2 diabetes has become a serious health problem for the nation [*1,2*]. Currently an estimated 6.5 million people aged 25 years and above are affected with diabetes in the country and, if no intervention strategies are adopted, the World Health Organization forecasts that the number will rise to 14.5 million by the year 2025 [*3*].

It is well established that poor control of diabetes results in markedly increased risk for heart disease, stroke, blindness, kidney failure, leg amputation and early death [*4,5*]. On the other hand, scientific evidence has clearly demonstrated that most diabetes-related pathologies are potentially avoidable if optimum metabolic control is achieved [*6,7*]. The management of diabetes is, however, dependent to a great extent on the affected person's own abilities to carry out self-care in their daily lives, and patient education is considered an essential component of achieving this objective [*8*]. There is further evidence that people affected with the disease often have inadequate knowledge about the nature of diabetes, its risk factors and associated complications [*9–11*], and that this lack of awareness may be the underlying factor affecting attitudes and practices towards its care [*12*].

Diabetes education, with consequent improvements in knowledge, attitudes and skills, leads to better control of the disease, and is widely accepted to be an integral part of comprehensive diabetes care [*13–15*]. At the same time, it is important to note that if recommendations are to be effective, they must be sensitive to and relevant to the culture of the people expected to carry them out [*16,17*].

Despite the high and increasing prevalence and the evidence that better knowledge is associated with better outcomes, Pakistan currently lacks structured education and information programmes regarding diabetes both for people at risk of the disease and for people suffering from it. So far, little has been done to assess the current knowledge levels and behaviours of people with diabetes, or to evaluate their educational needs. Education programmes are likely to be more effective if these are known.

This study attempted to assess disease-related knowledge, beliefs and practices among people with diabetes. As well as providing a baseline for evaluation, the data would be of use in developing an appropriate and culturally acceptable diabetes education programme.

Methods

The study was conducted in the outpatient clinics of a single centre, the Aga Khan University Hospital, Karachi, from December 2001 to March 2002. The hospital is a tertiary care hospital offering quality care to outpatients and inpatients of all socioeconomic classes. Patients were recruited from the consultant clinics, where the physicians are mainly specialized consultants and endocrinologists, and the community health centre where family physicians offer services at minimal charges.

The sample size was calculated using a 2-sided test of significance, an alpha level of 5% and 80% power to detect a bound on error for knowledge mean score of 2, with an estimated standard deviation of 10. The required sample size was calculated as 197.

The study group comprised 199 adults with diabetes aged ≥ 25 years attending the community health centre and consultant clinics of the Aga Khan University Hospital. The participants were selected sequentially based on the appointment registers, and

were of both sexes. The number of patients attending the 2 locations differed, normally 10–15 per day attended the consultant clinic and 4–5 per day attended the community health centre during the study period, consequently, more patients were recruited from the consultant clinic. Citing lack of time, 8% of those we approached refused to participate.

Participants were interviewed using a structured questionnaire to collect information on knowledge, beliefs and practices concerning their disease and management, in addition to demographic data.

A structured questionnaire was compiled adapting questions from published studies and adding questions that were considered of value based on local beliefs and clinical observations [*18,19*]. The questionnaire covered knowledge regarding symptoms of diabetes, optimal control levels, hypoglycaemia, recognition of microvascular and macrovascular complications, diet and exercise; beliefs about diabetes and use of insulin and nutrition related beliefs; and practices regarding diet, medication adherence and self-monitoring. Taking into consideration local myths, specific questions on belief were added.

Data were collected by 2 trained interviewers, medical graduates working as research officers in the department. They visited each clinic 2 days per week. The questionnaire was pilot tested on 10 patients from the same clinics to assess the suitability of content, clarity and flow of questions. A scoring system was developed for each component: each correct answer was given a score of 1. Three categories were defined on the basis of the score obtained by each participant: poor (< 40% of the total score); acceptable (41%–60% of the total score); and good (> 60% of the total score).

Data were analysed using *SPSS*, version 10. Chi-squared, independent samples *t*-test and 1-way analysis of variance were used to compare the groups.

Results

Descriptive statistics

A total of 199 people (95 men, 104 women) participated in the study (Table 1). The mean age [standard deviation (SD)] of the participants was 53.3 (11.2) years with no significant difference between the sexes. The overall illiteracy rate was 14.6%; more women (18.3%) than men (10.5%) were illiterate ($P = 0.008$). Furthermore, it was noted that for all education levels, women had a lower overall percentage than men. The mean duration (SD) of diabetes was 8.9 (7.3) years among men and 8.8 (6.2) years in women. Of the 92.5% of participants who had type 2 diabetes, 11.4% were on diet alone, 76.0% on oral hypoglycaemic drugs and 12.5% on insulin.

Approximately 38% of participants reported receiving some diabetes education at the clinics.

We found 42.2% of the participants could not give a single symptom for hypoglycaemia and only 22.3% could name ≥ 2 symptoms; nevertheless, 76.9% knew that the home treatment for hypoglycaemia is to take any sugared drink or food. Only 21.1% of the participants were aware of the target control levels for fasting blood sugar and 8.7% knew the target for the 2 hours postprandial blood sugar level. Around 18% of men and 27% of women did not know that diabetes can affect other organs of the body and were unable to name a single complication associated with diabetes.

Some important local beliefs about nutrition and insulin use in diabetes are detailed in Table 4: 80.4% of participants believed that a person with diabetes should not eat root vegetables, while around 1 in

Table 1 Characteristics of participants

Variable	No.	%
Age (years)		
25–39	22	11.1
40–49	55	27.6
50–59	64	32.2
60–69	41	20.6
70+	17	8.5
Sex		
Male	95	47.7
Female	104	52.3
Education level		
Illiterate	29	14.6
Primary	30	15.1
Secondary	62	31.2
Intermediate	26	13.1
University graduate & above	52	26.1
Occupation[a]		
Housewife	98	49.2
Blue-collar worker	17	8.5
White-collar worker	34	17.1
Self-employed	24	12.1
Retired	26	13.1
Duration of diabetes (years)		
< 1	20	10.1
1–5	72	36.2
6–15	88	44.2
> 15	19	9.5
Type of diabetes		
Type 2	184	92.5
Type 1	15	7.5
Type of treatment		
Diet	21	10.6
Oral hypoglycaemic drugs	140	70.4
Insulin	38	19.1
Place of treatment		
Consulting clinic	110	55.3
Community health centre	89	44.7

[a]Blue-collar workers included shopkeepers, drivers and labourers; white-collar workers included office workers and civil servants; self-employed was mostly businessmen.

4 believed that regular use of bitter gourd (*Momordica charantia*), a vegetable commonly known as *karela*, can cure diabetes.

Even though 94.0% of the participants tested blood glucose levels to check their metabolic control, only 73.4% maintained records. Wide variations occurred in the frequency of testing, ranging from daily to more than a year (daily 7.0%; weekly 17.6%; monthly 39.2%; 3-monthly 11.6%). Only 4% of respondents were also being assessed for $HbA1_c$. Overall, 29.6% of participants were self-monitoring their blood glucose levels, and 58.0% of those were on insulin.

Although 92.3% of the participants on insulin were using a combination of regular and intermediate-acting insulin, no more than 57.8% of them administered their insulin injections half an hour before meals whereas others were injecting either 1 hour prior to the meal or immediately before or after meals. Almost 73.6% were injecting insulin at an angle of 90 degrees; only 47.2% were injecting subcutaneously while others were injecting intradermally or intramuscularly. Even though 58.8% said that exercise should be done ≥ 4 times per week, only 29.0% were actually doing so.

Knowledge, beliefs and practices scores

The results of the diabetes knowledge, beliefs and practice scores are given in Table 2. The mean score for knowledge was significantly lower in females, and more females had poor knowledge compared to males ($P = 0.02$). No significant difference was, however, evident in the mean scores for beliefs and practices.

Table 3 gives the mean knowledge, beliefs and practices scores. The mean knowledge scores decreased with increasing age ($F = 4.62$; $P = 0.001$). Significantly higher knowledge scores were found in males ($F = 4.748$; $P = 0.03$), those with a higher education level ($F = 34.40$; $P < 0.001$), white-collar workers ($F = 8.055$; $P < 0.001$), those

Table 2 Distribution of participants according to their diabetes knowledge, beliefs and practices scores

Variable	Males (n = 95) No.	Females (n = 104) No.	Total (n = 199) No.	(%)
Knowledge score				
Poor	37	59	96	48.2
Acceptable	45	31	76	38.2
Good	13	14	27	13.6
Beliefs score				
Poor	46	62	108	54.3
Acceptable	32	24	56	28.1
Good	17	18	35	17.6
Practices score				
Poor	54	56	110	55.3
Acceptable	33	34	67	33.7
Good	8	14	22	11.0

Poor: < 40% of the maximum possible score (knowledge 59; beliefs 15; practices 14).
Acceptable: 41%–60% of the maximum possible score.
Good: > 60% of the maximum possible score.

with type 1 diabetes ($F = 12.30$; $P = 0.001$), people on insulin treatment ($F = 8.83$; $P < 0.001$) and people attending the consultant clinics ($F = 6.30$; $P = 0.013$).

The mean beliefs scores also decreased significantly with increasing age ($F = 3.43$; $P = 0.010$), while with increasing educational levels the scores increased (illiterate to graduate and above) ($F = 23.40$; $P < 0.001$). The scores were also higher in males ($F = 4.16$; $P < 0.04$), people with white-collar jobs ($F = 5.87$; $P < 0.001$) and those with type 1 diabetes ($F = 4.01$; $P < 0.04$). People who were on insulin had higher mean beliefs scores compared to those who were on oral hypoglycaemic drugs or diet alone ($F = 5.58$; $P = 0.004$).

The mean practices scores were significantly higher with longer duration of diabetes ($F = 2.72$; $P = 0.04$), for those on insulin therapy ($F = 18.49$; $P < 0.001$) and in people attending the specialist consulting clinics ($F = 14.68$; $P < 0.001$).

Discussion

Very limited literature exists on the knowledge, beliefs and practices of people with diabetes in Pakistan. A study looking only at knowledge among diabetes patients in Karachi found significant deficits in the study population [*9*]. The results of our study suggest that not only knowledge, but also the beliefs and practices of diabetes patients were less than satisfactory.

It is disturbing to note that the vast majority of participants were unaware of the ideal blood glucose control target levels and many were unable to name a single complication associated with diabetes. This lack of information and understanding of potential risks is worrying, and indicates participants' obliviousness to the gravity of their condition. This may be partially explained by the fact that diabetes, being almost asymptomatic, does not interfere with their daily routine and patients generally tend to ignore the condition until the disease is advanced [*20*].

Health beliefs are often affected by folklore and hearsay [*16,21*]. Our study has also highlighted certain beliefs and misconceptions prevalent among people with diabetes that are based on such belief systems. Most common among these are the nutrition-related beliefs, thereby identifying the need to provide education and counselling regarding diet. For example, there is a strong belief that a person with diabetes should not eat root vegetables as they are generally considered to be sweet. Another common perception in Pakistan is that there is no restriction on the amount of bread taken if it is prepared from gram flour (chickpea flour), indicating the need for understanding the concept of total calorie requirements.

The use of traditional remedies is prevalent in many cultures [*16,22,23*]. In the Indian subcontinent, traditional medicines

Table 3 Mean diabetes knowledge, beliefs and practices scores for different characteristics of the participants

Characteristic	Score[a]		
	Knowledge Mean (SD)	Beliefs Mean (SD)	Practices Mean (SD)
Age (years)			
25–39	28.1 (9.4)	8.1 (2.8)	6.3 (2.6)
40–49	26.0 (11.4)	7.1 (3.0)	6.3 (1.7)
50–59	22.6 (11.2)	6.2 (3.0)	6.3 (2.1)
60–69	20.2 (10.8)	5.9 (3.0)	5.8 (2.2)
70+	15.9 (11.0)	5.2 (3.0)	5.9 (1.8)
Sex			
Female	21.4 (11.8)	6.1 (3.3)	6.1 (1.9)
Male	24.9 (10.7)	7.0 (2.7)	6.2 (2.2)
Education level			
Illiterate	13.0 (8.6)	4.0 (2.9)	5.6 (2.1)
Primary	14.6 (8.3)	4.6 (2.0)	5.8 (1.9)
Secondary	21.6 (10.0)	6.1 (2.6)	6.1 (2.2)
Intermediate[b]	29.0 (8.5)	8.0 (2.5)	6.4 (2.3)
Graduate & above	32.4 (7.8)	8.65 (2.5)	6.6 (1.8)
Occupation			
Housewife	20.7 (11.6)	5.9 (3.1)	5.9 (2.2)
Blue-collar worker	17.6 (8.4)	5.2 (2.2)	5.8 (1.6)
White-collar worker	31.7 (8.8)	8.4 (2.8)	6.6 (1.7)
Self-employed	22.5 (11.1)	6.7 (2.5)	6.4 (2.4)
Retired	24.8 (10.0)	7.0 (2.7)	6.5 (1.9)
Duration of diabetes (years)			
< 1	19.0 (11.6)	5.6 (2.6)	5.0 (2.1)
1–5	21.8 (10.8)	6.2 (2.9)	6.3 (1.9)
6–15	24.1 (11.9)	6.7 (3.2)	6.3 (2.2)
> 15	27.6 (9.8)	7.4 (2.9)	6.0 (1.6)
Type of diabetes			
Type 2	22.3 (11.3)	6.4 (3.0)	6.1 (2.0)
Type 1	32.7 (6.9)	8.0 (2.6)	6.9 (2.5)
Type of treatment			
Diet	19.7 (11.9)	5.4 (3.1)	4.1 (1.8)
Oral hypoglycaemic drugs	21.8 (10.9)	6.3 (2.9)	6.1 (1.8)
Insulin	29.7 (10.7)	7.8 (3.3)	7.3 (2.3)
Place of treatment			
Community health centre	20.9 (11.0)	6.1 (2.9)	5.5 (2.0)
Consulting clinic	24.9 (11.5)	6.9 (3.1)	6.6 (2.0)
Overall	23.1 (11.4)	6.5 (3.0)	6.2 (2.0)

SD = standard deviation.
[a]Maximum possible scores: knowledge 59; beliefs 15; practices 14.
[b]Up to 12 years education in school.

Table 4 Main beliefs about nutrition and insulin use in people with diabetes

Belief	Yes %	No %	Don't know %
A person with diabetes is allowed to eat vegetables grown under the soil	17.1	80.4	2.5
A person with diabetes can eat as much basen ki roti[a] as he or she wants	60.3	27.6	12.1
Regular use of karela[b] can cure diabetes	25.1	59.3	15.6
A person with diabetes can eat "diabetic foods" in any quantity	8.5	43.7	47.7
Insulin use indicates that the person has reached the last stage of disease	32.7	28.6	38.7
Regular use of insulin can lead to addiction	33.7	22.1	44.2
Children and adolescents with type 1 diabetes should be allowed to adjust insulin dose on their own	16.1	31.6	52.3
Women with type 1 diabetes should avoid pregnancy	9.0	13.1	77.9
A woman taking insulin should breastfeed her baby	17.1	7.5	75.4

[a]Bread made from gram (chickpea) flour.
[b]Bitter gourd (Momordica charantia).

play an important role in diabetes care, and a number of plants, herbs and vegetables are used therapeutically [*24*]. Among these, bitter gourd (*M. charantia*) is widely used as an alternative therapy for diabetes [*23,25*] and our study also found that around 25% of the participants thought that regular use could cure diabetes. While studies in diabetic rats [*23*] and humans [*25*] have shown that *M. charantia* has hypoglycaemic effects, no study has demonstrated that it can control diabetes. Moreover, sufficient data are not available on the potency and effectiveness of bitter gourd to recommend its use as an alternative therapy.

The concept of insulin use indicating gravity of illness and becoming dependent on the drug has been documented in the Vietnamese population [*21*]. Many of the participants in our study also considered insulin use to be indicative of reaching the last stage of disease. The belief that insulin is an addictive drug is based on the fact that insulin needs to be taken daily and the person cannot do without it.

There is evidence that people with type 1 or type 2 diabetes on insulin are more adherent to self-monitoring of blood glucose [*26*] and this finding was supported in our study. However, the observation that over three quarters of the study population did not perform self-monitoring or exercise regularly is noteworthy, and sends a worrying message to diabetes health care providers and educators. Self-monitoring, exercise and weight reduction programmes should be included as part of any diabetes education package.

Few patients receive formal diabetes education in Pakistan. This study provides further evidence that there is a lack of information available to people with diabetes, with a large proportion never receiving any diabetes education at all.

As our study was conducted in a single centre, the results may not give a true reflec-

tion of the general population. Nevertheless, the findings have significant implications for the quality of diabetes education available to people with diabetes in Pakistan. The fact that the study was conducted in an urban university hospital, where diabetes education may be more readily accessible, raises further concern as there is more likelihood that the majority of people, especially those living in the rural areas and having less access to information, will have even poorer diabetes perceptions and practices.

There is, therefore, a need for increased effort towards developing and making widely available diabetes education programmes that focus on empowering the person with diabetes, not only providing them with information and skills, but also the ability to make decisions and take ownership of controlling their diabetes.

References

1. Shera AS, et al. Pakistan National Diabetes Survey: prevalence of glucose intolerance and associated factors in North West Frontier Province (NWFP) of Pakistan. Journal of the Pakistan Medical Association, 1999, 49(9):206–11.
2. Shera AS et al. Pakistan national diabetes survey; prevalence of glucose intolerance and associated factors in Baluchistan province. Diabetes research and clinical practice, 1999, 44(1):49–58.
3. King H, Aubert RE, Herman WH. Global burden of diabetes, 1995–2025: prevalence, numerical estimates, and projections. Diabetes care, 1998, 21(9): 1414–31.
4. World Health Organization study group on diabetes mellitus. Geneva, World Health Organization, 1985 (WHO Technical Report Series No.727).
5. Stratton M et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. British medical journal, 2000, 321(7258): 405–12.
6. The Diabetes Control and Complication Trial Research Group. The effect of intensive treatment of diabetes on the development of progression of long-term complications in insulin-dependent diabetes. New England journal of medicine, 1993, 329(14):977–86.
7. UK Prospective Diabetes Study (UKPDS) Group. Intensive blood glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). Lancet, 1998, 352(9131):837–53.
8. Tan AS et al. Patient education in the management of diabetes mellitus. Singapore medical journal, 1997, 38(4):156–60.
9. Jabbar A et al. Standard of knowledge about their disease among patients with diabetes in Karachi, Pakistan. Journal of the Pakistan Medical Association, 2001, 51(6):216–8.
10. Kamel NM et al. Sociodemographic determinants of management behaviour of diabetic patients. Part II. Diabetics' knowledge of the disease and their management behaviour. Eastern Mediterranean health journal, 2000, 5(5):974–83.
11. Sivaganam G et al. A comparative study of the knowledge, beliefs, and practices of diabetic patients cared for at a teaching hospital (free service) and those cared for by private practitioners (paid service). Annals of the New York Academy of Sciences, 2002, 958:416–9.
12. Hawthorne K, Tomlinson S. One-to-one teaching with pictures—flashcard health education for British Asians with diabetes.

British journal of general practice, 1997, 47(418):301–4.

13. Fritsche A et al. Long term effects of a structured inpatient diabetes teaching and treatment programme in type 2 diabetic patients: influence of mode of follow-up. Diabetes research and clinical practice, 1999, 46(2):135–41.

14. Cabrera-Pivaral CE et al. Effects of behavior-modifying education in the metabolic profile of the type 2 diabetes mellitus patient. Journal of diabetes complications, 2000, 14(6):322–6.

15. Nicolucci A et.al. Relationship between patient practice-oriented knowledge and metabolic control in intensively treated type 1 diabetic patients: results of the validation of the Knowledge and Practices Diabetes Questionnaire. Diabetes, nutrition & metabolism, 2000, 13(5):276–83.

16. Anderson RM et al. Barriers to improving diabetes care for blacks. Diabetes care, 1991, 14(7):605–9.

17. Hawthorne K. Effect of culturally appropriate health education on glycaemic control and knowledge of diabetes in British Pakistani women with type 2 diabetes mellitus. Health education research, 2001, 16(3):373–81.

18. Fitzgerald JT et al. The reliability and validity of a brief diabetes knowledge test. Diabetes care, 1998, 21(5):706–10.

19. Schoenberg NE, Amey CH, Coward RT. Diabetes knowledge and sources of information among African American and white older women. Diabetes educator, 1998, 24(3):319–24.

20. Brown JB et al. The role of patient, physician and systemic factors in the management of type 2 diabetes mellitus. Family practice, 2002, 19(4):344–9.

21. Mull DS, Nguyen N, Mull JD. Vietnamese diabetic patients and their physicians: what ethnography can teach us. Western journal of medicine, 2001, 175(5): 307–11.

22. Lin CC. Crude drugs used for the treatment of diabetes mellitus in Taiwan. American journal of Chinese medicine, 1992, 20(3–4):269–79.

23. Kar A, Choudhary BK, Bandyopadhyay NG. Comparative evaluation of hypoglycaemic activity of some Indian medicinal plants in alloxan diabetic rats. Journal of ethnopharmacology, 2003, 84(1):105–8.

24. Platel K, Srinivasan K. Plant foods in the management of diabetes mellitus: vegetables as potential hypoglycaemic agents. Nahrung, 1997, 41(2):68–74.

25. Ahmad N et al. Effects of Momordica charantia (Karolla) extracts on fasting and postprandial serum glucose levels in NIDDM patients. Bangladesh Medical Research Council bulletin, 1999, 25(1): 11–3.

26. Ruggiero L et al. Diabetes self-management. Self-reported recommendations and patterns in a large population. Diabetes care, 1997, 20(4):568–76.

Profile of breast lesions among women with positive biopsy findings in Yemen

A.K. Al-Thobhani,[1] Y.A. Raja'a,[2] T.A. Noman[3] and M.A. Al-Romaimah[3]

مُرْتَسَم آفات الثدي لدى النساء الإيجابيَّات الخزعة في الجمهورية اليمنية

عبد الله قاسم الذبحاني، يحيى أحمد رجاء، طارق عبد الواسع نعمان، محمد عبد الجليل الرميمة

الخلاصة: توضّح هذه الدراسة المُرْتَسَم الباثولوجي للثدي بالاعتماد على سجلات مختبر الهيستوباثولوجيا المرجعي في الجمهورية اليمنية، الخاصة بنحو 773 سيدة إيجابية الخزعة للسرطان، أو ممَّن استؤصل الثدي لديهن. وتم تصنيف أنواع السرطانات وفقاً للتصنيف الدولي لعلم الأورام. ووجدت آفات حميدة لدى 79.9٪ من الحالات، وكان أكثر هذه الآفات انتشاراً الورم الغدي الليفي (30.0٪) بعمر وسطي يبلغ 22.2 سنة عند ظهور المرض، يليها الداء الليفي الكيسي (27.4٪) ثم التهاب الثدي (13.1٪). كما وجدت سرطانة غزَّاءة invasive في 155 حالة (20.1٪) بعمر وسطي 44.7 سنة.

ABSTRACT This study described the profile of breast pathology based on records from a reference histopathology laboratory in Yemen of 773 women with positive biopsy or mastectomy findings. Cancers were classified according to the International classification of diseases for oncology. Benign lesions were found in 79.9% of cases. Fibroadenoma was the most prevalent lesion (30.0%) with a mean age at presentation of 22.2 years, followed by fibrocystic disease (27.4%) and breast inflammation (13.1%). Invasive carcinoma was found in 155 cases (20.1%), at a mean age of 44.7 years.

Profil des lésions mammaires chez les femmes ayant des résultats de biopsie positifs au Yémen

RÉSUMÉ La présente étude a décrit le profil de la pathologie mammaire sur la base des dossiers d'un laboratoire d'histopathologie de référence au Yémen pour 773 femmes ayant des résultats positifs de ponction-biopsie ou de biopsie de tissus suite à une mastectomie. Les cancers ont été classés selon la Classification internationale des maladies pour l'oncologie. Des lésions bénignes ont été trouvées dans 79,9 % des cas. Le fibro-adénome était le type de lésion le plus répandu (30,0 %), l'âge moyen à la présentation étant de 22,2 ans, suivi par la mastose sclérokystique (27,4 %) et l'inflammation mammaire (13,1 %). Un carcinome invasif a été trouvé dans 155 cas (20,1 %) à l'âge moyen de 44,7 ans.

[1]Department of Pathology; [2]Department of Community Medicine; [3]Department of Surgery; Faculty of Medicine and Health Sciences, University of Sana'a, Sana'a , Yemen (Correspondence to A.K. Al-Thobhani: abdulla_althobhani@yahoo.com).

Received: 01/01/05; accepted: 07/03/05

Introduction

Globally, breast cancer ranks first among cancers affecting women [*1*]. It has been found to be the main cause of death from cancer, second to lung cancer in some countries [*1,2*]. Worldwide 1 in 10 women is affected by breast cancer during their lifetime [*3*]. There is also the problem of benign tumours reported to be premalignant and the increased risk of developing breast cancer associated with proliferative fibrocystic diseases of the breast [*4*]. Furthermore, it is very important to differentiate between benign and malignant breast diseases in view of the clinical similarities between them [*3*]. Therefore, every change in the breast should be evaluated carefully for early detection of possible precancerous elements.

In Yemen, the magnitude of the problem of breast diseases is not yet known. There has been one limited study of breast cancers in the south-eastern governorates [*5*]. The current study aimed to describe the profile of breast lesions in the records of women with positive biopsy or mastectomy findings from a reference laboratory in Yemen.

Methods

The data were the results of all fine-needle breast biopsies, excisional breast biopsies and biopsies of mastectomies carried out between January 1997 and December 2001 in a histopathology laboratory in Yemen. The laboratory is one of the 4 major histopathology laboratories in Yemen and a reference laboratory for different hospitals and clinics throughout the country. Biopsies from male patients and biopsies that did not produce a clear and confirmed diagnosis were excluded ($n = 77$). Data were complete for the purpose of the study in 773 out of 850 records (90.9%).

Cancers were classified according to the *International classification of diseases for oncology* (3rd edition) [*6*]. Data about histopathological diagnosis, site of the lesion and women's age were analysed by *SPSS* to find means and standard deviations.

Results

Specimens from 773 patients had positive findings. The major diagnoses were fibroadenoma (in 30.1% of cases) at a mean age of 22.2 years, fibrocystic disease (27.4%) at a mean age of 30.2 years, invasive carcinoma (20.1%) at a mean age of 44.7 years and breast inflammation (13.1%) at a mean age of 33.1 years (Table 1). Other disorders were lactating adenoma, tubular adenoma and miscellaneous disorders.

Of the carcinoma cases, 137/155 (88.4%) were the ductal type. The remainder were lobular carcinoma (7 cases, 4.5%), medullary carcinoma (5 cases, 3.2%), intraductal carcinoma with Paget's disease (3 cases), mixed ductal–lobular carcinoma (2 cases) and tubular carcinoma (1 case).

Most of the patients with fibrocystic changes had a simple type (181/212 cases, 85.4%); 30 patients (14.2%) had proliferative fibrocystic changes without atypia and 1 case was with atypia.

Of the cases of inflammation, 45/101 (44.6%) were chronic mastitis. The others were duct ectasia (40 cases), galactocoele (6 cases), fat necrosis (5 cases), plasma cell mastitis (3 cases) and granulomatous mastitis (2 cases).

Miscellaneous disorders found were: normal breast tissue (6 cases), hyperplastic adipose tissue (2 cases), phylloides tumour (3 cases), malignant fibrous histiocytoma (3 cases), benign fibrous histiocytoma (2 cases), non-Hodgkin's lymphoma (2 cases),

Table 1 Distribution of breast diseases in women with positive findings on breast biopsy and mean age

Disease	Total		Left breast		Right breast		Both breasts		Age (years)	
	No.	%	No.	%	No.	%	No.	%	Mean	(SD)
Fibroadenoma	233	30.1	103	44.2	124	53.2	6	2.6	22.2	(6.8)
Fibrocystic disease	212	27.4	94	44.3	108	50.9	10	4.7	30.6	(10.5)
Carcinoma	155	20.1	92	59.4	63	40.6	0	–	44.7	(12.4)
Inflammation	101	13.1	54	53.5	47	46.5	0	–	33.1	(10.0)
Lactating adenoma	30	3.9	13	44.3	16	53.3	1	3.3	28.3	(6.4)
Tubular adenoma	13	1.7	7	53.8	6	46.2	0	–	27.9	(7.8)
Other	29	3.8	12	41.4	17	58.6	0	–	37.1	(16.2)
Total	773	100.0	375	48.3	381	49.3	17	2.3	31.3	(12.8)

SD = standard deviation.

intraduct papilloma (2 cases), fibrosarcoma (2 cases), and leiomyoma, small cell tumour, stromal sarcoma, haemangioma, granular cell tumour, angiosarcoma and lipoma (1 case each).

Carcinoma affected the left breast more than the right one (59.4% versus 40.6%), so too did inflammation. Fibroadenoma and fibrocystic disease, however, affected the right breast more than the left one (Table 1).

Table 2 shows the age distribution of cases. The peak incidence for fibroadenoma cases was at ages 11–20 years (61.4% of cases) and for fibrocystic disease was 21–30 years (42.9%). For carcinoma cases the peak incidence was in the age group 41–50 years (34.2%), followed by age 31–40 years (24.5%).

Discussion

Most studies on female breast pathologies in different centres in the Eastern Mediterranean Region have concentrated mainly on malignant neoplasms [*5,7–12*] and there are few reports addressing the pattern of all breast diseases [*13–17*]. The present study is the first focusing on the pattern of different breast diseases in Yemen.

This study revealed that about 80% of women with positive biopsy results had non-malignant changes. This finding is comparable with other results reported in Saudi Arabia [*13,14*]. The most frequent benign tumour in our study was fibroadenoma, constituting 30.1% of all cases. Similar results were obtained from other studies in Saudi Arabia [*13,14*]. Different results were observed in studies from the United States of America (18.5%) [*18*], United Kingdom (7.7%) [19], American blacks (34.7%) [*20*] and Africans [*21*]. Racial predisposing factors have to be considered in this issue, as the frequency of fibroadenoma is higher among blacks and lower among Euro-American female patients [*4,22*].

Non-neoplastic fibrocystic lesions of the breast ranked second in our study (27.4%), and this is comparable with one study from Saudi Arabia (24.1%) [*14*], but different from other studies in that country (13.1% and 12%) [*13,23*]. Fibrocystic diseases are more frequent in referrals in the United

Table 2 Type of breast diseases by age

Age (years)	Fibroadenoma		Fibrocystic disease		Carcinoma		Inflammation		Lactating adenoma		Tubular adenoma		Others	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
11–20	143	61.4	41	19.3	5	3.2	7	6.9	4	13.3	4	30.8	7	24.1
21–30	68	29.2	91	42.9	22	14.2	42	41.6	17	56.7	4	30.8	4	13.8
31–40	18	7.7	50	23.6	38	24.5	39	38.6	8	26.7	5	38.5	8	27.6
41–50	3	1.3	20	9.4	53	34.2	10	9.9	1	3.3	0	–	5	17.2
51–60	1	0.4	10	4.7	24	15.5	2	2.0	0	–	0	–	2	6.9
> 60	0	–	0	–	13	8.4	1	1.0	0	–	0	–	3	10.3
Total	233	100.0	212	100.0	155	100.0	101	100.0	30	100.0	13	100.0	29	100.0

Kingdom (37%) [*19*] and the United States of America (33.9%) [*18*]. Hormonal imbalance with prolonged exposure to oestrogen is hypothesized to be the main cause of these disorders [*4*]. The lower frequency in our society could be due to cultural factors which deter women from consulting medical staff who are predominantly men. Simple fibrocystic disease comprised most of the cases of fibrocystic disease in our study (around 85%) and this is less dangerous than proliferative fibrocystic disease (15%), which is associated with an increased risk of breast cancer [*4,22*]. Research has shown an association with carcinoma of the breast among female relatives of patients suffering from proliferative fibrocystic disease; thus clinical surveillance should be carried out with both the patient and their female relatives [*4,24,25*].

Inflammation of the breast was found in 13.1% of biopsies. The pattern of inflammatory breast disease in our study is relatively close to that observed in Saudi Arabia and Jordan [*14,15*]. Social factors and personal behaviours could be the possible cause of this condition where repeated pregnancies and lactations with accompanying change of breast physiology predispose women to breast infections.

Cancer of the breast constituted about 20% of biopsies in our study. This result is comparable with results from other studies in the region [*13,14*]. A previous study in Yemen showed that cancer of the breast ranked first among malignant neoplasms affecting women, along with gastrointestinal tract malignancies [*26*]. Invasive ductal carcinoma was the predominant type in our study, affecting 88% of women with carcinoma, a finding which is comparable with many studies [*5,17,18,23,25,27*]. The left breast was more affected than the right one, which was also seen in the study from

Oman [*17*]. The tendency for the left breast to be affected has been reported before [*28*], although the reasons are unclear.

The mean age of our carcinoma patients was 44.7 years, which is close to that found in patients in other studies in Yemen [*5*], Oman [*17*], Saudi Arabia [*12–14,23*], Egypt [*10*], Kuwait [*10*], Sudan [*29*], Lebanon [*30*], Jordan [*11,15*] and Palestine [*31*]. This study and reports from other Arab countries all concur that the peak incidence of breast cancer is higher around 10 years earlier in Arab countries compared with Europe and America [*18*].

The current study cannot explain trends of breast diseases between different countries. Factors such as age, genetics, racial, social, cultural, hormonal [*4,22*] and dietary habits may play a role. However, the overall results of this study are in concordance with studies performed in other Arab countries [*5,10–15,17,23,29–31*].

Conclusion

This study has shown that fibroadenomas, fibrocystic diseases, invasive carcinomas and inflammations were the major breast disorders among Yemeni female patients. About 80% of these diseases were benign and 20% of breast lesions were malignant and were found in a relatively young age group.

References

1. Parker SL et al. Cancer statistics, 1996. CA: a cancer journal for clinicians, 1996, 46:5–27.
2. Veronesi U, Goldhirsch A, Yamold J. Breast cancer. In: Peckham M, Pinedo HM, Veronesi U, eds. Oxford textbook of oncology. Oxford, Oxford Medical Publications, 1995:1243–89.
3. Wittekind Ch, Riede UN. Brustdrüse. In: Riede UN, Schaefer HE, eds. Allgemeine und spezielle Pathology. Stuttgart, Georg Thieme Verlag, 1993:950–61.
4. Morgan JW, Gladson JE, Rau KS. Position paper of the American Council on Science and Health on risk factors for breast cancer: established, speculated, and unsupported. The breast journal, 1998, 4:177–97.
5. Abdul-Hamid G, Tayeb MS, Bawazir AA. Breast cancer in south-east Republic of Yemen. Eastern Mediterranean health journal, 2001, 7:1012–6.
6. International classification of diseases for oncology (ICD-O-3), 3rd ed. Geneva, World Health Organization, 2000.
7. Ezzat AA et al. An overview of breast cancer. Annals of Saudi medicine, 1997, 17:10–5.
8. Al-Idrissi HY. Pattern of breast cancer in Saudi females in Eastern province of Saudi Arabia. Indian journal of medical science, 1991, 45:85–7.
9. Merdad AA et al. Breast cancer: a lot to be done! King Abdulaziz University medical science journal, 1999, 7:37–43.
10. Hoogstraten B et al. Breast cancer in Arabic females. Oncology, 1982, 39:134–9.
11. Tarawneh MS. Breast cancer in Jordan. A pathology review. Journal of the Kuwait Medical Association, 1980, 14:79–86.
12. Ibrahim EM. Pattern and prognosis of breast cancer: data from the Eastern Province of Saudi Arabia. Saudi medical journal, 1991, 12:227–31.
13. Jamal A et al. Profile of breast pathology at Asir central hospital: review of 312 breast biopsies. Saudi medical journal, 1997, 18:363–6.

14. Amr SS et al. The spectrum of breast diseases in Saudi Arab females: a 26 years pathological survey at Dhahran health center. Annals of Saudi medicine, 1995, 15:125–32.

15. Amr SS. Breast diseases in Jordanian females: a study of 1000 cases. European journal of surgical oncology, 1985, 11:257–67.

16. Gupta RK, Al-Misiri S. Profile of breast pathology at Asir Central Hospital. Review of 312 breast cases. Saudi medical journal, 1998, 19:217.

17. Devi KR, Kuruvila S, Musa MM. Pattern of breast neoplasms in Oman. Saudi medical journal, 1999, 20:38–40.

18. Leis HP. The diagnosis of breast cancer. CA: a cancer journal for clinicians, 1977, 27:209–37.

19. Ellis H, Cox P. Breast problems in 1,000 consecutive referrals to surgical out-patients. Postgraduate medical journal, 1984, 60:653–6.

20. Oluwole SF, Freeman HP. Analysis of benign breast lesions in blacks. American journal of surgery, 1979, 137:786–8.

21. Ajao OG. Benign breast lesions. Journal of the National Medical Association, 1979, 71:867–8.

22. Crum CP. The breast. In: Cotran RS, Kumar V, Robbins LR, eds. Robbins pathologic basis of diseases, 5th ed. Philadelphia, WB Saunders, 1994:1089–111.

23. Jamal AA. Pattern of breast diseases in a teaching hospital in Jeddah, Saudi Arabia. Saudi medical journal, 2001, 22(2):110–3.

24. Azzopardi JG. IN: Bennington JL, ed. Problems in breast pathology, Volume 11. Philadelphia, WB Saunders, 1979:89–90.

25. Nizze H, Al-Thobhani AK, Terpe H. Steroid hormone receptor profile of normal, benign and malignant female breast epithelium: an immunohistochemical analysis of 325 biopsies. The breast journal, 1998, 4:156–64.

26. Al-Thobhani AK, Raja'a YA, Noman TA. The pattern and distribution of malignant neoplasms among Yemeni patients. Saudi medical journal, 2001, 22:910–3.

27. Rosen PP, ed. Rosen's breast pathology. Philadelphia, Lippincott Raven, 1997:275–93.

28. Damjanov I, Linder J, eds. Anderson's pathology, 10th ed. Missouri, Mosby, 1997:2354–85.

29. Hidaytallah A. Carcinoma of the breast in the Sudan. I. Epidemiologic survey. Sudan medical journal, 1969, 7:43–9.

30. Abou-Dauod KT. Cancer of the breast and breast feeding. Study of 279 parous female and matched controls. Cancer, 1971, 24:781–4.

31. Barak F et al. Breast cancer at medical centers in Israel, the West Bank and the United States. Oncology, 1988, 45: 354–9.

Termination of second and early third trimester pregnancy: comparison of 3 methods

I. Bani-Irshaid,[1] T.Z. Athamneh,[1] D. Bani-Khaled,[1] M. Al-Momani[1] and H. Dahamsheh[1]

إنهاء الحمل في الأُثلوث الثاني أو بداية الثالث: مقارنة ثلاث طرق

إبراهيم بني ارشيد، طارق عثامنه، ضيف الله بني خالد، مراد المومني، حسن دهامشة

الخلاصة: قام الباحثون بتقييم كفاءة ومأمونية ثلاث طرق قانونية مستخدَمة في إنهاء الحمل بوصفه ضرورة علاجيَّة في الأُثلوث trimester الثاني أو بداية الأُثلوث الثالث، لدى 258 من الحوامل الأردنيات اللاتي تم توزيعهن بشكل عشوائي لتطبيق قثطار فولي مع أو بدون سحب أو إعطاء أقراص مهبلية من البروستاغلاندين E2. وقد كان معدل فشل إنهاء الحمل والمدة الإجمالية بين إدخال القثطار وبين إنهاء الحمل أعلى لدى استخدام قثطار فولي دون سحب (فقد زاد معدل الفشل بنسبة 16.5٪ والمدة بنسبة 16.5 ساعة عمَّا لو استُخدم قثطار فولي مع السحب (حيث بلغ معدل الفشل 10٪ والمدة 14.2٪ ساعة) كما كان أعلى أيضاً مما لو استخدمت الأقراص البروستاغلاندين E2 المهبلية (حيث بلغ معدل الفشل 8٪ والمدة 11.5 ساعة). ومع ذلك، تُعَدُّ قثطرة فولي طريقة مأمونة وزهيدة التكاليف لإنهاء الحمل في الأُثلوث الثاني أو بداية الأُثلوث الثالث منه، ويمكن تعزيز فعاليتها باستخدام السحب لإعطاء نتائج تشابه ما تُسفر عنه الأقراص المهبلية للبروستاغلاندين E2.

ABSTRACT The efficacy and safety of 3 methods used in legal termination of pregnancy in the second and early third trimester was assessed in 258 women in Jordan randomly assigned to receive Foley catheter (with and without traction) or prostaglandin E2 vaginal tablets. The failure rate of termination and the total insertion-to-termination time was higher with Foley catheter without traction (16.5%, 16.5 hours) than with traction (10.0%, 14.2 hours) or prostaglandin (8.0%, 11.5 hours). However, Foley catheter as a method of termination of pregnancy in second and early third trimester is safe and inexpensive, and its efficacy can be enhanced with the use of traction to give similar results to prostaglandin E2.

Interruption de grossesse au deuxième trimestre et au début du troisième trimestre : comparaison de 3 méthodes

RÉSUMÉ L'efficacité et l'innocuité de trois méthodes utilisées pour l'interruption légale de grossesse au deuxième trimestre et au début du troisième trimestre ont été évaluées chez 258 femmes en Jordanie qui ont été randomisées pour recevoir une sonde de Foley (avec ou sans traction) ou des ovules vaginaux de prostaglandine E2. Le taux d'échec pour l'interruption de grossesse et le temps total entre l'insertion et l'interruption de la grossesse étaient supérieurs avec la sonde de Foley sans traction (16,5 %, 16,5 heures) qu'avec traction (10,0 %, 14,2 heures) ou qu'avec la prostaglandine (8,0 %, 11,5 heures). Toutefois, la sonde de Foley, en tant que méthode d'interruption de grossesse au deuxième trimestre et au début du troisième trimestre, est sûre et peu coûteuse, et son efficacité peut être renforcée par le recours à la traction pour donner des résultats similaires à ceux de la prostaglandine E2.

[1]Department of Obstetrics and Gynaecology, King Hussein Medical Centre, Amman, Jordan
(Correspondence to I. Bani-Irshaid: irshaid71@yahoo.com).
Received: 09/10/03; accepted: 07/03/05

Introduction

Despite recent advances in prenatal diagnosis during the first trimester, termination of pregnancy in the second and early third trimester of pregnancy due to fetal abnormalities or intrauterine fetal death still accounts for 10% of abortions in the USA [*1*]. Achieving termination after the first trimester of pregnancy is one of the great challenges facing obstetricians today. Unfortunately, not all women who need termination have a favourable cervix for induction. As first described by Bishop [*2*], cervical ripening is an important process preceding effacement and dilatation of the cervix. A variety of techniques for termination of mid-trimester pregnancy can be used, but there is no consensus about which is the best [*3*].

Use of the Foley catheter for termination of pregnancy was first described by Krause in 1833 [*4*]. In 1967 Embrey and Mollison [*5*] reported a 94% successful induction rate after using the Foley catheter for cervical ripening in 100 women. The Foley catheter appears to affect cervical ripening by direct mechanical dilatation and also through release of endogenous prostaglandin [*6*] and this effect can be enhanced when traction is applied.

The vaginal or intracervical application of prostaglandin E2 (PGE2) has been widely used for mid-trimester termination because of its effect on both cervical ripening and uterine contraction [*7*]. In most studies PGE2 has been applied locally in gel form and the high dosages frequently cause severe side-effects, including vomiting, diarrhoea and fever [*7–10*]. In this study, we used tablets of PGE2 to replace the gel formulation, to diminish the side-effects.

The aim of this study was to compare the efficacy and safety of 3 methods of termination of pregnancy in the second and early third trimester: PGE2 vaginal tablets, Foley catheter without traction and Foley catheter with traction.

Methods

The study was conducted from July 1998 to February 2000 at the Department of Obstetrics and Gynaecology in Prince Hashem Ben Al-Hussein and Prince Rashed Ben Al-Hassan Military Hospitals in Jordan. The study sample comprised healthy women who were 15–30 weeks pregnant and admitted for legal termination of pregnancy due to intrauterine fetal death or gross congenital abnormality. Patients with known placenta praevia or unexplained vaginal bleeding and rupture of membranes were excluded from the study. The study was approved by the scientific committee in the Department of Obstetrics and Gynaecology of the King Hussein Medical Centre. Verbal consent was obtained from each woman after explaining the aims and design of the study. A total of 261 patients were entered into the study; 3 women were discharged after randomization but before the start of termination and were lost to follow-up.

During the study period the women were randomly assigned to 1 of 3 treatments until the time when the study was terminated: Foley catheter without traction (n = 91), Foley catheter with traction (n = 79), or PGE2 vaginal tablets (n = 88). Intravenous oxytocin drip was used for augmentation of termination in all 3 groups when cervical ripening was achieved. All patients were admitted to hospital and managed by the attending physician. The following were recorded: complete blood count and cross-match, vital signs and signs of uterine hyperstimulation from oxytocin.

The group randomly assigned to receive PGE2 had tablets (3 mg) (Pharmacia &

Upjohn, Belgium) placed into the endocervical canal or posterior vaginal fornix by sterile speculum examination. The dose was repeated every 6 hours as long as the Bishop score was still ≤ 5, to a maximum of 4 doses. Intravenous oxytocin was started when Bishop score reached > 5 (cervical effacement > 50%).

Those in the Foley groups had a no.14 Foley catheter with 40 mL balloon inserted into the endocervical canal under direct visualization by sterile speculum examination. Once it passed the internal os, 40 mL water was instilled in the balloon, then the catheter was placed inside the patient's thighs and firmly attached. In the group of patients randomized to receive traction, a continuous traction by 500 mL normal saline was achieved by taping the end of the Foley catheter to the long side of the patient's thigh, so that gentle, steady traction was applied. The catheter was checked for Foley bulb extrusion every 4 hours by vaginal examination, and the traction was adjusted so that gentle traction continued.

Because the aim of the trial was to evaluate the success of cervical ripening, the outcome measures for the 3 methods were: total time from insertion to expulsion of uterine contents, side-effects, patients' comfort (assessed by asking the women if they were comfortable with the procedure or if they were feeling any discomfort) and success/failure of termination.

Analysis of variance was used to investigate whether there was a difference between the 3 methods used. Student–Newman–Keuls post-hoc test was used to test the difference between the 3 methods. A probability of $P < 0.05$ was considered statistically significant.

Results

The mean age of the 258 women was 27.1 years and parity ranged from 0 to 7; 39.2% were nulliparous. The mean gestation age was 19 weeks. There was no statistically significant difference between the 3 groups with respect to maternal age, gestational age or parity. The main indication for termination was intrauterine fetal death for different reasons (84.6% of women), while gross congenital abnormality of the fetus, mainly due to anencephaly, was the indication for 15.4% of women.

In the prostaglandin E2 group, most of the patients required 3 applications of PGE2 tablets (mean 2.3 applications). No Foley catheter needed to be replaced after the initial application.

The overall failure rate of termination for all 3 methods was 11.6% (Table 1). The failure rate was higher when the Foley catheter was used without traction (16.5%) compared with Foley catheter with traction (10.0%), although the lowest failure rate in termination was with PGE2 tablets (8.0%) ($P < 0.001$). The average insertion-to-termination time was longer with Foley catheter without traction compared with Foley with traction (16.5 hours versus 14.2 hours), while it was shorter (11.5 hours) with PGE2 tablets ($P < 0.002$).

There were few maternal side-effects in all groups. The most common side-effect was discomfort at insertion of the Foley catheter (only 37 reported minimal to mild discomfort), while 4 of the patients in the PGE2 group reported nausea and vomiting. Uterine hyperstimulation, defined as 6 contractions per 10 minute period, occurred in only 2 patients. Despite reports of discom-

Table 1 Outcome of pregnancy termination in second and early third trimesters using Foley catheter with and without traction or prostaglandin (PGE2) tablets

Method	Total	Successful termination		Failed termination		Insertion to termination time (hours)[a]	
	No.	No.	%	No.	%	Mean	SD
Foley plus oxytocin, without traction	91	76	83.5	15	16.5	16.5	0.93
Foley plus oxytocin, with traction	79	71	89.9	8	10.1	14.2	1.24
Prostaglandin vaginal tablets	88	81	92.0	7	8.0	11.5	0.67
Total	258	228	88.4	30	11.6		
P-value				P < 0.001		P < 0.002	

[a]Time between insertion of Foley catheter or PGE2 tablets until expulsion of uterine contents.
SD = standard deviation

fort at the time of Foley catheter insertion there were few complaints of discomfort with any of the methods.

Discussion

Mid-trimester labour induction is necessary in a variety of circumstances; the indications may be maternal or fetal, but it is usually accompanied by an unfavourable cervix. To solve this problem, different methods of artificial cervical ripening have been developed. Mechanical devices such as the cervical balloon [*5,11,12*] and laminaria [*13,14*] have been used safely. In addition, preparations of prostaglandin have been used, in a variety of concentrations and application methods, to pharmacologically mature the cervix [*10*].

In this study we compared the use of a pharmacological method for cervical ripening, PGE2 tablets, with a mechanical method, the insertion of a Foley catheter with or without traction to enhance its effect. Early studies comparing the Foley catheter with PGE2 tablets found no difference in the time of cervical ripening or termination time [*8,9*]. Both Thomas et al. [*8*] and St Ong and Connors [*9*] compared the Foley catheter with PGE2 tablets and found both to be effective in changing the Bishop score, but neither found Foley catheter to be more effective than PGE2 tablets. It has been suggested that PGE2 tablets are cost-effective in termination of pregnancy [*15*]. In our study, the alternative was Foley catheter, which is relatively inexpensive and safe and has almost similar results in achieving success in termination of pregnancy and insertion-to-termination interval. With traction applied, it enhances the mechanical effect of Foley catheter to ripen the cervix, and this makes the method of traction competitive for PGE2 tablets and avoid the pharmacological side-effects such as nausea and vomiting.

To evaluate the efficacy of any method of termination for patients with unfavourable cervix, nulliparity should be one if the main considerations, as the cervix is more prone to faster ripening. In our study around 40% of women were nulliparas.

We can conclude that in locations where there is no experience with the use of PGE2, or when it is unavailable, the Foley catheter appears to be a safe, effective and relatively inexpensive method for termination of pregnancy, particularly when gentle traction is applied.

References

1. Abortion surveillance 1979—1980. Atlanta, Georgia, Centers for Disease Control, 1983.
2. Bishop EH. Pelvic scoring for elective induction. Obstetrics and gynecology, 1964, 24:266–8.
3. Liu HS et al. Second and early third trimester pregnancy termination by extra-amniotic balloon and intracervical PGE2. International journal of gynaecology and obstetrics, 1998, 60:29–34.
4. Hamilton J. Historical review of British obstetrics and gyneacology. Edinburgh, Livingston, 1954:1800–950.
5. Embrey MP, Mollison BG. The unfavorable cervix and induction of labor using a cervical balloon. Journal of obstetrics and gynaecology of the British Commonwealth, 1979, 74:44–8.
6. Ezimokhai M, Nwabinelli JN. The use of Foley's catheter in ripening the unfavourable cervix prior to induction of labour. British journal of obstetrics and gynaecology, 1980, 87:281–6.
7. Graves GR et al. The effect of vaginal administration of various doses of prostaglandin E2 gel on cervical ripening and induction of labor. American journal of obstetrics and diseases of women and children, 1985, 151:178–81.
8. Thomas IL et al. Preparations for induction of labour of the unfavorable cervix with Foley catheter compared with vaginal prostaglandin. Australian & New Zealand journal of obstetrics & gynaecology, 1986, 26:30–5.
9. St Ong RD, Conners GT. Preinduction cervical ripening: a comparison of intracervical prostaglandin E2 gel versus the Foley catheter. American journal of obstetrics and gynecology, 1995, 172:687–90.
10. Keirse MJ. Prostaglandins in preinduction cervical ripening. Meta analysis of worldwide clinical experience. Journal of reproductive medicine, 1993, 38:89–100.
11. Liu HS et al. Extra-amniotic balloon with PGE2 versus extra-ovular Foley catheter with PGF2alpha in mid-trimester pregnancy termination. International journal of gynaecology and obstetrics, 1998, 63:51–4.
12. Lin A, Kupferminc M, Dooley SL. A randomized trial of extra-amniotic saline infusion versus laminaria for cervical ripening. Obstetrics and gynecology, 1995: 86:545–9.
13. Manabe Y. Laminaria tent for gradual and safe cervical dilatation. American journal of obstetrics and gynecology, 1971, 110:743–5.
14. Kline SB, Meng H, Munsick RA. Cervical dilation from laminaria tents and synthetic osmotic dilators used for 6 hours before abortion. Obstetrics and gynecology, 1995, 86:931–5.
15. Sullivan CA et al. Combining medical and mechanical methods of cervical ripening. Does it increase the likelihood of successful induction of labor? Journal of reproductive medicine, 1996, 41:823–8.

Variation in repeat caesarean section complication rates among 3 hospitals in northern Jordan

Z.O. Amarin,[1] H.A. Alchalabi,[1] Y.S. Khader,[2] A.A. Gharaibeh[2] and R.M. Shwayat[3]

التفاوت في مضاعفات العمليات القيصرية المتكرِّرة، في ثلاثة مستشفيات في شمال الأردن

زهير عودة عمارين، هيفاء علي الجلبي، يوسف صالح قادر، أسما عايش غرايبة، رامي محمد شويات

الخلاصة: قام الباحثون باستقصاء معدل المضاعفات الناجمة عن الولادات القيصرية المتكرِّرة في 3 مستشفيات (المستشفى الوطني، والمستشفى العسكري، والمستشفى الجامعي) في إربد، من خلال دراسة سجلات التوليد الخاصة بنحو 989 سيدة خلال المدة من 1 كانون الأول 1999 إلى 30 آذار/مارس 2004. وقد وجدت فروق يُعْتَدُّ بها إحصائياً من حيث عدد الولادات القيصرية السابقة والمستشفى الذي أجريت به. وقد كانت العملية القيصرية من النوع الاختياري عند 579 (58.5٪) من السيدات. وكانت هناك فروق يُعْتَدُّ بها إحصائياً بين المستشفيات من حيث إخفاق تقدُّم المخاض كاستطباب لإجراء الجراحة القيصرية وفي غير ذلك من الاستطبابات. وبعد إجراء الضبط الذي يأخذ في الاعتبار عدد الجراحات القيصرية، كشف تحليل التحوُّف أن السيدات في المستشفيات العسكرية والمستشفيات الجامعية أكثر عرضة لحدوث المشيمة المنزاحة، في حين لا توجد أي فروق يُعْتَدُّ بها إحصائياً بين المستشفيات من حيث المضاعفات التالية للجراحة.

ABSTRACT We investigated the complication rates of repeat caesarean deliveries in 3 hospitals (national health, military, university) in Irbid by examining the obstetric records of 989 women from 1 December 1999 to 30 March 2004. There was a statistically significant difference between the number of previous caesarean sections and hospital. In total, 579 (58.5%) patients underwent elective caesarean section. There were statistically significant differences between hospitals for "failure to progress in labour" and "other" indications for caesarean section. After adjusting for the number of caesarean sections, regression analysis revealed that women from the military and university hospitals were more likely to have placenta praevia. There were no statistically significant differences between hospitals as regards post-operative complications.

Variation du taux de complications pour les césariennes itératives dans trois hôpitaux du nord de la Jordanie

RÉSUMÉ Nous avons étudié les taux de complications pour les césariennes itératives dans 3 hôpitaux (public, militaire, universitaire) à Irbid en examinant les dossiers obstétricaux de 989 femmes entre le 1er décembre 1999 et le 30 mars 2004. Il y avait une différence statistiquement significative entre le nombre des césariennes précédentes et l'hôpital. Au total, 579 patientes (58,5 %) ont subi une césarienne élective. Il y avait des différences statistiquement significatives entre les hôpitaux concernant l'arrêt de la progression du travail comme indication de la césarienne et les « autres » indications. Après ajustement sur le nombre de césariennes, l'analyse de régression a montré que les femmes des hôpitaux militaire et universitaire étaient plus susceptibles de présenter un placenta praevia. Il n'y avait pas de différence statistiquement significative entre les hôpitaux concernant les complications postopératoires.

[1]Department of Obstetrics and Gynaecology, King Abdullah University Hospital, Jordan University of Science and Technology, Irbid, Jordan (Correspondence to Z.O. Amarin: zoamarin@hotmail.com).
[2]Department of Public Health and Biostatistics, Jordan University of Science and Technology, Irbid, Jordan.
[3]Prince Rashid Military Hospital, Royal Medical Services, Irbid, Jordan.
Received: 08/01/04; accepted: 07/03/05

Introduction

Caesarean sections have for some time been performed with impunity. Such deliveries are associated with immediate and delayed morbidity and mortality risks [*1*]. Compared with vaginal deliveries, caesarean sections carry a higher number of postpartum complications [*2*]. During the past few decades the worldwide incidence of caesarean births has increased markedly [*3*]. Approximately 1 out of 4 women will have a caesarean delivery [*4*] and it is the most frequently performed surgical procedure in the United States [*5*]. Worldwide variation exists in rates for caesarean delivery [*6*]; currently the rates range from 10% to 40% of all deliveries [*7*].

Caesarean deliveries have come under scrutiny for more than a decade. The high rate of caesarean section poses a unique threat in the developing world where family size has not dipped to the low levels seen recently in the more industrialized countries. Numerous studies have shown variation in caesarean delivery rates by race, hospital type and hospital location [*8–10*]. The incidence in individual hospitals is dependent on the patient population [*11*].

About one-third of caesarean sections are repeat procedures [*12*]. In developing countries in general, and Middle Eastern countries in particular, the prevalence of women with multiple previous caesarean sections is high [*13*]. Repeat caesarean deliveries are associated with increased morbidity [*14,15*] but little has been done to investigate complications that are specifically associated with repeat caesarean deliveries. The impact of the type of hospital on clinical outcomes has been examined for a variety of medical procedures [*16*] Because little can be done to influence maternal factors that are associated with caesarean delivery complications [*17*], the aim of this study was to describe the role that individual hospitals play in complications from repeat caesarean section. The hypothesis is that different types of hospital may have significantly different observed caesarean delivery complication rates. As part of an ongoing quality improvement project we investigated the variability in the rates of complications at 3 differently financed public hospitals in the city of Irbid, northern Jordan. Our objective was to assess the individual hospital contribution to intra- and post-operative repeat caesarean delivery complications and to measure their magnitude.

Methods

We conducted a retrospective review of routinely collected admission data of all women with repeat caesarean section between 1 December 1999 and 30 March 2004. We did not apply any exclusion criteria. The settings were 3 public hospitals in the same city but which served different populations. The first, Princess Badea Teaching Hospital (PBTH), is a National Health Service maternity hospital open to the general population. The second, Prince Rashid Military Hospital (PRMH), is a general hospital open to military personnel and their families. The third, King Abdullah University Hospital (KAUH), is a semi-private university hospital open to insured university staff and their families, public service employees and cash payers. All hospitals have a 24-hour in-house attending specialist or faculty coverage, and most births are attended by residents with specialist or faculty supervision.

From the records of women with repeat caesarean sections performed at these hospitals over the study period, demographic data and significant aspects of the

medical history were extracted and the indications for repeat caesarean delivery were recorded. When more than 1 indication was found, a single main diagnostic variable was assigned for statistical analysis. Medical, ante- and intrapartum obstetric complications were identified, including pre-eclampsia, pre-existing and gestational diabetes, asthma, thyroid disease, placenta praevia, malpresentation, macrosomia, multiple gestation and placental abruption. The main outcome measures were intraoperative, immediate and short-term postoperative complication rates.

For each patient, outcome variables were recorded. These included haemorrhage (in excess of 800 mL) during the operation or in the puerperium, postoperative complications such as fever (> 38 ºC on 2 consecutive measurements 6 hours apart other than in the first 24 hours), uterine fenestration, bladder injury, placenta praevia, placenta praevia accreta, intestinal or urinary tract problems, emergency peripartum and postpartum hysterectomy, incision cellulites, thrombosis, embolism, and intensive care admission.

Analysis of variance was used to test for the difference in maternal age, parity and gestational age between the 3 hospitals. Chi-squared test was used to analyse the distribution of caesarean section data. After adjusting for the number of previous caesarean sections, binary logistic regression was used to analyse the difference in complication rates between hospitals. A *P*-value < 0.05 was used for the level of significance.

Results

A total of 989 women underwent repeat caesarean section in the 3 hospitals in the study period: 679 at PBTH, 185 at PRMH and 125 at KAUH.

The demographic distribution of women according to hospital and clinical features, broken down by the number of repeat caesarean deliveries is presented in Table 1. There were no statistically significant differences between hospitals with respect to maternal age, parity or gestational age. Of the 989 patients reviewed, 480 (48.6%)

Table 1 Demographic and clinical characteristics of repeat caesarean section patients by hospital

Characteristic	PBTH (n = 679) Mean (SD)	PRMH (n = 185) Mean (SD)	KAUH (n = 125) Mean (SD)	P-value
Maternal age (years)	31.5 (4.3)	31.4 (4.5)	31.2 (4.1)	0.766
Parity	3.2 (1.7)	3.1 (2.6)	3.1 (1.3)	0.735
Gestational age (weeks)	36.5 (1.9)	36.6 (2.4)	36.8 (2.5)	0.321
No. of previous caesarean	No. (%)	No. (%)	No. (%)	
sections				< 0.001
1	351 (51.7)	56 (30.3)	73 (58.4)	
2	204 (30.0)	25 (13.5)	34 (27.2)	
≥ 3	124 (18.3)	104 (56.2)	18 (14.4)	

PBTH = Princess Badea Teaching Hospital; PRMH = Prince Rashid Military Hospital; KAUH = King Abdullah University Hospital.
SD = standard deviation.

Table 2 Indication for caesarean section in patients with 1 previous caesarean delivery by hospital

Indication	PBTH (n = 351) No. (%)	PRMH (n = 56) No. (%)	KAUH (n = 73) No. (%)	P-value
Fetal distress	59 (16.8)	4 (7.1)	13 (17.8)	0.162
Failure to progress in labour	97 (27.6)	14 (25.0)	7 (9.6)	0.04
Placenta praevia	11 (3.1)	1 (1.8)	4 (5.5)	0.471
Placental abruption	10 (2.8)	0 (0.0)	4 (5.5)	0.184
Malpresentation	47 (13.4)	12 (21.4)	9 (12.3)	0.246
Pre-eclampsia	34 (9.7)	3 (5.4)	6 (8.2)	0.558
Macrosomia	19 (5.4)	4 (7.1)	5 (6.8)	0.808
Multiple pregnancy	10 (2.8)	1 (1.8)	3 (4.1)	0.731
> 40 weeks gestation	21 (6.0)	0 (0.0)	5 (6.8)	0.127
Other	43 (12.3)	17 (30.4)	17 (23.3)	0.001

PBTH = Princess Badea Teaching Hospital; PRMH = Prince Rashid Military Hospital; KAUH = King Abdullah University Hospital.

had undergone 1 previous caesarean section, 263 (26.6%) had undergone 2 and 246 (24.8%) had undergone 3 or more. The proportion of women with previous caesarean section was not comparable in the 3 hospitals (low, 30.3% vs. high, 58.4% for 1 previous caesarean section), (low, 13.5% vs. high, 30.0% for 2 previous caesarean sections) and (low, 14.4% vs. high, 56.2% for 3 or more previous caesarean section) ($P < 0.001$).

Of the total repeat caesarean deliveries, 579 (58.5%) patients underwent elective caesarean section. The KAUH caesarean section group had fewer patients undergoing elective caesarean section (61/125, 48.8%) compared to PRMH 97 (52.4%) ($P = 0.530$) and PBTH 417 (61.4%) ($P = 0.008$).

PRMH had fewer patients with the diagnosis of fetal distress (5/185, 2.7%) and PBTH had more patients with the diagnosis of failed trial of labour (97/351, 27.6%). The distribution of indications (only for patients with 1 previous caesarean section for whom normal labour could be attempted) and the corresponding number of patients of the 3 hospitals are presented in Table 2. There were statistically significant differences between the hospitals as regards failure to progress in labour as the indication for caesarean section and "other" indications.

The details of the postoperative maternal complications according to the number of caesarean sections are presented in Table 3. Generally, there was a decrease in the incidence of operative haemorrhage in women with higher number of previous caesarean sections. There was a difference between hospital rates for haemorrhage, especially for cases with 2 previous caesarean sections (low 7.3% vs. high 24.0%). However, analysis for this group and for women with 1 previous caesarean (low 14.8% vs. high 26.0%) and 3 or more previous caesarean sections (low 10.5% vs. high 18.5%) were not statistically significant.

Table 3 Caesarean section findings and postoperative complications by hospital and number of previous caesarean sections

Complication	Previous caesarean sections No.	PBTH No. (%)	PRMH No. (%)	KAUH No. (%)
Placenta praevia	1	8 (2.3)	5 (8.9)	1 (1.4)
	2	2 (1.0)	2 (8.0)	1 (2.9)
	≥ 3	4 (3.2)	16 (15.4)	2 (11.1)
Uterine fenestration	1	3 (0.8)	2 (3.6)	2 (2.7)
	2	3 (1.5)	2 (8.0)	1 (2.9)
	≥ 3	4 (3.2)	3 (2.9)	1 (5.6)
Haemorrhage	1	52 (14.8)	12 (21.4)	19 (26.0)
	2	15 (7.4)	6 (24.0)	3 (8.8)
	≥ 3	23 (18.5)	11 (10.6)	2 (11.1)
Hysterectomy	1	0	0	1 (1.4)
	2	2 (1.0)	0	0
	≥ 3	4 (3.2)	2 (1.9)	0
Fever	1	7 (2.0)	1 (1.8)	2 (2.7)
	2	0	3 (12.0)	1 (2.9)
	≥ 3	8 (6.4)	6 (5.7)	0
Wound infection	1	7 (2.0)	1 (1.8)	2 (2.7)
	2	2 (1.0)	0	0
	≥ 3	5 (4.0)	7 (6.7)	0
Visceral injuries	1	1 (0.3)	1 (1.8)	0
	2	2 (1.0)	0	0
	≥ 3	2 (1.6)	2 (1.9)	0

PBTH = Princess Badea Teaching Hospital; PRMH = Prince Rashid Military Hospital; KAUH = King Abdullah University Hospital.
Percentages calculated from total for each hospital for number of previous caesarean sections.

There were 41 (4.1%) cases of placenta praevia in the women from the 3 groups. There was an increased incidence of placenta praevia in relation to higher number of previous caesarean sections. There was 1 death of a mother with 3 previous caesarean sections and placenta praevia accreta. She died a few hours after undergoing caesarean hysterectomy. The cause was shock that could not be reversed.

Nine (0.9%) women required caesarean hysterectomy. Placenta praevia accreta was present in 6 of these women, 1 woman had hysterectomy with a normally sited placenta accreta, 1 was due to intraoperative atonic bleeding, and another was due to postoperative atonic bleeding of more than 1500 mL and severely lacerated uterine wound margins.

Eight (8) women had visceral injuries: 5 had bowel injury and in 3 the urinary bladder was attached high on the anterior abdominal wall where it was inadvertently entered and was repaired. There were 21 cases of uterine scar fenestration. The risk of fenestration did not seem to be affected by the number of previous caesarean sections. There were no cases of uterine rupture, thromboembolic events, anaesthetic complications or patients needing intensive postoperative care. One maternal death was recorded. The aggregate rate for analysed potentially avoidable complications of haemorrhage, hysterectomy, fever, wound infection and visceral injuries for the 3 hospitals in this study was 21.4% (212 complication/989 caesarean sections).

Binary logistic regression analysis revealed that women from PRMH (odds ratio = 3.66) and KAUH (odds ratio = 3.41) were more likely to have placenta praevia compared to women from PBTH after adjusting for the number of caesarean sections. Odds ratios for postoperative maternal complications (adjusted for the number of caesarean sections) and their 95% confidence intervals for women from PRMH and KAUH compared to women from PBTH are presented in Table 4. There were no statistically significant differences between the hospitals with regard to any of the postoperative complications.

Discussion

Giving birth is a ubiquitous event that usually occurs in a hospital setting. It has been calculated that the average woman in developed countries will have 3.3 pregnancies resulting in 2.1 live births [*17*]. Hospital births represent 12% of all hospitalizations [*18*]. Although patients presenting with 3 or more previous caesarean sections is not a common event in the industrialized world, its prevalence in developing countries is common [*19,20*]. This indicates the obvious importance of analysing the clinical outcomes of repeat caesarean deliveries. Teaching hospitals have lower unadjusted caesarean rates compared with other com-

Table 4 Logistic regression analysis (adjusted for caesarean section) for repeat caesarean section and caesarean section findings and postoperative complications

Complication	PBTH (n = 679)	PRMH (n = 185)			KAUH (n = 125)		
	OR	OR	95% CI	P-value	OR	95% CI	P-value
Placenta praevia	1	3.66	1.71–7.84	0.001	3.41	1.39–8.38	0.101
Haemorrhage	1	1.20	0.74–1.94	0.470	1.52	0.09–2.51	0.101
Hysterectomy	1	0.59	0.11–3.13	0.533	1.05	0.12–8.92	0.964
Fever	1	0.74	0.31–1.71	0.481	1.20	0.34–4.28	0.771
Wound infection	1	1.41	0.54–3.65	0.477	0.78	0.17–3.53	0.758
Visceral injuries	1	1.58	0.32–7.63	0.567	–[a]	–[a]	–[a]
Uterine fenestration	1	2.26	0.78–6.52	0.133	2.30	0.71–7.49	0.165

PBTH = Princess Badea Teaching Hospital; PRMH = Prince Rashid Military Hospital; KAUH = King Abdullah University Hospital.
OR = odds ratio; CI = confidence interval.
[a]OR were not calculated because the numbers were small.

munity hospitals [*21*]. Significant variations may be justified when individual hospitals serve different populations with varying risks. As a clinical measure of quality of care, studying the variations in rates among hospitals, especially those that are in the same area, may uncover inherent institutional clinical differences in caesarean delivery complication rates.

Our elective repeat caesarean delivery rate was similar to that reported by other studies [*22–25*] and represents the largest contribution to the repeat caesarean delivery rate. Patients' preference plays a significant role within this elective caesarean section group [*26*]. Failure to progress in labour was an indication for repeat caesarean section in 27.6% of patients at PBTH, 25.0% at PRMH and 9.5% at KAUH. Although not all patients who undergo a scheduled repeat caesarean delivery are candidates for a trial of labour, some patients in the elective group could have been allowed a trial of labour. This would have potentially decreased the repeat caesarean delivery rate and the possible complications. This probably reflects both patient and physician attitudes toward vaginal birth after caesarean section. They may be reluctant to attempt a trial of labour when the fetus in a subsequent pregnancy is presumed larger. Macrosomia was an indication for a second caesarean section in 5.8% of women in our study. A study by Zelop et al. demonstrated that a trial of labour after previous cesarean delivery may be a reasonable clinical option for pregnant women with suspected birth weights of > 4000 g, given that the rate of uterine rupture associated with these weights does not appear to be substantially increased when compared to lower birth weights [*27*]. However, some caution may apply when considering a trial of labour in women with infants weighing > 4250 g. A trial of labour may also be reasonable in women whose previous caesarean was for dystocia in the second stage of labour. It has been demonstrated that patients who underwent a trial of labour after a previous cesarean for dystocia in the second stage had a 75% chance of achieving vaginal delivery [*28*].

There is a strong relationship between hospital volume and complications of delivery; the likelihood of complications decreases as volume increases [*8*]. A high volume institution, which in this study was PBTH, may perhaps serve a demographically distinct population. Adjusting for case mix enables improved identification of hospitals with caesarean delivery complication rates significantly lower or higher than others [*29*]. For comparison across hospitals some studies have used multivariate regression techniques to "adjust" for differences, taking into consideration multiple co-morbidities [*30,31*]. In our study, we used binary logistic regression after adjusting for the number of previous caesarean sections to analyse the difference in complication rates between hospitals. Except for placenta praevia, which is not an avoidable complication, we found no significant difference in observed caesarean delivery complication rates between the 3 hospitals covering 3 different population sub-groups of the same region. If 1 of these hospitals was found to have the best practice results for an avoidable complication, then risk adjustment could be based on that hospital's data. Failing this, aggregate regional results can be used to provide the initial criteria. The overall rate for potentially avoidable complications (haemorrhage, hysterectomy, fever, wound infection and visceral injuries) for the 3 hospitals in this study was 20.6%, with no statistically significant difference between the hospitals. Therefore, no clear consensus exists regarding which clinical,

demographic or hospital factor should serve as a model.

Although our study does not suggest an accepted average rate for caesarean section complications, the wide variability observed within each risk category, suggests that surgery is often inappropriately used. In our study "other" was one of the variables that was significantly different between hospitals. Under this category we included all indications that were not on the study list of parameters. The data suggest, above all, that caesarean section is often practised when it is not clearly indicated. These circumstances make it necessary to devise interventions for the selective reduction of complications. Work in this area includes systematic review of all available evidence and research to increase the body of available evidence. Currently, the various practices considered appropriate are at the discretion of the clinician.

References

1. Hager RM et al. Complications of caesarean deliveries: rates and risk factors. American journal of obstetrics and gynecology, 2004, 190:428–34.
2. Loverro G et al. Maternal complications associated with caesarean section. Journal of perinatal medicine, 2001, 29:322–6.
3. Pinette MG et al. Vaginal birth after cesarean rates are declining rapidly in the rural state of Maine. Journal of maternal–fetal & neonatal medicine, 2004, 16:37–43.
4. Ventura SJ et al. Births: final data for 1998. National vital statistics reports, 2000, 48:1–100.
5. Hanley ML et al. Analysis of repeat caesarean section delivery indications: Implications of heterogeneity. American journal of obstetrics and gynecology, 1996, 175:883–8.
6. Martin JA et al. Births: final data for 2002. National vital statistics reports, 2003, 52:1–113.
7. Hacker N, Moore J G, eds. Essentials of obstetrics and gynecology, 3rd ed. Philadelphia, WB Saunders, 1998.
8. Garcia FA et al. Effect of academic affiliation and obstetric volume on clinical outcome and cost of childbirth. Obstetrics and gynecology, 2001, 97:567–76.
9. Aron DC et al. Impact of risk-adjusting caesarean delivery rates when reporting hospital performance. Journal of the American Medical Association, 1998, 279:1968–72.
10. Gregory KD et al. Caesarean deliveries for Medicaid patients: a comparison in public and private hospitals in Los Angeles County. American journal of obstetrics and gynecology, 1999, 180:1177–84.
11. Guillemette J, Fraser WD. Differences between obstetricians in caesarean section rates and management of labour. British journal of obstetrics and gynaecology, 1992, 99:105–8.
12. Takayama T et al. Risks associated with caesarean section in women with placenta previa. Journal of obstetrics and gynaecology research, 1997, 23:375–9.
13. Abu-Heija A, Zayed F. Primary and repeat caesarean sections: comparison of indications. Journal of obstetrics and gynaecology, 1998, 18:432–4.
14. Zaki ZM et al. Risk factors and morbidity in patients with placenta previa accreta compared to placenta previa non-accreta. Acta obstetricia et gynecologica Scandinavica, 1998, 77:391–4.
15. Waterstone M, Bewley S, Wolfe C. Incidence and predictors of severe obstet-

ric morbidity: case-control study. British medical journal, 2001, 322:1089–94.

16. Burns LR, Geller SE, Wholey DR. The effect of physician factors on the caesarean section decision. Medical care, 1995, 33:365–82.

17. Kuhn EM et al. The relationship of hospital ownership and teaching status to 30- and 180-day adjusted mortality rates. Medical care, 1994, 32:1098–108.

18. Martin JA et al. Births: final data for 2002. National vital statistics reports, 2003, 17:1–113.

19. Simoes E et al. Association between method of delivery, puerperal complication rate and postpartum hysterectomy. Archives of gynecology and obstetrics, 2005, 272:43–7.

20. Chama CM, El-Nafaty AU, Idrisa A. Caesarean morbidity and mortality at Maiduguri, Nigeria. Journal of obstetrics and gynaecology, 2000, 20:45–8.

21. Gillum BS, Graves EJ, Wood E. National Hospital Discharge Survey. Vital and health statistics. Series 13, 1998, (133): i–v, 1–51.

22. Bailit JL, Love TE, Mercer B. Rising cesarean rates: are patients sicker? American journal of obstetrics and gynecology, 2004, 191:800–3.

23. Macones GA et al. Obstetric outcomes in women with two prior cesarean deliveries: is vaginal birth after cesarean delivery a viable option? American journal of obstetrics and gynecology, 2005, 192:1223–8.

24. Durnwald C, Mercer B. Vaginal birth after cesarean delivery: predicting success, risks of failure. Journal of maternal–fetal, and neonatal medicine, 2004, 15:388–93.

25. Hendler I, Bujold E. Effect of prior vaginal delivery or prior vaginal birth after cesarean delivery on obstetric outcomes in women undergoing trial of labor. Obstetrics and gynecology, 2004, 104:273–7.

26. Wax JR et al. Patient choice cesarean: an evidence-based review. Obstetrical & gynecological survey, 2004, 59:601–16.

27. Zelop CM et al. Outcomes of trial of labor following previous cesarean delivery among women with fetuses weighing >4000 g. American journal of obstetrics and gynecology, 2002, 186:1104–5.

28. Bujold E, Gauthier RJ. Should we allow a trial of labor after a previous cesarean for dystocia in the second stage of labor Obstetrics and gynecology, 2002, 99:520–1.

29. Elkousy MA et al. The effect of birth weight on vaginal birth after cesarean delivery success rates. American journal of obstetrics and gynecology, 2003, 188:824–30.

30. Glantz JC. Caesarean delivery risk adjustments for regional interhospital comparisons. American journal of obstetrics and gynecology, 1999, 181:1425–31.

31. Richman VV. Lack of local reflection of national changes in caesarean delivery rates: the Canadian experience. American journal of obstetrics and gynecology, 1999, 180:393–5.

Fattening practices among Moroccan Saharawi women

M. Rguibi[1] and R. Belahsen[1]

الممارسات التي تؤدّي للسِّمْنَة بين الصحراويات المغربيات

محمد اركيبي، رقية بلحسن

الخلاصة: لدراسة السِّمْنَة في البيئة الصحراوية المغربية، تم الاستفسار من 249 من النساء عما يرغبن أن تكون عليه قدودهن وممارساتهن الغذائية. وقد أبدى معظم النساء (90.4٪ منهن) رغبتهن بزيادة أوزانهن في الوقت الحاضر أو في وقت مَضَى. ولزيادة الوزن تلجأ النسوة إلى قضاء فترة التسمين (التبلاح) لمدة لا تقل عن 40 يوماً، يُفْرِطْنَ فيها في تناول الطعام مع إنقاص النشاط البدني وتناول الوجبات التقليدية. كما يستعملن فاتحات الشهية مثل الحِلْبة أو التحاميل الشعبية أو الأدوية. وقد استخدم بعض النسوة الكوتيكوسيتروئيدات ليكسبن الوزن بسرعة. وتوضح الدراسة مدى الحاجة للتثقيف الصحي حول أخطار السِّمْنَة وأخطار استخدام الستيروئيدات في هذا المجتمع المحلّي.

ABSTRACT To study obesity in Moroccan Saharawi culture, 249 women were questioned about their desired body size and diet practices. The majority of women (90.4%) reported wanting to gain weight currently or at some time in the past. To gain weight, women used a fattening period (tablah) of at least 40 days of overeating with a reduction of physical activity and special traditional meals. Appetite enhancers (therapeutic drugs or fenugreek) and traditional suppositories were also used. Some women used corticosteroids to gain weight rapidly. The study highlights the need for health education about the dangers of obesity and steroid use in this culture.

Pratiques des femmes sahraouies au Maroc pour engraisser

RÉSUMÉ Afin d'étudier l'obésité dans la culture sahraouie au Maroc, on a interrogé 249 femmes sur le corps qu'elles souhaitaient avoir et sur leurs pratiques alimentaires. La majorité des femmes (90,4 %) ont déclaré vouloir prendre du poids au moment de l'étude ou l'avoir voulu à un moment donné dans le passé. Pour prendre du poids, les femmes utilisaient une période d'engraissement (tablah) d'au moins 40 jours de suralimentation avec une activité physique réduite et des repas traditionnels spéciaux. Des stimulateurs d'appétit (médicaments thérapeutiques ou fenugrec) et des suppositoires traditionnels étaient également utilisés. Certaines femmes utilisaient des corticostéroïdes pour prendre du poids rapidement. La présente étude souligne la nécessité d'une éducation sanitaire concernant les dangers de l'obésité et de l'utilisation des stéroïdes dans cette culture.

[1]Training and Research Unit on Food Sciences, Laboratory of Physiology Applied to Nutrition and Feeding, Chouaib Doukkali University School of Sciences, El Jadida, Morocco (Correspondence to R. Belahsen: rbelahsen@yahoo.com).

Received: 03/05/04; accepted: 31/01/05

Introduction

As a precursor of a variety of chronic diseases, obesity is a major cause of preventable morbidity and mortality [*1*], and its management is a complex issue that includes a wide range of cultural and psychosocial factors [*2*]. Several studies have indicated that there is a strong association between self-perceived weight status and weight control behaviour [*3,4*]. However, the desirability of a particular body size is not simply an autonomous, individual choice, but is mediated by cultural factors. In many industrialized countries there is a desire to lose weight that may be accompanied by dieting or calorie restriction, use of diuretics, vomiting or exercise [*5*]. Paradoxically, in many developing world communities, fatness is culturally associated with beauty, prosperity, health and prestige [*6–8*], and thinness is perceived to be a sign of ill health or poverty. Thus fattening rituals are sometimes practised, for example in some Pacific societies where women overfeed to induce body weight gain [*8*].

In Morocco, existing studies have reported that the prevalence of overweight and obesity has increased greatly during recent years and that the increase is greatest among women, half of whom are overweight or obese [*9–11*]. However, the etiology of obesity in Morocco is not well understood, especially in some ethnic groups. The present study was designed to investigate perceptions of desired body size and the diet practices used to lose or to gain weight among Moroccan Saharawi women.

Methods

Participants

The survey was conducted between October 2001 and April 2002 on a sample of 249 urban non-pregnant women aged 15 to 70 years old, from Laayoune, a city in the south of Morocco. The sample was selected from women who visited public health centres during an immunization campaign. Only women of Saharawi origin and without any previous systemic diseases were eligible for this investigation. A number of criteria were used to identify women as belonging to the Saharawi ethnic group: their communication skills in Hassaniyya dialects, their traditional clothing and the history of their family's residence. Saharawi ethnic groups, characterized by the Hassaniyya dialect, have been a traditionally nomadic population undergoing a rapid process of urbanization and all Saharawi women, from the age of puberty, are expected to dress traditionally. All participants were interviewed face-to-face by an interviewer who belonged to this Saharawi ethnic group. Informed consent was obtained verbally from each participant before they took part in the survey.

Data collection

Body weight and height were measured while the participants wore light clothing with no shoes using a portable scale and a metric tape adhered to a wall. Body mass index (BMI) was calculated as weight (kg)/height (m^2). The World Health Organization (WHO) definitions were used for underweight (BMI < 18.5 kg/m^2), normal weight (18.5 ≤ BMI < 25 kg/m^2), overweight (25 ≤ BMI < 30 kg/m^2) and obesity (BMI ≥ 30 kg/m^2) [*12*].

All participants were interviewed face-to-face by an interviewer from the same ethnic group. A discussion guide was developed including questions on sociodemographic characteristics, satisfaction with their body size, dietary history and practical behaviours used to lose or to gain body weight. The sociodemographic characteristics were: marital status (married,

divorced, widowed or single) and education level (never attended school, attended primary school or secondary school). To determine the perceptions of body weight, participants were invited to answer the following questions: Have you wanted to gain weight in the past? Do you want to gain weight now? Do you want to lose weight now? Participants were asked to describe any actions that they have taken to lose or gain body weight. All fattening practices used by the women were recorded, as well as other details such as portion size, frequency of eating, food composition and food preparation techniques.

Results

A total of 249 women were interviewed, with a mean age of 36.8 years. Most were married, divorced or widowed (79.9%) and two-thirds were illiterate (62.2%) (Table 1). The mean BMI was 29.6 kg/m^2 and 30% of women were overweight and 49% were obese.

Table 1 Sociodemographic characteristics of the study sample (n = 249 women)

Variable	Value	
	Mean (SD)	Range
Age (years)	36.8 (11.8)	15.0–70.0
BMI (kg/m^2)	29.6 (5.3)	17.3–41.4
	No.	%
Marital status		
Single	50	20.1
Married	166	66.7
Divorced	19	7.6
Widow	14	5.6
Education		
Never attended school	155	62.2
Primary school	47	18.9
Secondary school	47	18.9

At the time of the survey, despite the high prevalence of obesity in this population, a large majority of women (79.9%) described their weight as appropriate (199/249) and only 50 described it as inappropriate (8 desired to lose weight and 42 desired to gain it). Among the 199, 175 had wanted to gain weight in the past and 168 of them had used a fattening practice before.

Over 90% of the women were dissatisfied with their body size (225/249). Among the 8 women (2.4%) who wanted to be lighter, 2 were overweight and 6 were obese; only 2 obese women had made a previous attempt at losing weight using exercise activity and dieting. The majority of women wanted to gain weight rather than to lose it; 217 women reported that they had tried to gain weight at some time and 42 of them still desired to gain weight at the time of the survey. This desire to gain weight was in most cases accompanied by practising certain behaviours (Table 2). Only 12 women reported desiring to gain weight without practising any fattening behaviour whereas 168 women reported that they had already used (in the past) some fattening practices to grow fat, and at the survey time, 37 women were currently practising these.

Drugs, overfeeding and restriction of physical activity were 3 of the ways used by women to achieve their goal (fattening). The use of medications was an important

Table 2 Fattening practices used by Saharawi women desiring to gain weight gain

Practice	In the past (n = 175)		Currently (n = 42)	
Appetite stimulant	71	(40.6)	3	(7.1)
Overeating	56	(32.0)	30	(71.4)
Corticosteroids	41	(23.4)	4	(9.5)
Other	7	(4.0)	5	(11.9)

alternative to gain weight in this population. Among women desiring to gain weight 40.6% had taken in the past and 7.1% were currently taking a therapeutic or traditional medication that increased hunger. Also, 23.4% of these women had taken in the past and 9.5% were currently taking drugs promoting weight gain as a side-effect (such as corticosteroids). In fact, in addition to the therapeutic medication, the women reported that some seeds such as fenugreek (*halba*) consumed directly or added to dishes have been used to stimulate hunger. It is important to note that in some of these women even though they knew there were risks accompanying drug use, they had used them because it allowed them to gain weight quickly. In addition, women used some traditional suppositories called *ligue*, composed of dates mixed with seeds and medicinal plants, specifically for increasing their peripheral fat.

With regard to the role of dietary intake, some women said that prior to marriage they had gone through a fattening period of at least 40 days of intentional overeating with a high reduction of physical activity, traditionally called *tablah*. This period could last longer until they achieved the goal of gaining weight. Information on diet consumed during this period of weight gain showed that the types of food traditionally used in the past had changed with the move to a more urban lifestyle. The older women whose lifestyle was formerly nomadic used only the consumption of a large quantity of camel milk that could reach up to 10 litres a day. Whereas after settling in an urban area, the women used several alternative foods in this traditional fattening period such as the soup and couscous of barley, the liver, fat and meat of camel, olive oil, and sugared milk and rice. On the other hand, other women used special traditional meals (*aajna* and *lahssa*) as a supplement consumed at least twice a day, particularly before breakfast and after dinner. These meals (*aajna* and *lahssa*) are prepared from a mixture of several foods, seeds and medicinal plants. These 2 traditional meals differ by the presence of the date in *aajna* replaced by honey in *lahssa*, and by the type of medicinal plants used in each meal.

Discussion

Cultural ideas on what is desirable and attractive have important implications in the development of body image and may influence practices to achieve or maintain this particular body image. The results of this study highlight the role of sociocultural factors in the maintenance of traditional values about the desirability of body weight. Indeed, in spite of the high prevalence of overweight and obesity in this group of women, a large majority of them described their weight as appropriate. Walker has reported that in African cultures, obesity in women is regarded with far less disfavour than in industrialized countries and, accordingly, there is only a limited incentive in obese African women to reduce their weight [*13*]. This agrees with our observations in this population. In addition, even among the 6 overweight and obese women in this study who desired to lose weight only 2 had taken part in dieting or sports activities. The attitudes to weight loss in this Saharawi population are attributed to the cultural acceptance of fatness and the ignorance of the health risks associated with overweight and obesity.

It has been reported that even when black women perceive themselves as being overweight, they still consider themselves physically attractive [*14*]. Fatness was often considered as prestigious in Cameroon, and as having an effect on getting alliances or

finding a marriage partner in Indian society [*7*]. It is also reported that in the Tahiti and Nauru Pacific societies, where fattening is associated with beauty and fertility, the women overfeed and undertake little activity in order to grow fat [*8*]. In this study sample, the majority of Saharawi women desired to gain weight during their life, especially those of normal weight. This is a result of an association of beauty with overweight. Also, it is important to note that from puberty, the Saharawi culture obliges women to dress in traditional clothes, and there is a belief that this traditional clothing style requires a heavier body. Although the impact of obesity on health was mentioned by some women, the women's desirable body image was determined by the socially acceptable body type rather than a healthy body. All these data highlight the great sociocultural pressure experienced by the thinner women considered not to have the cultural ideal beauty standard and may explain the high prevalence of overweight observed in young Saharawi women who could easily develop obesity at any time after early adulthood.

Sedentary lifestyles and high-fat, energy-dense diets are reported to be among the principal causes of the accelerating problem of obesity worldwide [*15*]. This study also highlights the sociocultural factors that affect dietary lifestyle behaviours. Indeed, the desire to gain weight expressed by Saharawi women motivates them even to use weight-gain methods that are unhealthy. Discussions about weight gain across a Saharawi women's life-cycle showed that in this society there are periods of culturally acceptable fattening characterized by overeating and reduction of physical activity. The women had entered the fattening period as a preparation for marriage. Overeating and sedentary behaviour are the traditional methods of gaining weight in this population. Previously, in nomadic lifestyles, Saharawi women consumed a large quantity of whole camel milk as well as certain seeds and medicinal plants. After settling in an urban area where camel milk is not readily available, it is replaced by a variety of foods such as fat, meat and camel liver and meals prepared from barley flour and olive oil. In addition to fenugreek seeds consumed directly or added to dishes and to special traditional meals consumed as a supplement, Saharawi women used drugs to induce weight gain. What is serious in this population is not so much the utilization of drugs stimulating the appetite but that the drugs used are known to have repercussions on health. Corticosteroids, especially when taken for a prolonged period, can cause many other side-effects in addition to weight gain, such as osteoporosis [*16,17*]. In addition to the utilization of corticosteroids to increase their body weight rapidly, Saharawi women used traditional suppositories to increase their peripheral fat.

We conclude that steps need to be taken to prevent obesity in this population in order to limit the occurrence of more serious conditions. Any attempts at prevention require a change in social and cultural norms of beauty. Thus, interventions aiming at obesity prevention or management should primarily inform the population about the danger of corticosteroid utilization without a medical prescription, and educating Saharawi people about health issues related to overweight and obesity.

Acknowledgements

The authors wish to thank the Medical Delegation of Laayoune Province, Ministry of Health, Morocco, for their help with data collection. We also acknowledge the Director of Moulay Mehdi Hospital for

their cooperation as well as the staff in the laboratory of biological analysis at Moulay Mehdi Hospital, for their assistance. The survey was supported by the Ministry of Higher Education and Research, Morocco.

References

1. Obesity: preventing and managing the global epidemic. Working group on obesity. Geneva, World Health Organization, 1998.
2. Kumanyika S. Obesity in black women. Epidemiologic reviews, 1987, 9:31–50.
3. Flynn KJ, Fitzgibbon M. Body images and obesity risk among black females: a review of the literature. Annals of behavioral medicine, 1998, 20(1):13–24.
4. Fantaine KL. The conspiracy of culture: women's issues in body size. Nursing clinics of North America, 1991, 26:669–75.
5. Wardle J, Griffith J. Socioeconomic status and weight control practices in British adults. Journal of epidemiology and community health, 2001, 55:185–90.
6. Brown PJ. Culture and the evolution of obesity. Human nature, 1991, 2:31–57.
7. Treloar C et al. The cross cultural context of obesity: an INCLEN multicentre collaborative study. Health and place, 1999, 5:279–86.
8. Pollock NJ. Cultural elaborations of obesity-fattening practices in Pacific societies. Asia Pacific journal of clinical nutrition, 1995, 4:357–60.
9. Benjelloun S. Nutrition transition in Morocco. Public health nutrition, 2002, 5(1A):135–40.
10. Mokhtar N et al. Diet, culture and obesity in Northern Africa. Journal of nutrition, 2001, 131:887–92S.
11. Belahsen R, Mziwira M, Fertat F. Anthropometry of women of childbearing age in Morocco: body composition and prevalence of overweight and obesity. Public health nutrition, 2004, 7(4):523–30.
12. National Institutes of Health and National Heart, Lung, and Blood Institute (NIH and NHLBI). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults—the evidence report. Obesity research, 1998, 6(suppl. 2):51–209S.
13. Walker ARP. Epidemiology and health implications of obesity, with special reference to African populations. Ecology of food and nutrition, 1998, 37:21–55.
14. Kumanyika S, Wilson JF, Guilford-Davenport M. Weight-related attitudes and behaviours of black women. Journal of the American Dietetic Association, 1993, 93:416–22.
15. James WPT, Ralph A. New understanding in obesity research. Proceedings of the Nutrition Society, 1999, 58:385–93.
16. Hedberg A, Rossner S. Body weight characteristics of subjects on asthma medication. International journal of obesity related metabolic disorders, 2000, 24(9):1217–25.
17. Walsh LJ et al. Use of oral corticosteroids in the community and the prevention of secondary osteoporosis: a cross sectional study. British medical journal, 1996, 313:344–6.

Effect of 5 years of dental studies on the oral health of Tunisian dental students

F. Maatouk,[1] W. Maatouk,[2] H. Ghedira[1] and S. Ben Mimoun[3]

تأثير الدراسة مدة خمس سنوات على صحة الفم والأسنان لدى طلاب كلية طب الأسنان في تونس

فتحي معتوق، وهيبة معتوق، هشام غديرة، سماح بن ميمون

الخلاصة: تعتبر هذه الدراسة حول صحة الفم والأسنان لدى طلبة الصف الخامس بكلية طب الأسنان، استكمالاً للبحث الذي أجري على نفس الطلبة في المُنَستير في عام 1998–1999 عندما كانوا بالصف الأول. وهي تهدف إلى تقييم مردود الدراسة على ممارسات صحة الفم والأسنان لديهم. وقد شملت هذه الدراسة 140 طالباً تونسياً من العدد الكلي للطلبة (155 طالباً) الذين شملتهم الدراسة الأولى. وأظهرت النتائج أن 84.3٪ يشكون من أمراض الأنسجة الداعمة للأسنان، و80.0٪ يعانون من سوء الإطباق، و43٪ يشكون من التسوُّس. وقد أبرز تحليل هذه النتائج بالمقارنة مع الدراسة السابقة تحسُّناً عاماً في صحة الفم والأسنان، حيث ارتفع معدل تسويك الأسنان بالفرشاة، وانخفض معدل انتشار التسوُّس وجيوب الأنسجة الداعمة للأسنان، كما تحسَّن مَنْسَبُ الأسنان المنخورة والمقلوعة والمحشوة DMF، بيد أن معدل انتشار التدخين، والنزف، والقَلَح لم يتغيَّر، كما زاد معدل سوء الإطباق.

ABSTRACT This study is a follow-up of one made in 1998–99 on first-year dental students in Monastir. Now in their fifth year, we assessed the effect of dental studies on students' oral health practices and dental health. Of the 155 students in the first study, 140 were still enrolled. Periodontal troubles, malocclusion and dental decay affected 84.3%, 80.0% and 43.0% of the students respectively. Compared with the previous study, students had achieved a better dental health status – tooth brushing rate was much higher, prevalence of dental decay and periodontal pockets had decreased, and DMF index had improved. However, the prevalence of smoking, bleeding and calculus had not changed, and the frequency of malocclusion had increased.

Impact sur la santé bucco-dentaire des étudiants tunisiens en médecine dentaire de 5 années d'études

RÉSUMÉ La présente étude est un suivi de celle qui a été réalisée en 1998-1999 chez les étudiants de première année de médecine dentaire à Monastir. Alors que ces étudiants se trouvent maintenant en cinquième année, nous avons évalué l'impact des études dentaires sur leurs pratiques de santé bucco-dentaire et sur leur santé dentaire. Sur les 155 étudiants de la première étude, 140 sont toujours inscrits. Les troubles parodontaux, les malocclusions et les caries dentaires touchent 84,3 %, 80,0 % et 43,0 % des étudiants respectivement. Par rapport à la première étude, les étudiants ont un meilleur état de santé bucco-dentaire – le taux de brossage est beaucoup plus élevé, la prévalence des caries dentaires et des poches parondontales a diminué, et l'indice CAO s'est amélioré. Toutefois, la prévalence du tabagisme, des saignements et du tartre n'a pas changé, et la fréquence des malocclusions a augmenté.

[1]Paediatric Dentistry Department, Dental School, Monastir, Tunisia (Correspondence to F. Maatouk: fethi.maatouk@fmdm.rnu.tn).
[2]Regional Office of School and University Medicine, Monastir, Tunisia.
[3]Private practice, Megrine, Tunisia.
Received: 15/04/04; accepted: 26/08/04

Introduction

One of the general objectives of teaching dentistry is to train experts whose principal task is to motivate patients to adopt good oral hygiene practices. They are more likely to be able to do this if they themselves are motivated.

Reports on the impact of education on the oral hygiene of dental students differ. Both Lang et al., in a study undertaken on Danish students [*1*], and Cavaillon et al., in an investigation into students at the University of Paris V [*2*], noted a clear improvement in the oral hygiene practices of students during their studies. On the other hand, Ainamo and Ainamo, in a study on Finnish and Indian students [*3*], El-Mostehy et al., in an investigation of 100 Egyptian students [*4*], and Meister et al., in a study at the University of Marquette (Michigan) in the United States of America [*5*], all noted the absence of improvement in the practices of oral hygiene in students, in spite of having received information and education.

Since 18 November 1975, the date of the establishment of the dental school in Tunisia, very few studies involving Tunisian dental students have been conducted. Among them, a retrospective survey was performed with 155 first-year dental students in 1998 (90 girls and 65 boys) from 18 to 22 years [*6*]. This study, which aimed to assess social conditions, school history and the oral health status of the students, showed that the most frequent oral conditions affecting the students were periodontal diseases (88.4%), dental caries (70.3%), malocclusion (62.6%) and fluorosis (52.3%).

In this study we report the results of a follow-up descriptive study carried out 5 years later on the same sample of students when they were in their final year (2002–2003). The study aimed to assess the changes in oral health indicators and analyse the effect of dental studies on the students' oral hygiene practices.

Methods

Of the 155 Tunisian dental students registered in the first year for the academic year 1998–1999, 140 went through to the final year in 2003. These students were aged from 21 to 25 years [mean 22.7 (SD 0.7) years]. About 53.6% of them came from medium socioeconomic background (based on parental jobs) and women constituted more than half the sample (61.4%).

To assess the prevalence of oral diseases, the students were examined by the same dentist at the university dental clinic. The clinical examination was performed according to the World Health Organization (WHO) criteria using normal dental examining instruments (mouth mirrors, explorers and WHO periodontal probe) [*7*]. Data were recorded on a simplified WHO form [*7*]. The decayed (D), missing (M) and filled (F) teeth index (DMF) and the community periodontal index for treatment needs (CPITN) were calculated. In addition, the students were requested to complete a self-administered questionnaire about oral hygiene, habits and choice of professional practice.

Data were analysed using *Epi-Info*, 6.04 and compared with the previous study. The Pearson chi-squared test was used to compare different percentages at the 5% level of significance [*8*].

Results

The findings revealed that three-quarters of students (75.0%) intended to choose a career in the private sector after graduating,

either as specialists (44.0%) or as general practitioners (46.4%); only 7% wanted to teach in dental school.

As regards oral hygiene practices, 86.0% of the students brushed their teeth at least twice a day; the mean frequency of daily tooth brushing was 2.52 (SD 0.89). The majority of our sample used a commercial toothpaste (91.4%) and about half of them used one or more means complementary to brushing, mouthwash (25.7%), flossing (2.9%), other (10.7%), more than one (10.7%). Nearly 18% of the students smoked (14.3% men and 3.7% women) with an average of 15 cigarettes per day.

Over 90% of them had visited a dentist prior to the previous year, but only 64.3% had seen a dentist in the last year, generally for a periodontal concern (in 13% of cases). Of these, 12.9% were for periodontology, 10.7% for oral surgery, 10.7% for dentistry concerns and 3.6% for orthodontics.

Table 1 shows the dental conditions affecting the students: 112 students had malocclusion; 31.4% of these needed orthodontic treatment, but only 3.6% were already having such treatment. Periodontal problems affected 84.3% of the students; fortunately 75.6% of these lesions were reversible; calculus was the most frequent periodontal problem (55.8% of students), on average found in 3 sextants of dentition (Table 1).

Regarding dental caries, 43.0% of students were affected. The D, M and F scores among the 140 students were: 147 decayed (mean 1.05), 21 missing (mean 0.15) and 157 filled (mean 1.12) teeth giving 325 affected teeth overall and mean DMFT of 2.32. Dental fluorosis affected 23 (16.4%) of our sample, primarily Dean stages 2 and 3 (Table 2).

More girls (75%) opted for private practice (25%) than boys (χ^2, $P < 0.0001$). The rate of smoking among the students had increased since 1998 but the difference between the 2 periods was not significant.

Comparison with previous study

Table 3 gives a comparison of the results of the 1998–1999 study compared with the current study.

In 1998–1999, 30% of the students were undecided on what career to take up after graduation. In the current study, only 3.6% were still undecided ($P < 0.0001$). Three-quarters of all the students had chosen private practice (75.0%) (Table 3).

Table1 Prevalence of malocclusion and periodontal disease by sex in the dental students

Condition	Males (n = 54)		Females (n = 86)		Total (n = 140)	
	No.	%	No.	%	No.	%
Malocclusion						
Mild	21	39.0	47	54.7	68	48.6
Moderate or severe	21	39.0	23	26.7	44	31.4
Periodontal disease[a]						
Bleeding	11	20.4	19	22.0	30	21.4
Calculus	29	53.7	49	57.0	78	55.7
Pockets (4–5 mm)	4	7.4	6	7.0	10	7.1

[a]Mean no. of sextants (standard deviation) affected with bleeding = 0.32 (0.77), with calculus = 3.24 (2.28) and with pockets = 3.69 (2.72).

Table 2 Prevalence of dental fluorosis among the dental students by Dean stage

Dental fluorosis stage	No. (n = 140)	%
Questionable	4	2.9
Very mild	7	5.0
Mild	11	7.9
Moderate	1	0.7
Severe	0	0
Total	23	16.4

A large proportion of the students (77.4%) brushed their teeth twice daily or more in 1998–1999. This improved appreciably in 2002–2003 to 86.5% ($P < 0.05$). In addition, more students used commercial toothpaste than pharmaceutical ones in the current study compared with the previous one ($P < 0.0001$) and also used additional means of hygiene, primarily mouthwash ($P < 0.0001$).

More students had visited the dentist than in the previous study ($P < 0.0001$) because of greater motivation and ease of access to dental consultation. Therefore the dental therapeutics index had increased from 19.1% 5 years ago to 51.6% in 2003 ($P < 0.0001$), notably those of periodontology and oral surgery.

The prevalence of malocclusion had increased appreciably ($P < 0.0001$) as a result of an increase in the rate of mild malocclusion from 28.4% to 48.6%, which may be due to a noncompensated dental extraction and/or differences in judgement between the 2 investigators. The rate of moderate to severe malocclusion remained unchanged (31%) suggesting insufficient orthodontic management.

Table 3 Comparison of students' practices and dental status between 1998 and 2003

Variable	1998–999 (n = 155) %	2002–2003 (n = 140) %	Success rate in exams (%)
Males	42.0	38.6	83.0
Females	58.0	61.4	95.5
Future practice			χ^2, Significance
Private	61.3	75.0	6.33, P < 0.01
Undecided	30.0	3.6	18.53, P < 0.0001
Practised oral hygiene	77.4	86.5	3.99, P < 0.05
Use of commercial toothpaste	70.0	91.4	19.72, P < 0001
Use of additional means of hygiene	30.3	50.0	34.11, P < 0.0001
Ever visited dentist	63.2	90.7	30.7, P < 0.0001
Mild malocclusion	28.4	48.6	12.7, P < 0.0001
Periodontal pockets (4–5 mm)	20.0	7.1	10.16, P < 0.001
Dental caries	70.3	42.8	22.68, P < 0.0001
Therapeutics index (had undergone dental treatment)	19.1	51.6	34.97, P < 0.0001

As in 1998, the prevalence of periodontal trouble remained at an alarmingly high level (84.3% in 2002–03 versus 88.4% in 1998–99) but the difference was not statistically significant. Detailed analysis showed that the rate of shallow pockets (4–5 mm) however had appreciably decreased ($P < 0.001$) (Table 3). The prevalence of dental caries had significantly decreased since 1998 from 70.3% to 42.8% ($P < 0.0001$). In the DMF index, we noted a clear reduction in the D component, an improvement in the F component, and the M component remained the same.

Discussion

The predominance of women seen in our study was also noted in other countries such as France [*3,9,10*], the United States [*11*] and Japan [*12,13*]. With an average academic success rate of 95.5%, the women were ahead of the men. Tooth brushing frequency was significantly higher in girls ($P < 0.0001$); Polychronopoulou et al. noted the same tendency in Greece [*14*]. Although the girls brushed their teeth more frequently, the boys had lower frequency of periodontal trouble: 81.5% versus 86.0% ($P < 0.01$).

Private practice attracted most of the students which is in agreement with Crossley and Mubarik [*15*]. Teaching as a career attracted only a few students. More girls opted for hospital practice than boys, possibly because of family responsibilities, safety and job security. Winters and Butters noted the same tendency in their study [*16*].

The rate of smoking among the students had increased since 1998 but the difference between the 2 periods was not significant. In the current study, the prevalence of smoking was greater in males ($P < 0.0001$) as was also shown by Ghannem et al. and a WHO report which reported males constituting 70% of smokers in the world [*17,18*]. A large body of epidemiological research indicates that tobacco use is generally associated with periodontal disease [*19–21*].

The percentage of smokers in 2002–2003 remained lower than that reported in a study by Malbrunot where 33% of dental students of Clermont Ferrand (France) smoked [*10*], but it was about the same as that noted by Fakhfakh who reported that of 257 Tunisian medical students examined, 24% smoked [*22*].

An effort needs to be made to tackle this problem especially as these students, as health professionals, should be setting a good example. This is supported by the study of Koerber, Crawford and O'Connell in the United States [*23*]. Yip et al. have gone as far as suggesting including an action against smoking in this direction in the American dental course [*24*].

The paradox between a large percentage of students brushing their teeth (86%) and a high prevalence of periodontal lesions (84%) was also reported by Carlos et al. in their study on 100 Philippine dental students who had excellent oral hygiene [*25*]. They explained this by bad tooth brushing techniques, inadequate toothbrushes or over-brushing. Regarding periodontal treatment needs, 84.3% of our students required oral hygiene improvement and 78% required scaling.

In spite of some changes, statistically, we had overall in 2003 the same population of students as that of 1998. Therefore, we can consider that our comparisons are valid and justified. However, there may be a possible difference in judgement between the 2 investigators in the 2 studies, which is a frequent bias in a "before–after" survey.

In general, at the end of their course, the dental students had achieved a better dental

health status, particularly in the following areas:

- the tooth brushing rate, which was much higher;
- the prevalence of dental decay had decreased;
- the DMF index, where the D component had decreased whereas the F component had clearly increased;
- the rate of periodontal pockets had decreased.

In spite of these improvements, there were the following negative points:

- smoking prevalence had not decreased;
- the prevalence of bleeding and calculus had not changed;
- the frequency of malocclusion had increased.

Dental school lecturers should address the dental practices of their students and consider introducing modifications to the courses tackling this issue.

Acknowledgement

The authors are grateful to all those who helped them in this study, especially the dental students.

References

1. Lang NP, Cumming BR, Loe HA. Oral hygiene and gingival health of Danish dental students and faculty. Oral epidemiology, 1977, 5:237–42.
2. Cavaillon JP et al. Longitudinal study on oral health of dental students at Louis VII University. Community dentistry and oral epidemiology, 1982, 10:137–43.
3. Ainamo J, Ainamo A. Development of oral health during studies in India and Finland. International journal of dentistry, 1978, 24:427–33.
4. El-Mostehy MR, Zaki ATT. The dental student's attitude towards the profession as reflected in his oral cavity. Egyptian dental journal, 1996, 15:104–9.
5. Meister F Jr et al. Comparison of the oral hygiene and periodontal health status of a class of dental students as freshmen and as seniors. Journal of preventive dentistry, 1980, 6:245–52.
6. Maâtouk F et al. Profil de l'étudiant de première année médecine dentaire en Tunisie. Revue de santé de la Méditerranée orientale, 2001, 7(1–2):52–9.
7. Oral health surveys. Basic methods, 4th edition. Geneva. World Health Organization, 1997.
8. Abramson JH, Abramson ZH. Making sense of data: A self-instruction manual on the interpretation of epidemiological data. New York, Oxford University Press, 2001.
9. Demoor J, Vandendrissche J. Changement dans le monde des dentistes. Revue belge de médecine dentaire, 1982, 37(5):209–14.
10. Malbrunot X. Situation socio-économique des étudiants enodontologie à Clermont–Ferrand en 1991/1992 [Thèse chirurgie dentaire]. Clermont–Ferrand, 1993.
11. Hyson JM Jr. Women dentists: the origins. Journal of the California Dental Association, 2002, 30:444–53.
12. Kawamura M et al. A cross cultural comparison of dental health attitudes and behavior among freshman dental students in Japan, Hong Kong and West China. International dental journal, 2001, 51:159–63.

13. Motoko A et al. [The relationship among eating, lifestyles and oral health status of students.] Kokubyo gakkai zasshi, 2002, 69:290–5 [In Japanese].

14. Polychronopoulou A, Kawamura M, Athanasouli T. Oral self-care behavior among dental school students in Greece. Journal of oral science, 2002, 44:73–8.

15. Crossley ML, Mubarik A. A comparative investigation of dental and medical student's motivation towards career choice. British dental journal, 2002, 193:471–3.

16. Winter PA, Butters JM. An investigation of dental student practice preference. Journal of dental education, 998, 62(8):565–72.

17. Ghannem H et al. Study of cardiovascular disease risk factors among urban schoolchildren in Sousse, Tunisia. Eastern Mediterranean health journal, 2000, 6(5–6):1046–54.

18. Tobacco or health: a global status report. Geneva, World Health Organization, 1997.

19. Papapanou PN. Periodontal diseases: epidemiology. Annals of periodontology, 1996, 1:1–36.

20. Hashim R, Thomson M, Pack A. Smoking and periodontal diseases. Dental news, 2002, 9(4):9–21.

21. Howat A, Trabelsi I, Bradnock G. Oral hygiene levels and behaviors in pre-clinical and final-year dental students. Journal of clinical periodontology, 1979, 6:177–85.

22. Fakhfakh R. Le tabagisme des étudiants en médecine en Tunisie: tendance des comportements et des attitudes. Cahiers de Santé, 1996, 6(1):37–42.

23. Koerber A, Crawford J, O'Connell K. The effects of teaching dental students brief nutritional interviewing for smoking–cessation counseling: a pilot study. Journal of dental education, 2003, 67:439–47.

24. Yip JK et al. Dental students' attitudes toward smoking cessation guidelines. Journal of dental education, 2000, 64:641–50.

25. Carlos MC et al. The prevalence and distribution of gingival recession among UE dental students with a high standard of oral hygiene. Journal of the Philippine Dental Association, 1996, 47:27–48.

Dimensional accuracy of 3 silicone dental impression materials

A.K. Hassan[1]

مضبوطيّة الأبعاد لثلاث من مواد الطبعات السنية السيليكونية

عامر خالد حسن

الخلاصة: أُجريت هذه الدراسة لقياس التغيُّرات في الأبعاد في مواد الطبعات السنِّية السيليكونية، والتي قد تؤثِّر على ملاءمة البدلات السنية. وقد تم إعداد 20 عينة للطبعات السنية لكل من المواد السيليكونية الثلاثة، وهي الزانتوبرين — هـ وبريزيدنت وفولدنت، وذلك باستخدام طرق المزج المزدوج والمزج الأوحد. ثم أُجريت قياسات منتقاة على قوالب حجرية لكل طبعة، وفي الحالات الثلاثة جميعها أدى المزج الأوحد إلى قوالب أكثر دقة مما آلت إليه طريقة المزج المزدوج. وكانت طبعات الزانتوبرين — هـ هي الطبعات الأكثر مضبوطيَّةً.

ABSTRACT This study was carried out to measure the dimensional changes in silicone impression material, which can affect the fitness of the prosthesis. Using both single and double mix techniques, 20 impression samples for each of 3 different proprietary silicones, Xantopren-H, President and Fulldent, were made. Selected measurements were made on the stone casts made from each impression. In all 3 cases, the single mix gave more accurate casts than the double mix technique. The Xantopren-H impressions had the most accurate dimensions.

Exactitude dimensionnelle de trois matériaux d'empreinte dentaire à base de silicone

RÉSUMÉ La présente étude a été réalisée pour mesurer les changements dimensionnels du matériau d'empreinte dentaire à base de silicone qui peuvent affecter l'ajustement de la prothèse. Au moyen des techniques des simple et double mélanges, 20 prélèvements d'empreintes ont été effectués pour chacune des trois différentes silicones : Xantopren H, President et Fulldent. Certaines mesures ont été réalisées sur des moulages en plâtre fabriqués à partir de chaque empreinte. Dans l'ensemble des trois cas, le simple mélange a produit des moulages plus précis que la technique du double mélange. Les empreintes Xantopren H avaient les dimensions les plus précises.

[1]Medical Services of Qatar Armed Forces, Doha, Qatar (Correspondence to A.K. Hassan: amir_alagidi@yahoo.com).

Received: 12/01/04; accepted: 01/03/05

Introduction

Several studies have been carried out aimed at enhancing the physical properties of silicone impressions. Of the physical properties which may adversely affect the fit and retention of dental prostheses, dimensional change in the impression material is considered the most serious. It is therefore considered the main feature of any impression material, and needs to be taken into consideration to achieve a good restoration [*1,2*]. Accuracy of impressions depends on the composition and manipulation technique of the impression as well as the die cast material itself [*1,3*]. A number of studies have been carried out to evaluate the accuracy of impression techniques [*4–8*]. In many, metal or ceramic casts were used [*9–11*]; acrylic resin casts have also been used [*10*].

The mixing technique for silicone impressions can be either single or double mix. This study was carried out to examine the dimensional accuracy of 3 silicone impression materials and the single and double mixing techniques for each of them.

Methods

This study was carried out in 2003 in Garafa Medical Complex, Doha, Qatar.

Sample impressions made with 3 different silicones, Xantopren-H (Bayer Dental, Leverkusen, Germany), President (Coltene AG, Altsatten, Switzerland) and Fulldent (JTC-Fulldent SA, Arsier, Switzerland) were used to prepare stone casts (GC Company, Tokyo). For each material, 20 impressions were made, 10 using the single mix technique and 10 using the double mix. All the impressions were mixed following the manufacturer's instructions. The single mix technique was carried out by mixing and applying the putty (heavy body) and allowing it to harden before applying the wash (light body). The double mix technique was carried out by mixing the heavy and light bodies together before applying.

The impressions were taken over a resin master cast. This was used in view of its low wettability, low thermal conductivity and low price [*12*]. Undercut areas of the cast, especially in the embrasure areas, were blocked out with cold cure acrylic prior to impression.

Reference grooves to be used as measurement points were first cut on the master cast using a wide, straight fissure bur (the grooves would then be duplicated on the stone casts produced from the experimental impressions). These grooves were positioned as follows: on the buccolingual surface of the distobuccal cusp of the left second molar, on the buccolingual surface of the buccal cusp tip of the first premolar; and mesiodistally on the distolingual cusp of the left and right first molars [*10*].

Three measurements were taken for each cast by measuring the distance between the left first premolar and the distobuccal cusp of the left second molar (mesiodistal) and a straight measurement (buccolingual) was taken between the distolingual cusp of the first molar and the distolingual cusp on the opposite side (Figure 1) [*10*]. The third measurement (diagonal) was taken from the left first premolar to the mesiobuccal cusp tip of the right second molar [*10*]. These measurements were carried out in duplicate for the casts made from each of the 3 materials and the mean distances calculated. All measurements were taken by a single examiner using an electronic vernier calliper. Measurements of the resin master cast were taken in a similar manner as for the controls.

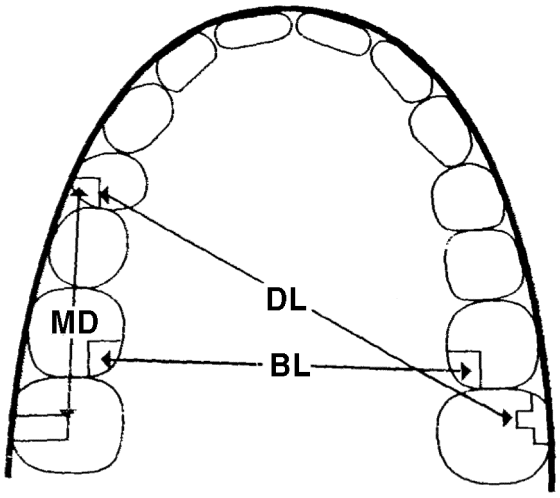


Figure 1 Diagram showing the reference points and measurement lines (DL = diagonal; MD = mesiodistal; BL = buccolingual) on the casts

Results

Table 1 shows the reference measurements for the master cast. The results obtained for each measurement of each subgroup, single and double mix, are shown in Table 2.

Xantopren-H silicone gave the most accurate dimensions as the measurements taken were almost equal to the dimensions of the standard master cast. The other 2 silicones showed slight dimensional inaccuracy.

For all 3 materials, the single mix sample showed better accuracy than the double mix, but the differences were not statistically significant.

Table 1 Measurement of master cast

Line	Teeth	Distance (cm) Mean (SD)
Buccolingual	6–6	4.5 (0.6)
Mesiodistal	4–7 (same side)	3.0 (0.2)
Diagonal	4–7 (opposite sides)	5.2 (0.1)

SD = standard deviation.

Discussion

Silicone is considered one of the best available impression materials for fixed prostheses [*2,3*]. The dimensional accuracy of different silicone impression materials and the benefit of different mixing procedures, single and double mix, were studied. The mixing technique is considered an essential factor in impression accuracy [*9,10*]. The difference between single and double mix in accuracy and elasticity may be attributed to the rate of polymerization: faster polymerization will prohibit the penetration of free radicals. The light body component occupies a minute volume, so its effect on the resultant deformation will be slight [*4,5*].

In this study it was shown that Xantopren-H gave better dimensional accuracy than President and Fulldent impressions.

Table 2 Measurement of casts made from the 3 test materials

Line	Distance (cm)					
	Fulldent mix		President mix		Xantopren-H mix	
	Single Mean (SD)	Double Mean (SD)	Single Mean (SD)	Double Mean (SD)	Single Mean (SD)	Double Mean (SD)
Buccolingual	4.1 (0.8)	4.1 (1.0)	4.0 (1.6)	4.0 (0.2)	4.5 (0.6)	4.1 (1.6)
Mesiodistal	2.8 (0.7)	2.9 (1.1)	2.9 (1.5)	2.9 (1.2)	3.0 (0.8)	3.0 (0.2)
Diagonal	5.0 (0.3)	5.1 (1.2)	5.1 (1.7)	5.1 (0.8)	5.1 (0.9)	5.1 (1.0)

SD = standard deviation.

Besides, the study illustrates that the single mix techniques is better than the double mix technique in all samples. This agrees with the findings of previous studies, which recommend using single mix rather than double mix [*10,12–15*].

A 3-scale measurement was used for each sample to minimize the effect of error in the results. Therefore, it is believed that this method is the best and the most suitable for dimensional accuracy tests of elastomeric impressions.

References

1. Shillinburg HT Jr et al. Fundamentals of fixed prosthodontics, 3rd ed. Chicago, Quintessence Publishing, 1997:281–305.
2. Rosenstiel S, Land MF, Fujimoto J. Contemporary fixed prosthodontics, 2nd ed. St. Louis, Mosby, 1998:332–6.
3. Philips RW. Skinner's science of dental materials, 9th ed. Philadelphia, WB Saunders, 1991:265–78.
4. Osrland G. Some properties of rubber base materials. Odontologisk tidskrift, 1957, 65:94–104.
5. Brown D. An update on elastomeric impression. British dental journal, 1981, 150(2):35–40.
6. Dahl BL, Dymbe B, Valderhaug J. Bonding properties and dimensional stability of hydrocolloid impression. Journal of prosthetic dentistry, 1985, 53(6):796–800.
7. Chen SY, Liang WM, Chen FN. Factors affecting the accuracy of elastomeric impression materials. Journal of dentistry, 2004, 32(8):603–6.
8. Sawyer HF, Sandrik J, Neiman R. Accuracy of casts produced from alginate and hydrocolloid impression materials. Journal of the American Dental Association, 1976, 93:806–8.
9. Shaheen HM. A new method for evaluating deformity of alginate impression material from the practical aspect. Egyptian dental journal, 1974, 20(2):43–8.
10. Instruments and devices. Chicago, American Dental Association, 1970 (Specification no. 19).
11. Cohen BI et al. Dimensional accuracy of three different alginate impression materials. Journal of prosthodontics, 1995, 4(3):195–9.
12. Mansfield MA, Wilson HJ. Elastomeric impression materials. A comparison of methods for determining working and setting times. British dental journal, 1972, 132(3):106–10.
13. Goldberg AJ. Viscoelastic properties of silicone, polysulfide, and polyether im-

pression materials. Journal of dental research, 1974, 53(4):1033–9.

14. Kaloyannides IM. Elasticity of elastomer impression materials: 11. Permanent deformation. Journal of dental research, 1973, 52(4):719–24.

15. Martignoni M, Schonenberger L. Precision fixed prosthodontics: clinical and laboratory aspects, 1st ed. Chicago, Quintessence Publishing, 1990:33–56.

Oral Health Country/Area Profile Programme

The WHO Oral Health Country/Area Profile Programme (CAPP) was established in collaboration with WHO Noncommunicable Diseases Cluster, several WHO Collaborating Centres, and organizations and individuals around the world in 1995. The objective of CAPP is to present global information on dental diseases and oral health services for various countries/areas. The main server is located at the WHO Collaborating Centre for Education, Training and Research at the Faculty of Odontology, Malmö, Sweden. CAPP has developed enormously over the past decade, dealing with an average of 7934 successful requests per day (December 2005).

The database can be accessed from the CAPP home page at http://www.whocollab.od.mah.se/. Data for countries of the WHO Eastern Mediterranean Region can be found at: http://www.whocollab.od.mah.se/emro.html

واقع السلامة المهنية لعمال النظافة في مستشفيات إحدى المحافظات الفلسطينية

عصام أحمد الخطيب[1]

الخلاصة: تهدف هذه الدراسة إلى تسليط الضوء على واقع السلامة المهنية لعمال النظافة في المستشفيات الفلسطينية، وعلاقة ذلك بواقع التعاطي مع النفايات الطبية في هذه المستشفيات. لقد تبين من نتائج الدراسة أن مستوى السلامة المهنية لعمال النظافة دون المستوى المطلوب، إذ لا تتوافر لدى معظمهم معدَّات الوقاية الشخصية، وأن أكثر من 40٪ منهم قد تعرض للوخز بالإبر أثناء تعامله مع النفايات الطبية. ولوحظ عدم وجود سياسة محددة لإعطاء اللقاحات لعمال النظافة لوقايتهم من الأمراض المعدية، كما أنه لا يتم إجراء فحوصات طبية قبل التوظيف أو أثناءه. وأفاد 37.2٪ فقط من عمال النظافة بأنهم تلقوا تدريبا حول كيفية التعاطي مع النفايات الطبية، وأن 23.2٪ منهم يعملون 15 ساعة أو أكثر في اليوم، ولوحظ عدم وجود استقرار لعمال النظافة في عملهم، إذ تبين أن 55.8٪ من عمال النظافة لم يُمْضُوا سوى عام واحد أو أقل على عملهم في المستشفى. كذلك لوحظ عدم وجود اهتمام كبير للمسؤولين بسلامة العمال المهنية وتحقيق رضاهم، وهناك نقص كبير في البنية التحتية الخاصة بالتعامل مع النفايات الطبية، وهناك احتياجات كثيرة لعمال النظافة في المستشفيات ينبغي توفيرها لهم؛ لتمكينهم من القيام بعملهم على خير وجه، وتحقيق السلامة المهنية لهم والرضاء عن عملهم.

Occupational safety of cleaning personnel in Palestinian district hospitals

ABSTRACT This study examined occupational safety among cleaning workers in Palestinian hospitals and its relation with the medical waste management in these hospitals. The level of occupational safety was below standard requirements, as protective equipment and clothes are not available for most workers. Over 40% of workers had been pricked with needles while handling medical waste. There was no clear policy for vaccination of workers against infectious diseases and no medical examination for workers before or during employment. Only 37.2% were trained in handling medical waste and 23.2% were working 15 hours per day or more; 55.8% had spent 1 year or less in their work.

La sécurité au travail du personnel de nettoyage dans des hôpitaux de district palestiniens

RÉSUMÉ La présente étude a examiné la sécurité au travail chez les agents de nettoyage des hôpitaux palestiniens et sa relation avec la gestion des déchets médicaux dans ces hôpitaux. Le niveau de sécurité au travail n'était pas conforme aux normes exigées, l'équipement et les vêtements de protection n'étant pas disponibles pour la plupart des employés. Plus de 40 % des agents s'étaient piqués avec des aiguilles lors de la manipulation des déchets médicaux. Il n'y avait pas de politique claire pour la vaccination du personnel contre les maladies infectieuses et pas de visite médicale pour le personnel avant ou pendant l'emploi. Seuls 37,2 % des agents étaient formés à la manipulation des déchets médicaux et 23,2 % travaillaient 15 heures par jour ou plus ; 55,8 % occupaient cet emploi depuis 1 an ou moins.

(1) معهد الصحة العامة والمجتمعية، جامعة بيرزيت، فلسطين
عصام أحمد الخطيب، البريد الإلكتروني: ikhatib@birzeit.edu
الاستلام: 13/10/05، القبول: 26/12/05
Issam A. Al-Khatib. Institute of Community and Public Health, Birzeit University, Palestine.

المقدِّمة

إن طبيعة وظروف وأسلوب العمل الذي يؤديه عامل النظافة في المستشفيات يمكن أن يكون سببًا لإصابته بأمراض وإصابات عمل تؤثر على صحته وحياته، وتقلل من كفاءته وإنتاجيته، وتؤثر بالتالي على خدمات ومصالح المجتمع والدولة. فعامل النظافة في المستشفى يعتبر عنصرًا أساسياً في المحافظة على نظافة المستشفى والصحة العمومية؛ لذا يجب حمايته ورعايته صحيّاً ونفسيّاً من الآثار والظروف التي تعكسها عليه طبيعة العمل الذي اختاره أو قُدّر له السير فيه في هذه الحياة.

تعتبر النفايات الطبية نفايات خطرة؛ وذلك بسبب آثارها السلبية على المجتمع والصحة العمومية، إن لم يتم التعامل معها بشكل سليم. فهنالك العديد من الأمراض التي يمكن أن تنتقل عن طريق النفايات الطبية مثل التهاب الكبد الفيروسي "بي" والتهاب الكبد الفيروسي "سي" والإيدز وما إليها من الأمراض [1]، وذلك عن طريق التعرض للجروح بالمخلفات الطبية الحادة كالإبر الملوثة بدم المرضى الحاملين لمثل هذه الجراثيم، باعتبار أن المستشفيات تمثِّل المصدر الرئيسي لإنتاج النفايات الطبية.

هنالك العديد من أنظمة التصنيف المستخدمة لتمييز المكونات المختلفة للنفايات الطبية، والتي تختلف من بلد لآخر، أو من مؤسسة لأخرى. وقد وضعت منظمة الصحة العالمية تصنيفاً خاصاً بالدول النامية، وذلك لأغراض عملية، ويمكن تلخيصه في ما يلي [2]:

(أ) النفايات الطبية غير الخطرة (النفايات العامة)
(ب) الأدوات الحادة
(ج) النفايات المسببة للعدوى (غير الأشياء الحادة المعدية)
(د) النفايات الكيميائية والطبية
(هـ) غيرها من النفايات الخطرة الطبية

هذا التصنيف الخاص بالدول النامية تم تبسيطه إلى خمسة أقسام، حتى يسهل فَصْلُ النفايات الطبية، وتجميعها، وتخزينها، ونقلها داخل المؤسسة الطبية وخارجها. إذ إنه كلما ازدادت الأصناف، أصبح فصلها وجمعها وتخزينها ونقلها أصعب. وهذا التصنيف يمكن اعتماده في المستشفيات الكبيرة. أما في المراكز الصحية الصغيرة فيمكن تبسيط هذا التصنيف إلى قسمين فقط: نفايات طبية ونفايات غير طبية.

كل النفايات الطبية الناتجة في مناطق المعالجة والواردة في (المجموعة ج) والمقترحة من قِبَل منظمة الصحة العالمية للدول النامية، ينبغي التخلص منها في حاويات صفراء اللون يوجد بداخلها أكياس صفراء.

أما الأدوات الحادة (المجموعة ب) فيجب وضعها في حاويات خاصة صنعت لهذا الغرض. وإذا تعذر ذلك فيمكن استخدام علب المشروبات الخفيفة، أو القناني البلاستيكية، أو أيَّة حاويات مشابهة، ليتم استخدامها للتخلص من الإبر وغيرها من الأدوات الحادة، إذ إن هذه الأدوات قد تسبب خطراً كبيراً على الطاقم الذي يتعامل معها إذا تم التخلص منها مع النفايات العادية.

وأما المجموعة د (النفايات الكيميائية الطبية الصلبة والسائلة) يجب التخلص منها على النحو الذي يضمن السلامة العامة للجميع. فالأدوية والكيماويات المختلفة الناتجة عن الجراحات المختلفة، ينبغي أن يتم التخلص منها بعد معالجتها، ولا يمكن بأيِّ حال التخلص منها مع المياه العادمة دون سابق معالجة [3]. كذلك ينبغي إعادة الأدوية عند انتهاء صلاحيتها، أو عند عدم الحاجة إليها إلى شخص مسؤول في المستشفى، ومن ثم إلى جهة مركزية كوزارة الصحة. وفي المؤسسات التي لا يمكن القيام بذلك فيها، يكون التخلص منها عن طريق الحرق الذي يتم للنفايات الطبية.

الأخطار التي قد تنتج عن قصور التعامل مع النفايات الطبية

قد تصبح النفايات الطبية سبباً مهماً للوفاة في أنحاء العالم، إذا لم يتم التعامل معها بالشكل السليم. فالعديد من الأمراض المعدية التي ظن كثير من الناس أنه قد تم السيطرة عليها؛ لاتزال وتستمر لتؤلّف مشكلة حقيقية للصحة العمومية. وهذا يجعل من الأهمية بمكان توخي الحرص والتعاطي مع النفايات الطبية بالشكل السليم، لضمان السلامة المهنية لعمال النظافة. فالأشياء المهمة في إدارة النفايات الطبية التي ينبغي أن تؤخذ بعين الاعتبار، هي المحافظة على الصحة العمومية، وتجنب المخاطر الناشئة عن التعاطي مع النفايات الطبية الناتجة عن المراكز الصحية المختلفة. ويعتبر عمَّال النظافة من أكثر الفئات المعرضة لمثل هذه المخاطر [*2, 4-8*].

من جهة أخرى فإن التدريب يعتبر أمراً مهماً للتقليل من مخاطر النفايات الطبية على السلامة المهنية لعمال النظافة، فالتدريب يمكّن العمال من التعرف على مفاهيم السلامة، والصحة، والأماكن التي توجد فيها أخطار، ويتيح لهم التعرف على كيفية استعمال أدوات الوقاية الشخصية، ويوضح أساليب العمل التي تقلّل الخطر إلى الحد الأدنى. كذلك يؤكد التدريب على المسؤوليات الفردية في تطبيق قواعد السلامة في الموقع، حيث تم تأكيد ذلك من قبل العديد من المؤلفين [*9-11*].

ينبغي معاملة عمال النظافة والخدمات بلطف ولا يجوز النظر إليهم بفوقية، وذلك حتى يشعروا بأن دورهم مهم في إنجاح نظام التعامل مع النفايات الطبية، وهم بحاجة إلى أن يشعروا بأنهم جزء مهم من طاقم العاملين في خدمة المستشفى، وينبغي تقديم تدريب وافٍ لهم يتناسب مع طبيعة عملهم، حتى يعلموا بأن قلة النظافة يمكن أن تؤثر في تأخير تحسن المريض نتيجة للمعالجة المباشرة، ويمكن أن تسهم في سوء إدارة النفايات، وانتشار الأمراض المعدية خارج المستشفى، فعملهم يحتاج إلى الشعور بالواجب ومسؤولية الخدمة، التي ينبغي تعزيزها وترسيخها في نفوسهم [*2, 12-15*].

ويعتبر الرضى عن العمل مؤشراً قوياً على مستوى السلامة المهنية لعمال النظافة في المستشفيات، إذ ينعكس مستوى الرضى عن العمل على مستوى الأداء الذي يقوم به عامل النظافة في كثير من الأحيان [*16*] .

وتتألَّف عملية التعامل مع النفايات الطبية بشكل أساسي من سبعة عناصر، كل عنصر منها ينبغي أن يُقيَّم من خلال الموظفين، ويشمل ذلك تكلفة المواد، جنباً إلى جنب مع مخاطر الصحة والسلامة المهنية. وهذه العناصر السبعة هي التمييز المناسب للنفايات الطبية والفصل فيما بينها، والتعاطي معها (الجمع، والقياس، والتخزين، والنقل)، والمعالجة، والتخلُّص، وتدوين المعلومات، والتدريب. ولكل من هذه العوامل أثر مهم على السلامة المهنية لعمال النظافة في المستشفيات، وإن أي خلل في أي من هذه العناصر قد يؤثر بشكل مباشر أو غير مباشر على السلامة المهنية لعمال النظافة [*4, 17, 18*].

وتهدف هذه الدراسة إلى بحث واقع السلامة المهنية لعمال النظافة في المستشفيات الفلسطينية، ومن ثم اقتراح الحلول المناسبة للمشاكل القائمة، وذلك من خلال التطرق وتحليل العوامل المختلفة التي تؤثر على السلامة المهنية لعمال النظافة في المستشفيات. والهدف العام من ذلك، هو الإسهام في تحسين مستواها وتحسين الصحة العامة لهؤلاء العمال. أما الأهداف التفصيلية لهذه الدراسة فهي إعطاء تصور ومعلومات واضحة عن الواقع الحالي للسلامة المهنية لعمال النظافة في المستشفيات وذلك عن طريق معرفة علاقة عمال النظافة بطرق التعاطي مع النفايات الطبية، وظروف عملهم، ومعرفة مدى رضاهم عن العمل، وتوجهاتهم واحتياجاتهم ومقترحاتهم لتحديد المشكلة القائمة، ومحاولة الوصول إلى الحل المناسب الذي يرتقي بمستوى السلامة المهنية لعمال النظافة، ووضع الآليات الملائمة لرفع مستوى الوعي الشامل في المراكز والمؤسسات ذات العلاقة بسلامة العاملين فيها والعمليات التي تجرى داخلها والبيئة المحيطة بها.

المنهجية

تم اختيار ستة من المستشفيات التسعة الموجودة في إحدى المحافظات الفلسطينية لإجراء هذه الدراسة، وهي كما يلي: مستشفى حكومي، ومستشفى أهلي، ومركز تأهيل معاقين حركيّا، ومستشفى جراحي خاص، ومستشفى تخصصي خاص للولادة والعقم والجراحة النسائية، ومستشفى تخصصي خاص للعيون، علمًا بأنه يوجد ثلاثة مستشفيات ولادة تم اختيار إحداها إذ إنها لا تختلف كثيراً بعضها عن بعض بشكل عام.

اعتمدت هذه الدراسة على طريقتين لجمع المعلومات، الأولى كيفيَّة، وهي نماذج خاصة تم إعدادها لكتابة الملاحظات أثناء العمل الميداني. والثانية كمِّية، حيث تم استخدام استمارة شبه منتظمة خاصة بالمقابلات الشخصية لعمال النظافة. وتم مقابلة 43 عامل نظافة من أصل 45 كانوا يعملون في المستشفيات أثناء العمل الميداني.

وقد تضمن النموذج الخاص بالمشاهدات الميدانية جميع الخطوات المتعلقة بإدارة النفايات الطبية في إطار المستشفيات، وكيفية سلوك عمال النظافة في التعامل معها. أما الاستمارة الخاصة بعمال النظافة في المستشفيات، فقد تضمنت عدة مواضيع تتعلق بالمعلومات الشخصية والخبرة في مجال إدارة النفايات الطبية والأدوات التي يتم استخدامها، والاحتياجات المختلفة لتطوير نظام إدارة النفايات الطبية والمقترحات بالإضافة إلى سلامة العمال وصحتهم، ومدى انسجامهم في العمل وتقبُّلهم له، ومدى رضاهم، وغير ذلك من الأسئلة. بدأ العمل الميداني بتاريخ 1999/2/2، وانتهى في بتاريخ 1999/5/8، وتم تدقيق الاستمارات الخاصة بعمال النظافة في كل مستشفى قبل الانتهاء من العمل الميداني فيه، ثم تم إعادة تدقيقها قبل إدخال البيانات، وبعد ذلك تم ترميزها، وإدخالها، ثم تحليلها باستخدام رزمة SPSS.

النتائج الرئيسية ومناقشتها

يعتبر عمال النظافة في المستشفيات من الفئات التي لها دور مهم ومباشر في التعامل مع النفايات الطبية، وهي الفئة الأكثر تعرضا للأخطار الناجمة عن التعامل معها، مما يعرض سلامتهم المهنية للخطر. وقد بلغ عددهم 43 عاملا، منهم 24 في المستشفى الحكومي، و7 في المستشفى الأهلي، و7 في مركز التأهيل، و2 في المستشفى الجراحي الخاص، و3 في المستشفى التخصصي للولادة.

بعض الخصائص المنتقاة لعمال النظافة

فيما يلي عرض لنتائج بعض الخصائص المنتقاة التي تتعلق بالمعلومات الشخصية بشكل عام وأهمها ما يلي:

الجنس: بلغت نسبة الذكور من عمال النظافة في المستشفيات 65.1٪ والإناث 34.9٪ حيث بلغ عدد الذكور 28 بينما بلغ عدد الإناث 15، وتتركز الإناث في مستشفيات الولادة، وفي المستشفيات التي يوجد فيها أقسام للولادة.

العمر: تبين أن هناك تفاوتاً كبيراً في أعمار عمال النظافة، حيث بلغ أصغرهم 18 عاماً، بينما بلغ أكبرهم 60 عاماً وبلغ متوسط أعمارهم 30.77 عاماً. وتم تقسيم الأعمار إلى فئات عمرية كما هو موضح في الجدول (1). ويلاحظ من الجدول (1)، أن معظم عمال النظافة من جيل الشباب، إذ إن أكثر من 95٪ منهم تقل أعمارهم عن 43 عاماً، وأن أكثر من 72٪ من عمال النظافة تقل أعمارهم عن 35 عاما. وهذا يسهل مهمة تدريب عمال النظافة في حالة وجودها، إذ إنه كلما تجاوز عمر العامل عمر الشباب، ازدادت الصعوبة في تدريبه وتوضيح المفاهيم المختلفة للتعامل مع النفايات الطبية له.

المؤهلات العلمية: يعرض الجدول (1) توزيع التحصيل العلمي لعمال النظافة. ويلاحظ من هذا الجدول أن هناك تبايناً واضحاً في تحصيلهم العلمي. ويمكن القول بشكل عام، أن نسبة الأمية بين عمال النظافة في المستشفيات متدنية حيث بلغت 4.7٪ وأما نسبة العمال الذين يحملون مؤهلات علمية بعد الثانوية العامة أو ما يزالون يدرسون في

إحدى المؤسسات التعليمية العليا فقد بلغت 7٪. وبشكل عام، فإن عدد السنوات الدراسية التي أنهاها عمال النظافة تعتبر مقبولة، حيث يمكن التعامل معهم بشيء من السهولة في حالة اتباع الأسلوب والطريقة المناسبة لذلك.

مدة العمل في مجال النظافة العامة داخل المستشفى: يوضح الجدول (2) توزيع عمال النظافة في المستشفيات حسب مدة العمل داخل المستشفى. ويلاحظ أن 24 عاملا (56٪) مضى على وجودهم في هذا العمل أقل من عام. وهذا يؤكد عدم استمرار العامل في هذا العمل لفترة طويلة، وإنما يميل إلى تغييره. وهذا يستدعي معرفة الظروف التي تؤدي إلى ترك عمال النظافة في المستشفيات لعملهم، والعمل على تغييرها نحو الأفضل من أجل استقرار عمال النظافة

الجدول (1): توزيع عمال النظافة حسب العمر وسنوات الدراسة

العمر			الدراسة		
الفئة العمرية	التكرار	النسبة المئوية	عدد السنوات الدراسية	التكرار	النسبة المئوية
25-18	13	30.2	أمي	2	4.7
30-26	11	25.6	6 -1	9	20.9
35-31	7	16.3	9 -7	15	34.9
أكثر من 35	12	28.0	أكثر من 9	17	39.6
المجموع	43	100		43	100

الجدول (2): توزيع عمال النظافة في المستشفيات حسب مدة العمل في مجال النظافة داخل المستشفى

نوع المستشفى	مدة العمل داخل المستشفى بالسنة								المجموع	
	أقل من سنة		1 - 2		3 سنوات أو أكثر		لا يوجد جواب			
	التكرار	و(٪)	التكرار	و(٪)	التكرار	و(٪)	التكرار	و(٪)	التكرار	و(٪)
حكومي	18	75.0	5	20.8	0	0.0	1	4.2	24	100
أهلي	4	57.1	2	28.6	1	14.3	0	0.0	7	100
مركز تأهيل	0	0.0	1	14.3	6	85.7	0	0.0	7	100
خاص جراحي	1	50.0	0	0.0	1	50.0	0	0.0	2	100
تخصصي للولادة خاص	1	33.3	2	66.7	0	0.0	0	0.0	3	100
المجموع	**24**	**55.8**	**10**	**23.3**	**8**	**18.6**	**1**	**2.3**	**43**	**100**

($P = 0.005$, $\chi^2 = 32.950$)

في عملهم، إذ إن الخطر في التعامل مع النفايات الطبية يقل كلما ازدادت الخبرة في العمل. ووجد أن هناك ترابطاً يُعْتَدُّ به إحصائياً، ما بين المستشفى ومدة العمل في مجال النظافة داخل المستشفى ($P = 0.005$, $\chi^2 = 32.950$). فعلى سبيل المثال تَرَكَّز معظم العمال الذين عملوا في المستشفى أقلَّ من سنة في المستشفى الحكومي، حيث بلغ عددهم 18 عاملاً من أصل 24 عملاً يعملون فيه، ويشكلون ما نسبته 41.9٪ من عمال النظافة في المستشفيات موضوع البحث. ويمكن تفسير ذلك بأن عدد سنوات العمل في المستشفى مرتبط بشركة النظافة المتعهدة، وهي حديثة العهد في المستشفى، وبالتالي تم تعيين العمال حديثاً. كذلك هناك عدة أسباب منها:

- عدم ارتياح العمال في عملهم ومعاملتهم معاملة غير جيدة في بعض الأحيان من قبل الكثيرين وخاصة المسئول عنهم، حيث تم ملاحظة ذلك أثناء العمل الميداني.
- عدم وجود ضمان لاستمرارهم في العمل، حيث يمكن لشركة النظافة أن تستغني عن خدمات من تشاء من العمال ولأسباب غير مقنعة أحيانا.
- عدم المحافظة على حقوقهم كعمال نظافة، حيث لا يوجد لهم تأمين صحي أوغير ذلك من الحقوق.

العلاقة بين المعلومات الشخصية المختلفة لعمال النظافة ومدة العمل

تمت محاولة معرفة العلاقة بين المتغيرات المختلفة للمعلومات الشخصية لعمال النظافة، حيث وجد أنه لا يوجد ترابط يُعْتَدُّ به إحصائياً بين كل من الجنس، العمر، والمؤهلات العلمية من جهة ومدة العمل في مجال النظافة داخل المستشفى، ومدة العمل في مجالٍ النظافة خارج المستشفى من جهة أخرى. كذلك تم محاولة معرفة العلاقة بين مدة العمل في مجال النظافة داخل المستشفى، ومدة العمل في مجال النظافة خارج المستشفى وتبين أنه لا توجد فروق جديرة بالملاحظة بينهما كذلك. ومعنى ذلك أنه يتم استخدام عمال النظافة دون أي شروط مسبقة، إذ إنه لا توجد شروط معينة لتعيين عامل النظافة في المستشفيات، حيث تم ملاحظة ذلك أثناء العمل الميداني، تبين أنه لا يوجد شرط للخبرة أو العمر أو الجنس، أو المؤهلات العلمية أو التدريب. إلا أن اتفاقية تقديم خدمات النظافة بين وزارة الصحة وشركة النظافة (المتعهد)، فيها نص واضح وصريح على مواصفات عامل النظافة في المستشفيات [*19*] منها:

(أ) أن تتراوح أعمار عمال النظافة ما بين 18 سنة و55 سنة.

(ب) أن تتم مقابلة عمال النظافة من قبل المدير الإداري وموافقته على عملهم في المستشفى قبل البدء بالعمل.

(ج) أن يتقيد العمال بالأوامر والتعليمات التي تصدر عن إدارة المستشفى وغير ذلك من الشروط.

ومن اللافت للانتباه أنه لا يتم تطبيق معظم هذه المواصفات والشروط، علماً بأنها تصب في صالح المستشفى، والسلامة المهنية لعمال النظافة، والمصلحة العامة.

إدارة النفايات الطبية وعلاقتها بالسلامة المهنية لعمال النظافة

تعريف النفايات الطبية

طلب من يعرفون الفرق بين النفايات الطبية والعادية من عمال النظافة داخل المستشفيات تعريف النفايات الطبية، حيث كان عددهم 35 (81.4٪). و لم يعط أحد منهم تعريفًا واضحًا، وإنما تم ذكر أصناف مختلفة من النفايات الطبية. والجدول (3) يوضح الأصناف المختلفة من النفايات الطبية حسب ما ذكرها عمال النظافة، ونسبة الذين ذكروها ونسبة الذين لم يذكروها من الذين قالوا بأنهم يعرفون الفرق. ويلاحظ من الجدول أن عمال النظافة يركزون بشكل أساسي في تعريفهم على الأدوات الحادة بدرجة أولى، حيث بلغت نسبة الذين ذكروا الأدوات الحادة على أنها نفايات طبية حوالي 97٪. في المقابل لم يتم التركيز على بعض النفايات الخطرة كالنفايات الناتجة من المختبرات والتي بلغ نسبة الذين ذكروها حوالي 9٪ فقط. وهذا يدل على عدم وجود المعرفة الكافية لدى عمال النظافة عن معنى النفايات الطبية، ومدى الخطورة التي قد تشكلها عليهم إذا لم يتعاملوا معها بالشكل الصحيح.

الجدول (3): توزيع عمال النظافة في المستشفيات حسب تصنيفهم للمخلفات الطبية

تصنيف المخلفات الطبية	التكرار		النسبة المئوية	
	ذكر	لم يذكر	ذكر	لم يذكر
مخلفات العمليات مثل الدم والأنسجة والأجنَّة	5	30	14.3	85.7
المخلفات الكيميائية مثل مواد التنظيف والمواد المعقِّمة	3	32	8.6	91.4
الأدوات الحادة مثل الإبر، الشفرات، الـمَحَاقن	34	1	97.1	2.9
قطـن، شـاش، قفـازات، شراشـف، كمامـات، أنابيـب، لاصقات	20	15	57.1	42.9
الأدوية الزائدة عن الحاجـة أو الملوثـة، أكيـاس الغلوكـوز، المحاليل	17	18	48.6	51.4
الجبس	1	34	2.9	97.1
نفايات المختبرات	3	32	8.6	91.4

تدريب عمال النظافة على التعاطي مع المخلفات الطبية حسب نوعها

أما بالنسبة لتدريب عمال النظافة الـجدد في المستشفيات على كيفيـة التعاطي مـع النفايـات الطبيـة، فـيرى 16 (37.2٪) من عمال النظافة الذين تم مقابلتهم أنه يتم تدريبهم، و يرى 23 (53.5٪) مـن العمـال أنـه لا يـتم تـدريب العمال الجدد. أما بقية العمال وعددهم 4 (9.3٪) فلا يـدرون إن كـان يـتم تـدريب العمـال الجـدد أم لا. مـن هـذه النتائج يتبين أنـه لا توجـد هنـاك خطـة أو سياسـة واضـحة في تـدريب عمـال النظافـة عنـد قـدومهم للعمـل داخـل المستشفيات، كذلك لا يوجد هناك تعليم مستمر بعد عملهم، علمًا بأن توسيع إدراك العامل وتوعيتـه بمخـاطر مهنتـه والأمراض المهنية التي يمكن أن تصيبه في حالة عدم تطبيق شروط الصحة والسلامة المهنية سيؤهله دون شك إلى اتبـاع طرق الوقاية لحماية نفسه وبالتالي استمرارية عمله بنشاط وكفاءة وزيادة إنتاجه وزيادة نسبة الربح لصاحب العمـل، وفي المحصِّلة رفع مستوى السلامة المهنية لديه.

ويمكن القول إن التدريب الذي أفاد بعض عمال النظافة بأنهم تلقوه في المستشفيات لم يكن تدريباً حقيقياً، وإنمـا هو مجرد توجيهات بسيطة لا ترقى إلى مستوى التعاطي السليم مـع النفايـات الطبيـة. أمـا التـدريب الـذي تلقَّـاه بقيـة العمال على أيدي الأطباء والتمريض، فلا نستطيع الحكم على مستواه أو على مدى شموليته، حيث لم نحصل على أيـة مادة تدريبية تتعلق بهذا الموضوع من أي جهة كانت.

فصل النفايات الطبية عن النفايات العادية

بعد سؤال عمال النظافة في المستشفيات عن معنى النفايات الطبية وإجابتهم عليه، تم إعطاء هـؤلاء العمـال فكـرة مبسطة عن معنى النفايات الطبية حتى يستطيعوا الإجابة على بقية الأسئلة الموجودة في الاستمارة.

كانت إجابات عمال النظافة عن السؤال الخاص بفصل المخلفات الطبية عن المخلفات العادية متنوعة. فقد أجاب 24 عاملا (55.8٪) بأنه لا يتم الفصل من قبل الطاقم الطبي، و13 عاملا (30.2٪) بأن عملية الفصل تتم أحيانا، وأما الذين ذكروا بأنه يتم فصل النفايات الطبية عـن النفايـات العاديـة دائمـا فكـان عـددهم 5 (11.6٪)، وتـبين أن أحـد العمال (2.3٪) لم يجب على هذا السؤال. وهذا يؤكد حقيقة مهمة وهي أنه في غالب الأحيان لا يتم فصل النفايـات الطبية عن النفايات العادية، وإن تم ذلك فإنه يتم بشكل جزئي. وهذا يتطلب إعادة النظـر في الوضـع القـائم ومحاولـة

الوصول إلى الفصل الكامل للنفايات الطبية عن النفايات العادية، إذ إن ذلك يخفف بشكل كبير من احتمال العدوى وانتقال بعض الأمراض إلى عمال النظافة أثناء تعاملهم مع النفايات الطبية.

الأكياس المستخدمة في نقل النفايات الطبية وكيفية التعاطي معها

تعتبر نوعية الأكياس المستخدمة في نقل النفايات الطبية ذات أهمية خاصة، فينبغي أن تكون سميكة بحيث لا تتمزق بسهولة، وعادة ما تكون بلون أصفر [2] إلا أن الواقع في جميع المستشفيات التي تم فيها العمل الميداني لا يراعي هذه المواصفات، حيث تستخدم أكياس ذات ثخن قليل جداً يمكن أن يتمزق بسهولة، بعد تعبئته بالنفايات الطبية أو حتى النفايات العادية. ويمكن تأكيد هذه الحقيقة من النتائج، حيث أفاد 18 (41.9٪) من عمال النظافة أن الأكياس تتعرض أحيانا للتمزق، وأن 14 (32.6٪) منهم أفاد أنها تتمزق نادراً، بينما أفاد 11(25.6٪) من العمال الذين تم مقابلتهم في المستشفيات المدروسة أن الأكياس لا تتمزق. ويعتبر تمزُّق الأكياس أثناء التعامل بها خطرًا على السلامة المهنية لعمال النظافة.

أما الأسباب التي قد تؤدي إلى تمزُّق الأكياس حسبما يراها عمال النظافة فهي متنوعة، وهي تعبئة الأكياس بأكثر من سعتها، واحتواء الأكياس على أدوات حادة، وعبث الزائرين بالأكياس، وحمل الأكياس بطريقة غير صحيحة، والنوعية غير الجيدة للأكياس، واحتوائها على أكياس بول. وهذه الأسباب قد تكون منفردة أو قد يجتمع منها أكثر من سبب معا.

أما حمل الأكياس المحتوية على النفايات الطبية من مكان إلى آخر في المستشفى، فيعتبر من الأمور المهمة التي تسهم في المحافظة على سلامة العمال وصحتهم، بالإضافة إلى التقليل من تسرب النفايات الطبية من الأكياس. ويرى 29 (67.4٪) من العمال أنهم يحملون الأكياس وينقلونها بسهولة دائما من مكان إلى آخر. بينما يرى 13 (30.2٪) من العمال أنهم يحملونها بسهولة أحيانا. وأفاد أحد العمال (2.3٪) أنه يحمل الأكياس بصعوبة أثناء نقلها من مكان لآخر. وتعتبر هذه النتائج مؤشراً للدلالة على وجود صعوبات لدى بعض العمال في حمل الأكياس ونقلها، وخاصة في المستشفيات الحكومية، وتم مشاهدة ذلك أثناء العمل الميداني، وفي الكثير من الأحيان تم مشاهدة عمال النظافة وهم يحملون الأكياس على عربة نقل يزيد ارتفاع مستوى الأكياس فيها عن مستوى رؤوسهم، مما كان يؤدي إلى انقلابها، وتمزُّق الأكياس المحملة عليها، وتلويث المنطقة المحيطة بها، وبالتالي قد تتسبب في بعض المشاكل الصحية لعمال النظافة وغيرهم.

بعض المظاهر الاخرى التي لها دور مهم في تعزيز السلامة العامة لعمال النظافة

يعتبر ارتداء القفَّازات من الأشياء المهمة في المحافظة على سلامة عمال النظافة أثناء عملهم، وينبغي أن يكون ارتداؤها إجباريا لعمال النظافة، كما ينبغي أن تكون ثخينةً ثخانةً كافية؛ وذلك للحفاظ على سلامة الأيدي من التعرض للوخز أو ملامسة النفايات الطبية بشكل مباشر [1]. لكن الواقع يختلف كثيراً في المستشفيات عمَّا ينبغي أن يكون عليه. فمن خلال الإجابات، أفاد 35 (81.4٪) من عمال النظافة بأنهم يرتدون القفَّازات دائماً أثناء التعامل مع النفايات الطبية، بينما أفاد 6 (14٪) من العمال بأنهم يرتدون القفَّازات أحياناً، وأفاد أحد العمال (2.3٪) أنه نادراً ما يرتدي القفازات أثناء التعامل مع النفايات الطبية، بينما أفاد آخر أنه لا يرتدي القفازات أثناء تعامله مع النفايات الطبية. وهذه النتائج تختلف عن الواقع، حيث تم مشاهدة الكثير من عمال النظافة أثناء تعاملهم مع النفايات الطبية لا يرتدون هذه القفَّازات، وأحياناً يرتدون قفَّازات رقيقة جداً لا تتناسب مع طبيعة عملهم، وليست مخصصة أساساً لهذا النوع من العمل.

ومن الأشياء التي تقلل من سلامة عمال النظافة، وقد تعرِّض بعضهم للإصابة بجروح أو وخزات في أيديهم، وضعُ أيديهم في أكياس النفايات الطبية وضغطُها. ويمكن تأكيد هذه الحقيقة من النتائج، حيث أفاد اثنان (4.7٪) من عمال النظافة بأنهم يضعون أيديهم دائما في أكياس النفايات الطبية، وذلك من أجل ضغط النفايات الطبية فيها. بينما أفاد 7 (16.3٪) من العمال بأنهم يضعون أيديهم أحيانا في الأكياس لضغط النفايات الطبية فيها، وأفاد 3 (7٪) من العمال

بأنهم نادراً ما يضعون أيديهم، والأغلبية من عمال النظافة 31 (72.1٪) أفادوا بأنهم لا يضعون أيديهم في الأكياس لضغط النفايات الطبية فيها. وبناءً على هذه النتائج يلاحظ أنه يوجد بعض الخطر من هذه الممارسة، حيث قد يتعرض العمال لجروح أو وخز في حالة وجود أدوات حادة في الأكياس مع النفايات الطبية. ومن خلال الملاحظات الميدانية وُجد العديد من عمال النظافة ممن يضعون أيديهم في الأكياس لضغطها، وهم لا يرتدون القفّازات المناسبة.

وتعتبر ملابس العمل من الأمور المهمة التي تساعد على وقاية عمال النظافة كما تساعد على المحافظة على سلامتهم. وقد أفاد 30 (69.8٪) من عمال النظافة أنهم يرتدون ملابس خاصة أثناء العمل، بينما أفاد 7 (16.3٪) من العمال أنهم أحيانا يرتدون ملابس خاصة أثناء العمل، وأفاد 2 (4.7٪) منهم بأنهم نادراً ما يرتدون ملابس خاصة أثناء العمل، وأفاد 4 (9.3٪) من عمال النظافة بأنهم لا يرتدون ملابس خاصة أثناء عملهم في المستشفى. وبناءً على هذه النتائج، فإنه من الضروري إلزام عمال النظافة بارتداء ملابس خاصة أثناء عملهم في المستشفى وتعاطيهم مع النفايات الطبية.

أما نوعية الملابس التي يرتديها عمال النظافة، فقد أفاد 7 (17.9٪) من العمال الذين يرتدون ملابس خاصة يرون أنها واقية، بينما أفاد 7 (17.9٪) منهم بأنهم يرون أنها واقية نوعاً ما، وأفاد 22 (56.4٪) منهم أنها غير واقية. وأجاب 3 (7.7٪) من العمال بأنهم لا يعرفون ما إذا كانت واقيةً أم لا، وبشكل عام، ومن خلال المشاهدات الميدانية فإن الملابس في معظمها لم تكن واقية بالشكل المطلوب الذي يحافظ على السلامة المهنية للعمال.

وبناءً على ما سبق فإن عمال النظافة يتعرضون من فترة لأخرى إلى وخز الإبر أو الجروح، ويعود ذلك لعدة أسباب، منها طبيعة ملابس العمل، وتصرُّفات العمال أثناء العمل، ووجود الأدوات الحادة في أكياس النفايات وما إلى ذلك. وقد أفاد 17 (40.5٪) من العمال بأنهم قد تعرضوا لوخز الإبر، بينما أفاد 25 (59.5٪) من العمال أنهم لم يتعرضوا لذلك، و لم يجب أحد العمال (2.3٪). هذه الحقيقة تؤكد أنه لا يزال هناك وضع غير سليم من حيث فصل الأدوات الحادة التي يراد التخلص منها عن بقية النفايات الطبية.

وهناك مسألة مهمة تسهم في سلامة العمال، وراحتهم في العمل، وهي اطمئنان مسئول العمال عنهم من حيث راحتهم وصحتهم وسلامتهم، حيث تلعب العلاقة الجيدة ما بين العمال ومسئوليهم دورا مهما في إنجاز الأعمال المنوطة بهم، حيث تدفع الراحة النفسية للعامل تدفعه للمزيد من الإتقان والإخلاص في العمل. وقد أفاد 23 (53.5٪) من العمال أن المسؤولين عنهم دائماً يطمئنُّون عليهم من حيث صحتهم وراحتهم وسلامتهم. بينما أفاد 8 (18.6٪) من العمال أن المسؤولين يطمئنُّون أحياناً عليهم، وأفاد 10 (23.3٪) من العمال بأن مسؤوليهم نادرا ما يطمئنُّون عليهم، بينما يرى أحد العمال أن مسؤوله لا يطمئنُّ عليه، ووجد أن أحد العمال لم يجب على هذا السؤال. ومن خلال هذه النتائج يلاحظ أن نسبة مرتفعة من مسؤولي العمال لا يلقون اهتماماً للاطمئنان على العمال والسؤال عن أحوالهم، بل كل ما يهمهم هو العمل، بغض النظر عن وضع العامل النفسي أو الصحي أو ما شابه ذلك. وقد شوهدت عدة أحداث تؤكد هذه الحقيقة خاصة في المستشفى الحكومي، حيث كثيراً ما كان يتعرض عمال النظافة إلى التوبيخ أو التهديد بالفصل من العمل وغير ذلك، مما يجعل العامل غير مستقر في عمله، وغير مرتاح، ومضطرباً نفسياً، مما يؤدي بالتالي إلى التأثير بشكل سلبي على أداء العامل، وهذا يتفق مع الدراسات التي قام بها باحثون آخرون [*20-22*].

كذلك يعتبر الفحص الطبي لعمال النظافة قبل التوظيف للعمل في المستشفيات، وأثناء العمل، من الأمور الهامة، وذلك للتأكد من خلُّوهم من الأمراض المعدية، خاصةً وأنهم يتنقلون بين المرضى والطاقم الطبي والزوار وغيرهم، علماً بأنه لا توجد قوانين أو تعليمات مكتوبة في المستشفيات تتعلق بمواصفات عمال النظافة من حيث وضعهم الصحي أو إصابتهم بأمراض معدية. وتبيَّن من النتائج أن 10 (23.3٪) من عمال النظافة تَمَّ فحصُهم قبل التوظيف، بينما أفاد 33 (76.6٪) من العمال بأنه لم يتم فحصُهم. وهذا دليل على عدم وجود سياسة واضحة في المستشفيات تجاه هذه المسألة.

أما أثناء التوظيف، فتبين أن هناك نفس العدد من العمال 10 (23.3٪) تم فحصُهم، وأفاد 33 (76.6٪) من عمال النظافة بأنه لم يتم فحصهم أثناء العمل في المستشفى. ووجد أن هناك علاقة يُعتدُّ بها إحصائياً ($P = 0.00$, $\chi^2 = 23.508$) بين عمال النظافة الذين تم فحصهم قبل التوظيف والعمال الذين تم فحصهم بعد التوظيف. وهذا يعكس سياسة محدَّدة في المستشفيات، إذ إن المستشفى الذي لديه سياسة فحص عمال النظافة قبل توظيفهم، هو نفس المستشفى الذي لديه سياسة فحص العمال بعد توظيفهم. وهذه الظاهرة واضحةٌ تماماً في كل من المستشفى الحكومي، والمستشفى الجراحي الخاص، وفي مركز التأهيل. ففي المستشفى الحكومي والجراحي لا يتم الفحص الطبي لعمال النظافة لا قبل التوظيف ولا بعده، كما هو واضح في الجدول (4)، أما في مركز التأهيل فيلاحظ أنه تم فحص جميع العمال قبل التوظيف، وتم فحص 6 من أصل 7، وهم العمال الذين يعملون في المركز، أما في بقية المستشفيات فيلاحظ أنه لا توجد سياسة واضحة في هذا الشأن، حيث يتم الفحص الطبي لبعض عمال النظافة سواءً قبل التوظيف أو بعده.

وهناك مسألة مهمة ينبغي التركيز عليها للمحافظة على سلامة عمال النظافة في المستشفيات وغيرها من مراكز الرعاية الصحية، وهي إكساب عمال النظافة مناعة ضد بعض الأمراض المعدية وذلك عن طريق تطعيمهم، وخاصة ضد مرض التهاب الكبد الفيروسي "بي" viral hepatitis B ومرض الكُزَاز tetanus، حيث أوصت منظمة الصحة العالمية بضرورة إكساب جميع الذين يتعاملون مع النفايات الطبية المناعة ضد هذين المرضين [*1*]. أما الواقع الموجود في المستشفيات، فهو عكس المطلوب تقريباً، حيث أفاد 4 (9.3٪) من عمال النظافة بأنه قد تم تطعيمهم، أما بقية العمال وعددهم 39 (90.7٪) فقد أفادوا بأنه لم يتم تطعيمهم. ويلاحظ أنه لا توجد هناك سياسة واضحة المعالم من حيث تطعيم العاملين في المستشفيات الفلسطينية، ولا بد من بحث هذه المسالة من قبل المسؤولين، والخروج بسياسة موحدة يتم تعميمها على جميع المستشفيات والمراكز الصحية.

الجدول (4): توزيع عمال النظافة في المستشفيات حسب الفحص الطبي قبل التوظيف وبعده

		نوع المستشفى					المجموع
		حكومي	أهلي	مركز تأهيل	خاص جراحي	تخصصي للولادة خاص	
الفحص الطبي قبل التوظيف	تم	0	2	7	0	1	10
	لم يتم	24	5	0	2	2	33
الفحص الطبي أثناء العمل	تم	0	4	6	0	0	10
	لم يتم	24	3	1	2	3	33

(*$P = 0.00$, $\chi^2 = 23.508$)

ساعات العمل اليومية لعمال النظافة

يبذل عامل النظافة جهدا لا باس به أثناء عمله في المستشفيات. ولذلك، فإن تحديد ساعات العمل يعد أمراً مهماً لعامل النظافة للقيام بواجبه على النحو المطلوب. إلا أن الواقع في العديد من المستشفيات وخاصة الحكومية منها غير ذلك، حيث يعمل بعض العمال لمدة تزيد عن 16 ساعة، وذلك من أجل تحسين أوضاعهم المادية أحياناً، ويكون ذلك من متطلبات أو شروط العمل أحياناً أخرى. ويوضح الجدول (5) عدد ساعات العمل لعمال النظافة في المستشفيات، ويلاحظ من هذا الجدول أن معظم العمال الذين يعملون في المستشفى الحكومي يعملون لساعات طويلة، أكثر من 8

الجدول (5): توزيع عمال النظافة في المستشفيات حسب عدد ساعات العمل

نوع المستشفى	عدد ساعات العمل		
	8 ساعات أو اقل	10 - 14	15 ساعة أو أكثر
حكومي	2	12	10
أهلي	6	1	0
مركز تأهيل	7	0	0
خاص جراحي	1	1	0
تخصصي للولادة خاص	2	1	0
المجموع والنسبة المئوية	**18 (41.9)**	**15 (43.9)**	**10 (23.2)**

ساعات، حيث يعمل 12 عاملاً، من أصل 24 من العمال، في مستشفى رام الله لمدة تتراوح ما بين 10-14 ساعة في اليوم، ويعمل 10 منهم لمدة 15 ساعة أو أكثر في اليوم. ويعود السبب في ذلك، إلى أن العمال يعملون لدى شركة خاصة، يهمها كثيراً أن تحقق أرباحاً طائلة، وذلك على حساب العمال، حيث يحصلون على أجر أقل من نظرائهم الذين يعملون في المستشفيات الأخرى. ولتعويض الفارق في الأجر، والحصول على أجر أكبر فإنهم يزيدون من عدد ساعات العمل، وفي ذلك نوع من الضرر على صحة العمال، وكذلك درجة الإتقان في العمل، وخاصة أن احتمال إصابتهم بحوادث عمل هو أمر وارد، نتيجة لتعاملهم مع النفايات الطبية. أما بقية المستشفيات، فيلاحظ أن معظم عمال النظافة فيها يعملون لمدة 8 ساعات أو أقلَّ يومياً، وهذا يفسر الفارق في مستوى النظافة العامة ما بين المستشفى الحكومي وبقية المستشفيات، فالعامل الذي يعمل لفترات زمنية طويلة يصبح تركيزه في العمل أقل، ويزيد احتمال تعرضه لحوادث العمل، ويكون هناك تأثير سلبي على نظافة المستشفى.

مدى رضى عامل النظافة عن عمله

يوضح الجدول (6)، توزيع عمال النظافة في المستشفيات حسب مدى الرضى عن عملهم. ويلاحظ من هذا الجدول أن معظم العمال في جميع المستشفيات باستثناء المستشفى الحكومي، إما راضون جداً أو راضون رضىً عادياً عن عملهم، والقليل منهم راضٍ نوعا ما. أما جميع العمال غير الراضين رضى عادياً أو غير الراضين على الإطلاق عن عملهم في المستشفى ومجموعهم 10، فهم جميعاً من المستشفى الحكومي، علما بأن العدد الكلي لعمال النظافة في المستشفى الحكومي هو 24، أي أن حوالي 42٪ من عمال النظافة في المستشفى الحكومي إما غير راضين أو غير راضين على الإطلاق عن عملهم في المستشفى. وهناك العديد من العوامل التي تعكس مدى رضى عامل النظافة عن عمله في المستشفى، منها الدخل، والمهام المكلف بها، والمعاملة التي يتعامل معه بها مسؤوُله، ونظرة المجتمع إليه، ومدى تعاون الطاقم الطبي معه ومدى توافر الأدوات والمعدات اللازمة للقيام بالعمل. ومن المعلوم أن العاملين في أعمال ذات مستوى منخفض يعانون أكثر من غيرهم من ضغط نفسي ذي علاقة بالعمل [*16, 12*].

احتياجات عمال النظافة في المستشفيات

للوقوف على الأسباب التي قد تؤدي إلى عدم رضى عمال النظافة عن طبيعة عملهم، تم سؤالهم عن أهم الاحتياجات اللازم توافُرُها لهم حتى يستطيعوا القيام بها على أحسن وجه، وقد تنوعت هذه الاحتياجات، ويلخص الجدول (7) هذه المطالب والاحتياجات، علما بأن أحد العمال (2.3٪) لم يجب على هذا السؤال، ويلاحظ من الجدول (7) أن أكثر الاحتياجات التي تم التركيز عليها هي المعاملة الجيدة من قبل المسؤولين والطاقم الطبي، بالإضافة إلى تعاون الزوار والمرافقين، إذ إن كل هذه العوامل توفر الراحة النفسية للعمال، وتساعدهم على أداء عملهم بالوجه السليم.

الجدول (6): توزيع عمال النظافة في المستشفيات حسب مدى الرضى عن العمل

المستشفى	مدى الرضى عن العمل				
	راض جداً	راض رضى عادياً	راض نوعاً ما	غير راض	غير راض على الإطلاق
حكومي	3	8	5	5	5
أهلي	1	4	2	0	0
مركز تأهيل	2	5	0	0	0
خاص جراحي	0	1	1	0	0
تخصصي للولادة خاص	1	1	1	0	0
المجموع والنسبة المئوية	**7 (16.3)**	**19 (44.2)**	**9 (20.9)**	**5 (11.6)**	**5 (11.6)**

الجدول (7): توزيع عمال النظافة في المستشفيات حسب الاحتياجات التي يشعرون بضرورة توفيرها لهم للقيام بعملهم على أتم وجه*

الاحتياجات	التكرار		النسبة المئوية (٪)	
	ذكر	لم يذكر	ذكر	لم يذكر
السكن، الطعام، فترة استراحة، مكان خاص للعمال في المستشفى	4	38	9.3	88.4
اللباس، قفازات، أحذية واقية، مواد تنظيف، توفير حاويات، سلاّت، فصل المواد الحادة عن النفايات العادية، توفير حاويات خاصة بالنفايات الطبية، توفير أكياس مناسبة	22	20	51.2	46.5
التعامل الجيد من قبل المسؤول، احترام الطاقم الطبي للعمال، التعاون معهم أثناء العمل، تعاون الزوار والمرافقين والمرضى والشرطة، تنظيم عملية الزيارات، توفير الراحة النفسية للعمال	11	31	25.6	72.1
مطالب مادية مثل تحسين الرواتب، توفير التامين الصحي، توفير مواصلات، توفير الأمن الوظيفي مثل تعيين العمال على ملاك المستشفى وليس على ملاك شركة خاصة، إعطاء العامل فترة زمنية قبل فصله من العمل، أخذ الأجر في الوقت المحدد وعدم تأخيره، زيادة أجر ساعات العمل الليلية، عدم خصم ساعات عمل دون مبرر، العمل لفترات قصيرة، توفير يوم رسمي للراحة، التطعيم ضد الأمراض المعدية.	6	36	14.0	83.7

* أجاب 42 (97.7٪) على هذا السؤال، بينما لم يجب أحد العمال (2.3٪) عليه

بالإضافة إلى الاحتياجات الخاصة بعمال النظافة، يرى عمال النظافة أن هناك العديد من الاحتياجات الخاصة بالنفايات الطبية، وذلك لضمان التخلص منها بالشكل الأمثل، ويلخص الجدول (8) هذه الاحتياجات. ومن خلال استعراض هذه الاحتياجات، يلاحظ أن العديد من الاحتياجات الخاصة بالتعامل مع النفايات الطبية غير متوافرة، حيث تعكس تلك الاحتياجات جزءاً من واقع عملية التعامل مع النفايات الطبية والتخلص منها في المستشفيات.

الجدول (8): توزيع عمال النظافة في المستشفيات حسب الاحتياجات التي يجب توفيرها للمساعدة في التخلص من النفايات الطبية في المستشفى بالشكل الأمثل*

الاحتياجات	التكرار		النسبة المئوية (٪)	
	ذكر	لم يذكر	ذكر	لم يذكر
توفير الأدوات اللازمة لجمع النفايات الطبية مثل الأكياس السميكة، صندوق خاص للإبر، عربات خاصة لنقل النفايات، سلات خاصة مع وجود إشارات تحذيرية عليها، توفير مواد معقمة مثل الكلور، زيادة عدد العمال	22	19	51.2	44.2
توفير الملابس، والقفازات السميكة، والأحذية الخاصة، وتوفير أكثر من غيار ملابس، عدم ارتداء ملابس العمل من قبل أكثر من شخص	3	38	7.0	88.4
تعاون الطاقم الطبي في فصل النفايات، تعاون الزوار والمرضى والمرافقين	3	38	7.0	88.4
وجود عاملات إناث في الليل والنهار للدخول في قسم الولادة لأغراض التنظيف وجمع النفايات وعدم الطلب من العمال الرجال أو السماح لهم بدخول قسم الولادة	1	40	2.3	93.0
توفير مكان تخزين وحاويات خاصة بالنفايات الطبية داخل المستشفى وخارجه، وأن يكون مكان الحاوية الخارجية بعيدا عن المستشفى، ووضع إشارة عليه ووضع حماية له، ضرورة التخلص من النفايات الطبية من الغرف بالسرعة الممكنة، أن تبقى بعيدا عن الأطفال، تعقيم النفايات الطبية قبل أن يتم التعامل معها، فصل النفايات الطبية عن النفايات العادية، إغلاق منطقة الحاويات	19	22	44.2	51.2
توعية العمال وتدريبهم وإعطاء التعليمات اللازمة لهم وتعريفهم بطريقة الفصل الصحيحة	7	34	16.3	79.0

* أجاب 41 (95.3٪) على هذا السؤال، بينما لم يجب اثنان من العمال (4.7٪) عليه

الخلاصة والتوصيات

معظم عمال النظافة من هم جيل الشباب، ويوجد ميل لدى عمال النظافة في المستشفيات، وخاصة الحكومية منها، نحو عدم استمرار العامل في هذا العمل لفترة طويلة، وذلك بسبب عدم توافر ظروف عمل مناسبة تحافظ على سلامتهم المهنية، وقد لوحظ أن تعريف عمال النظافة للنفايات الطبية يكاد يكون محصوراً في الأدوات الحادة مثل الإبر، والشفرات، والمحاقن بالدرجة الأولى، والقطن، والشاش، والقفازات، والشراشف، والأقنعة، والأنابيب البلاستيكية، واللاصقات بالدرجة الثانية، وهذا يتعارض مع ما هو متعارف عليه عالمياً. ووجد أن هناك أنواعاً خطيرة من النفايات الطبية التي لم يذكرها إلا القليل من عمال النظافة، وهذا يدل على قلة وعيهم بالنفايات الطبية ومخاطرها.

ويتم اتِّباع بعض أسس السلامة العامة للعمال في المستشفيات الخاصة، حيث يتم إجراء الفحص الروتيني للعمال في المستشفى قبل التوظيف، وذلك للتأكد من خلوهم من الأمراض المعدية، وهذا غير موجود في المستشفيات الحكومية. أما بالنسبة لتطعيم عمال النظافة، فلا يوجد هناك سياسة متبعة في جميع المستشفيات الحكومية والخاصة. الكثير من عمال النظافة يتسمون بسوء الأداء، ولا يقومون باتباع أصول النظافة خاصة في المستشفيات الحكومية، ولا يوجد عندهم تعليمات خاصة بكيفية التعاطي مع النفايات الطبية، إذ إن السلامة المهنية شبه مفقودة عند معظمهم، وهم معرَّضون للخطر، ويتعرَّض الكثير منهم للوخز بالإبر، من جهة أخرى فإن بعض مسؤولي العمال لا يلقون بالاً للاطمئنان على العمال والسؤال عن أحوالهم، بل كلُّ ما يهمهم هو العمل، بغض النظر عن وضع العامل النفسي أو الصحي أو ما إلى ذلك. والكثير من الزوَّار لا يتعاونون مع عمال النظافة، أو أن هناك تعاوناً قليلاً من قبلهم، ويسببون بعض الإشكاليات لعمال النظافة والطاقم الطبي ولجميع العاملين في المستشفى. وهناك احتياجات ومطالب متنوعة لعمال النظافة في المستشفيات، وذلك من أجل تطوير عملية التعامل مع النفايات الطبية بالشكل السليم.

ومن أجل رفع مستوى السلامة المهنية لعمال النظافة في المستشفيات الفلسطينية، فإن هناك ضرورة ملحة لتعرفهم على طبيعة هذه المهنة، والإدارة السليمة للنفايات الطبية، مع ضرورة للعمل على تحقيق التوصيات التالية:

- تطوير الوعي لدى عمال النظافة لمفهوم المخلفات الطبية وخطورتها وهذا يعتبر أمراً ذا أولوية قصوى.
- توفير التدريب المناسب لعمال النظافة بما يتناسب مع طبيعة تعاملهم أو علاقتهم بالنفايات الطبية.
- وجود جهة أو جهات متخصصة في تدريب عمال النظافة وغيرهم ممن لهم صلة بهذا الموضوع، حتى يتم توحيد المفاهيم العامة لدى الجميع، وحتى نحافظ على صحة الجميع وسلامتهم.
- فحص عمال النظافة في مؤسسات الرعاية الصحية قبل التوظيف، وإعطائهم اللقاحات الضرورية، مع ضرورة توعيتهم بأهمية ذلك.
- توعية جميع العاملين في المؤسسات الصحية بأهمية عمال النظافة فيها، مع توجيه الجميع إلى أهمية معاملتهم بالحسنى، واحترامهم، حتى يشعروا بانتمائهم للمؤسسات التي يعملون فيها، ويقوموا بعملهم على الوجه الأفضل.
- العمل على توفير احتياجات عمال النظافة العاملين في المستشفيات ومطالبهم، من أجل تطوير إدارة النفايات الطبية بالشكل السليم.
- ضرورة قيام إدارة المستشفيات الحكومية بشكل خاص ووزارة الصحة بشكل عام، بالعمل على تنفيذ الشروط الخاصة بتعيين عمال النظافة لدى شركات النظافة الخاصة، ومحاولة تحسينها حتى نصل إلى مواصفات مناسبة لعامل النظافة في المستشفى تضمن استمراره واستقراره في العمل بكفاءة تتناسب مع طبيعة عمله.
- وجود سياسة واضحة في المستشفيات تمنع من استغلال العمال وتحافظ على سلامتهم المهنية.

- توفير البنية التحتية للتعامل مع النفايات الطبية، مما يسهل على عمال النظافة القيام بعملهم على أحسن وجه، دون تعرضهم لمخاطر التعامل مع النفايات الطبية.
- تحسين النظرة الاجتماعية إلى مهنة عمال النظافة، وتوفير ظروف عمل أكثر راحة، من أجل الارتفاع بمستوى رضاهم.

References

المراجع

1. Safe management of wastes from health-care activities. Geneva, World Health Organization, 1999.
2. Managing medical waste in developing countries. Geneva, World Health Organization, 1994.
3. FacilitiesNet. Managers in health care organizations search for opportunities and resources that can make facilities more environmentally friendly. Trade Press Publishing Corporation, 2005 (http://www.facilitiesnet.com/ms/article.asp?id=3228, accessed 17 July 2006).
4. Anderson GK. Incineration as a waste disposal option in EMRO. Amman, World Health Organization Regional Office for the Eastern Mediterranean, 1995.
5. Hall T. Health care waste management handbook. Gateshead, Environmental Technology Consultants Limited, 1994.
6. Monreal J. Considerations on the management of hospital wastes in Latin America. Washington DC, Pan American Health Organization, 1991.
7. Medical waste management in the United States. First Interim Report to Congress. Washington DC, United States Environmental Protection Agency, Office of Solid Waste, 1990 (EPA/530-SW-90-051a).
8. Management of waste from hospitals. Copenhagen, World Health Organization Regional Office for Europe, 1985.
9. Freeman HM, ed. Standard handbook of hazardous waste treatment and disposal. New York, McGraw–Hill, 1989.
10. Baker KH, Herson DS, eds. Bioremediation. New York, McGraw–Hill, 1994.
11. Hasan SE, ed. Geology and hazardous waste management. Upper Saddle River, New Jersey, Prentice Hall, 1998.
12. Cropley M, Steptoe A, Joekes K. Job strain and psychiatric morbidity. Psychological medicine, 1999, 29:1411–6.
13. Mausner-Dorsch H, Eaton WW. Psychosocial work environment and depression: epidemiologic assessment of the Demand–Control model. American journal of public health, 2000, 90:1765–70.
14. Kuper H, Marmot M. Job strain, job demands, decision latitude, and risk of coronary heart disease within the Whitehall II study. Journal of epidemiology and community health, 2003, 57:147–53.
15. Parslow RA et al. The impact of employee level and work stress on mental health and GP service use: an analysis of a sample of Australian government employees. BMC public health, 2004, 4(1):41.
16. Michie S, Wren B, Williams S. Reducing absenteeism in hospital cleaning staff: pilot of a theory based intervention. Occupational and environmental medicine, 2004, 61:345–49.
17. Anderson GK. Clinical waste disposal. Amman, World Health Organization Regional Office for the Eastern Mediterranean, 1992.
18. NHS Estates, Health Guidance Note. Safe disposal of clinical waste whole hospital policy guidance. London, Her Majesty's Stationery Office, 1995.

.19

.2001

20. Ferrie JE et al. Effects of chronic job security and change in job security on self-reported health, minor psychiatric morbidity, physiologic measures, and health related behaviours in British civil servants: the Whitehall II Study. Journal of epidemiology and community health, 2002, 56:450–4.

21. Australian Public Service Commission. Management Advisory Committee. Organisational renewal. Canberra, Commonwealth of Australia, 2003.

22. D'Souza R et al. Work and health in contemporary society: Demands, control and insecurity. Journal of epidemiology and community health, 2003, 57:849–54.

أكاديمية الصحة

http://www.who.int/healthacademy/ar/index.html

تعتبر أكاديمية الصحة، التي أُنشئت من قِبَل منظمة الصحة العالمية في شهر كانون الأول/ديسمبر 2003، مبادرة جديدة لتحسين الصحة عن طريق التكنولوجيا. حيث توفّر الأكاديمية العلوم الصحية للعامَّة من خلال التعلُّم الإلكتروني مما يساعد الأفراد على اتخاذ الطرق الصحيحة للوقاية من الأمراض واتِّباع حياة صحية أفضل.

وتشكِّل المصادر المعلوماتية الغنية التي تستند إليها منظمة الصحة العالمية وخبرتها الواسعة في مجال الصحة، بالإضافة إلى قدرتها للوصول إلى المعلومات الصحية في جميع الدول، المصدر الرئيسي للمحتوى الصحي الرسمي للأكاديمية الصحية.

إن تقنية التعلُّم الإلكتروني المستخدَمة من طرف أكاديمية الصحة لا تقتصر فقط على عملية التعلُّم عن بُعْد، بل إنها تؤهل المتعلِّم أن يؤسِّس معرفته من المبادئ الأساسية التي تُدرَّس ومن ثَـمَّ الاستمرار في البناء على هذه المعرفة. كما تساعد هذه التقنية على تنمية الحس النقدي وتزيد من القدرة على التركيز.

Knowledge and practices of health care workers and medical students towards universal precautions in hospitals in Mazandaran Province

N. Motamed,[1] F. BabaMahmoodi,[2] A. Khalilian,[3] M. Peykanheirati[4] and M. Nozari[4]

المعارف والممارسات لدى العاملين على إيتاء الرعاية الصحية وطلاب الطب حول الاحتياطات الشاملة في المستشفيات في ولاية مازانداران

نيلوفر معتمد، فرهنك بابا محمودي، عليرضا خليليان، معصومة بيكان حيرتي، مريم نوذري

الخلاصة: تستقصي هذه الدراسة المعارف والممارسات حول الاحتياطات الشاملة لدى 540 من العاملين في إيتاء الرعاية الصحية وطلاب الطب في مستشفيين جامعيين في ولاية مازانداران في جمهورية إيران الإسلامية. وقد اقتصرت النسبة المئوية لمن سمع عن الاحتياطات الشاملة على 65.8٪ من العاملين في أحد المستشفيين و90٪ من العاملين في المستشفى الآخر و53٪ من الطلاب. وبشكل إجمالي كان هناك فهم متواضع للاحتياطات، باستثناء ما يخص التخلُّص من الأدوات الحادة والتماس مع السوائل المهبلية، واستخدام القناع والمئزر وتنظيف رَشَاش الدم. ويعاني العاملون الصحيون من صعوبة في التمييز بين سوائل البدن العميقة وبين إفرازات البدن التي لا تعتبر مصدراً للعدوى. وقد سُجِّلَتْ كذلك الممارسات الجيدة المتمثِّلة بغسل اليدين والتخلص من الإبر واستخدام القفازات والأقنعة والمآزر.

ABSTRACT This study investigated knowledge of and practices towards universal precautions among 540 health care workers and medical students in 2 university hospitals in Mazandaran Province, Islamic Republic of Iran. Only 65.8% and 90.0% staff in the 2 hospitals and 53.5% of medical students had heard about universal precautions. Overall, there was a low understanding of precautions, except concerning disposal of sharps, contact with vaginal fluid, use of mask and gown or cleaning spilled blood. Health workers had difficulty distinguishing between deep body fluids and body secretions that are not considered infectious. Good practices were reported regarding hand-washing, disposal of needles, and glove, mask and gown usage.

Connaissances et pratiques des agents de soins de santé et des étudiants en médecine concernant les précautions universelles dans des hôpitaux de la Province de Mazandaran

RÉSUMÉ La présente étude a examiné les connaissances et les pratiques concernant les précautions universelles chez 540 agents de soins de santé et étudiants en médecine dans deux hôpitaux universitaires de la Province de Mazandaran (République islamique d'Iran). Seulement 65,8 % et 90,0 % du personnel des deux hôpitaux et 53,5 % des étudiants en médecine avaient entendu parler des précautions universelles. De manière générale, il y avait une faible compréhension des précautions, sauf pour ce qui concerne l'élimination des objets piquants et tranchants, le contact avec les sécrétions vaginales, le port du masque et de la blouse ou le nettoyage des souillures de sang. Les agents de santé avaient du mal à faire la distinction entre les liquides internes de l'organisme et les secrétions corporelles qui ne sont pas considérées comme infectieuses. Des bonnes pratiques étaient signalées en ce qui concerne le lavage des mains, l'élimination des aiguilles et l'utilisation des gants, du masque et de la blouse.

[1]Department of Community Medicine, Bushehr Medical School, Bushehr University of Medical Sciences, Bushehr, Islamic Republic of Iran (Correspondence to N. Motamed: nilo1351@yahoo.com).
[2]Department of Infectious Diseases; [3]Department of Community Medicine; Sari Medical School, Sari, Islamic Republic of Iran.
[4]Mazandaran University of Medical Sciences, Sari, Islamic Republic of Iran.
Received: 14/06/04; accepted: 12/09/04

Introduction

Since medical history and examination cannot reliably identify all patients infected with human immunodeficiency virus (HIV) and other bloodborne pathogens, the United States Centers for Disease Control (CDC) has proposed a series of procedures that health care workers' (HCWs) should use with all patients [*1*]. "Universal precautions" are designed to prevent health care staff being exposed to blood and body fluids by applying the basic principle of infection control through hand-washing, utilization of appropriate protective barriers, such as gloves, mask, gown and eyewear, and safe handling of needles.

Universal precautions practices are important, as any health care organization has a responsibility to protect its staff from potential danger and itself from loss of manpower if staff suffer occupational injuries or illnesses [*2*]. Patients too may be harmed if staff are uniformed about safe handling of blood or body fluids or they may be deprived of appropriate care due to inappropriate fears or misunderstandings [*3,4*].

HCWs working in hospitals frequently provide care to patients whose hepatitis B virus (HBV) or HIV status is unknown. The Islamic Republic of Iran is a medium endemic area for hepatitis B infection, with about 3.1% of the population being carriers of HBV and 30%–50% of the population having evidence of previous infection with the virus [*5*]. The risk of HBV infection after a known occupational exposure is about 25%. Furthermore, there is a 0.3%–0.5% occupational risk of infection with HIV after percutaneous exposure to HIV-contaminated blood [*6*], although the cumulative career risk may be as high as 1%–2% among emergency service staff or surgeons [*7*]. Occupational exposure to HIV is common in the developing world. A survey assessing exposure to HIV among HCWs in South Africa showed that 13% of the staff reported accidental exposure when caring for HIV-positive patients [*8*].

Data from a study in Sweden [*9*] showed that the majority of reported cases of occupational blood exposure were among nurses and a minority were among physicians. Other data [*10*] showed that nurses are the staff most frequently involved in occupationally acquired HIV infection. A study assessing the frequency of body fluid exposure among midwives showed that 65.1% of them had experienced exposure to amniotic fluids or blood at least once in the past 6 months and 25% reported 5 or more such exposures [*11*]. Lymer et al. showed that of 1180 incidents, only 9% had been reported [*9*].

Surveys have shown that the use of universal precautions significantly decreases the number of incidents of occupation exposure to blood [*12,13*]. Nevertheless, the level of compliance with universal precautions is generally low [*14-16*]. The weakest aspects reported are not practising hand decontamination, [*17*], not using barrier protection and recapping needles [*18,19*].

The objectives of the present study were to measure knowledge about universal precautions among HCWs and medical students, to investigate their practice towards universal precautions and to look for any relationship between knowledge and practice. Such information would be useful in identifying specific areas that may need further attention in the continuing education of nursing and medical students and in providing feedback to these groups about improving safe practices.

Methods

This was a cross-sectional survey. The sample was all medical staff (ancillary staff,

nurses, operating room staff and laboratory technicians) and medical students at the 2 university hospitals in Sari, Mazandaran Province, Islamic Republic of Iran (hospital A and hospital B).

Scale

A self-administered questionnaire was constructed, consisting of 3 parts. Part I collected demographic data, including age, sex, years of experience in job, level of education and type of occupation (laboratory, operating room, nursing, health service, medical student). Part II asked respondents if they had heard about "universal precautions", and then measured knowledge of universal precautions, with 10 statements (scored "true" or "false"; maximum score 10). Part III investigated their practice towards universal precautions in 8 questions about use of protective devices, disposal of sharps, and decontamination of spills and used articles (scored "agree" or "disagree"; maximum score 8). The statements measuring knowledge of and practice towards universal precautions were based on the universal precautions guidelines recommended by the CDC in 1996 (12 items) [*1*] and a questionnaire devised by Chan et al. in Hong Kong [*2*].

The content validity of the questionnaire was assessed using the ideas of experts from the infection control committee of the 2 hospitals. A pilot study with 20 subjects was used to test the feasibility and internal consistency of the questionnaire. The reliability coefficient for the questionnaire (using Cronbach's α coefficient) was 0.71.

Data analysis

Frequencies, means and standard deviations were used to summarize the data. Knowledge was scored with 1 for a correct answer and 0 for a wrong answer, then the total score was calculated. The relationship between the knowledge scores and practice rates toward universal precautions was calculated using the Pearson correlation coefficient. The Kruskal–Wallis 1-way analysis of variance or Mann–Whitney U tests were used to examine knowledge and practice in relation to demographic data, depending on the data level of measurement.

Ethical considerations

The research proposal was sent to the 2 hospital managers for approval in order to gain access to the staff. Distributors provided information about the study to the participants and the anonymity and confidentiality of the responses, voluntary participation and the right to refuse participation were emphasized.

Results

Demographic data

Of the 650 questionnaires distributed, 540 (83.1%) were completed and returned (283 from staff at hospital A, 173 from staff at hospital B, and 84 from medical students). Only 65.8% of hospital A staff had heard about universal precautions compared with 90.0% of hospital B staff. Among the staff respondents, 40.6% had 0–5 years of experience in their job, 10.3% had 6–10 years, 15.1% had 11–15 years and 34.0% had more than 15 years of experience (Table 1). The majority (64.3%) had a bachelor degree in nursing. The demographic profile of medical students was similar except that 67.7% were female and 33.3% male.

Staff knowledge of universal precautions

The mean knowledge score of hospital A staff was 7.34, of hospital B staff was 8.63 and of medical students was 7.81. Most of the staff in both hospitals answered cor-

Table 1 Demographic data of the sample of hospital health care workers in Mazandaran Province (excludes medical students)

Variables	No.	% (n = 456)
Age (years)		
20–29	177	38.8
30–39	152	33.3
40–49	109	23.9
50+	18	3.9
Sex		
Male	159	34.9
Female	297	65.1
Years of experience		
0–5	185	40.6
6–10	47	10.3
11–15	69	15.1
> 15	155	34.0
Level of education		
Below diploma	34	7.5
Diploma	57	12.5
University diploma	72	15.8
Bachelor degree or above	293	64.3
Occupation		
Ancillary staff	70	15.4
Laboratory worker	46	10.1
Operating room	59	12.9
Midwife	18	3.9
Nurse specialist or officer	263	57.7

n = total number of respondents.

rectly the items related to disposal of sharps (94.9% and 99.3% correct respectively), clearing up blood spills (70.8% and 93.9%), use of mask and gown (96.3% and 99.3%), application of universal precautions with all patients irrespective of their underlying illness (92.6% and 94.3%), and application of universal precautions when in contact with vaginal fluids (97.5% and 95.6%) and not with saliva (79.0% and 76.8%) (Tables 2 and 3).

Nevertheless, many of them had the misconception that the universal precautions should be applied when in contact with sweat (80.8% and 39.6% respectively) (Table 2). In addition, many of the hospital A staff had the misconception that washing with ordinary detergents is insufficient for decontamination of devices that are only in contact with skin (51.6%).

Practice of universal precautions

Concerning the use of protective devices, almost all respondents agreed on the practice of wearing gloves, gown and eye wear when they were exposed to deep body fluids or blood products (Table 3). Concerning the use of gloves when exposed to sweat, practices were poor, as only 19.2% of hospital A staff, 60.3% of hospital B and 33.9% of medical students answered this question correctly. For the care of patients by a health care worker with non-intact skin, only 16.1%, 50.4% and 25.2% of hospital A and B and medical students answered correctly. Also the respondents' practices toward disposal of sharps into a sharp box was good (94.8%, 99.3%, 100% respectively).

Regarding wearing gloves as the first step in cleaning surfaces, the practices of hospital B staff was slightly better than the 2 other groups. Also only 74.5% of medical students agreed that washing with soap and water for 5 minutes is the first step after contact with infective materials.

Relationships between knowledge and practices

A significant relationship between the respondents' knowledge of and practices toward universal precautions was shown in hospital B ($r = 0.58$, $P < 0.001$). Also knowledge and practices of hospital B staff was better than in hospital A.

In Hospital A, using the Kruskall–Wallis analysis of variance, it was found that knowledge was highest in the 30–40 years old age group and lowest in the > 50

Table 2 Knowledge of universal precautions (UP) among health care workers (HCWs) and medical students in Mazandaran Province

Item	% answering correctly		
	HCWs hospital A (n = 283)	HCWs hospital B (n = 173)	Students (n = 84)
Have you ever heard of UP?[a]	65.8	90.0	53.5
UP are applied to patients with HIV and HBV only (F)	87.9	86.3	96.3
UP should be applied to all persons regardless of their infection status (T)	92.6	94.3	90.9
Isolation is necessary for patients with blood-borne infections (F)	53.7	77.4	81.8
Used needles can be recapped after giving an injection (F)	89.9	90.7	58.1
For decontamination of devices such as manometer (with only contact with skin) washing with usual detergent is enough (T)	48.4	85.6	87.2
Subcutaneous injuries during intravenous injections are the most common cause of occupational infections (T)	78.4	92.8	72.7
Universal precautions are not necessary in situations that might lead to contact with saliva (T)	79.0	76.8	81.8
There is effective anti-HCV vaccine (F)	77.9	88.5	100.0
HCWs with non-intact skin should not be involved in direct patient care until the condition resolves (T)	55.8	77.4	32.7
Blood spills should be cleaned up promptly with sodium hypochlorite (T)	70.8	93.9	80.0

[a]% who heard of UP.
n = total number of respondents.
T = true, F = false (researchers' views).
HCV = hepatitis C virus; HIV = human immunodeficiency virus.

years group. Also the group with a university diploma had the highest knowledge of universal precautions, followed by the group with a bachelor degree. There was no significant relationship between knowledge and practice score and years of experience. The analysis also revealed that laboratory workers had the highest knowledge, followed by midwives, nurses and operating room staff.

In Hospital B, a significant relationship was shown between knowledge and practice and occupation, as nurses obtained the highest score. The group with the fewest years of experience (0–5 years) had the highest knowledge score and the group with a bachelor degree or more had the highest knowledge of and practice toward universal precautions. The 20–30 year old age group had the highest knowledge and practice score. There was a significant relationship between age and knowledge of and practice toward universal precautions, as the 20–30 year old age group had the highest and the > 50 year group the lowest.

Using the Mann–Whitney U test, it was found that women had a significant higher level of knowledge of and practice toward

Table 3 Practice of universal precautions among health care workers (HCWs) and medical students in Mazandaran Province

Item	% answering correctly		
	HCWs hospital A (n = 283)	HCWs hospital B (n = 173)	Students (n = 84)
I assume that blood and all body fluids of patients are infectious (T)	98.7	98.6	100.0
I wear mask, gown and eye wear if procedures and patient care activities are likely to cause splashing of blood and deep body fluids (T)	96.3	99.3	100.0
I dispose of used needles into a sharp box after injection (T)	94.9	99.3	100.0
I wear gloves as the first step in cleaning surfaces contaminated with blood or other bloody body fluids (T)	90.6	95.2	89.0
Washing with soap and water for 5 minutes is my first step after contact with infective material (T)	89.9	89.2	74.5
I apply universal precautions in situations that might lead to contact with sweat (F)	19.2	60.3	33.9
If I have a wound, I wear gloves before caring for patients (T)	16.1	50.4	25.2
I apply universal precautions in situations that might lead to contact with vaginal discharge (T)	97.5	95.6	98.1

n = total number of respondents.
T = true, F = false (researchers' views).

universal precautions than men (z = 2.86, $P = 0.006$; z = 3.78, $P < 0.0001$ in hospital A and B respectively).

Discussion

The study showed an overall low understanding of universal precautions among health staff and medical students, except concerning disposal of sharps, contact with vaginal fluid, use of mask and gown or clearing up spilled blood. Universal precautions were not only insufficiently but also selectively understood. Chan et al. likewise showed that nurses' knowledge of universal precautions was inadequate [*2*], despite the fact that the majority of occupational blood exposures involved nurses [*9*]. Furthermore, the knowledge score in our study was less than optimal, especially in hospital A, where only 65.8% of staff had even heard about universal precautions. This may be related to the lack of regular post-employment education on issues of universal precautions, especially in that hospital.

Although the efficacy of universal precautions is controversial [*20*], they remain a valuable way to minimize or prevent accidental exposure of staff to pathogens. It is necessary to reinforce and clarify the concept of universal precautions and infection control guidelines among hospital staff, especially the staff of the operating room. Universal precautions are usually incorporated in the current student training curriculum of HCWs; however, there is a lack of regular integration of universal precautions guidelines as part of on-the-job

training in our hospitals. Although infection control committees in both hospitals have programmes of regular training and examination, it seems that this curriculum has not been implemented effectively. In general, hospital B staff performed better than hospital A staff, presumably because the current activity of the hospital B infection control committee is more regular and comprehensive. Ryan et al. [*21*] also recommend that there should be a systematic evaluation of nursing students' knowledge pertaining to universal precautions. A more comprehensive ongoing educational programme on universal precautions should be organized and this should be considered as a mandatory refresher course for all HCWs in the hospitals. As suggested by Van Wissen [*22*], one way to achieve this is to select target groups on the basis of prior knowledge. The content of the programme should be tailor-made according to the recommendations of the target group, and there could be a sympathetic forum in which more personal issues can be confidentially discussed. Support sessions should be provided for nurses in which feelings and fears can be openly discussed [*23*]. Although we did not test their actual practices in universal precautions, most respondents in all the groups agreed that universal precautions should be used for all patients irrespective of their bloodborne infection status. However, Young et al. showed that nurses did not always use adequate protection if they thought a patient was HIV negative or if they did not know the patient's HIV status [*24*].

Meunier et al. showed that 30% of third and forth year students who already have experience in clinical practice described blood exposure accidents during their hospital training and only 45% of these accidents were reported [*25*]. In our study, medical students were less knowledgeable than staff in some aspects: only 53.5% had heard about universal precautions and only 58.1% knew that used needles cannot be recapped. It seems that medical students have no systematic programme of education about universal precautions during clinical practice.

Occupational safety and health regulations require both employers and employees to reduce or eliminate occupational risks. Protective barrier use is a major element of universal precautions. To encourage their use, protective barriers must be readily available, easy to use, effective and comfortable. Therefore, staff managers and infection committee members should take a leadership role to ensure safe practices and resolve related practical issues. Also the education of medical students during the years of clinical practice is very important. Post-educational surveys or observational studies about universal precautions as practiced in clinical settings need further attention. Further studies should include physicians as well as support staff in order to gain a more comprehensive picture of the practice of universal precautions in hospitals.

References

1. Centers for Diseases Control and Prevention. Recommendations for prevention HIV transmission in health-care settings. Morbidity and mortality weekly report supplements, 1987, 36(SU02).

2. Chan R et al. Nurses' knowledge of and compliance with universal precautions in an acute care hospital. International journal of nursing studies, 2002, 39:157–63.

3. Van Servellen GM, Lewis CE, Leake B. Nurses' responses to the AIDS crisis: implications for continuing education programs. Journal of continuing education in nursing, 1988, 19:4–8.

4. Walsh G. AIDS: fear of contagion among nurses. British journal of nursing, 1992, 1(2):66–71.

5. National protocol of prevention of HBV. Tehran, Iranian Ministry of Health, 2000.

6. Chin JE. Control of communicable disease manual, 17th ed. Washington, American Public Health Association, 2000:1–9.

7. Wears RL et al. An analysis of emergency physicians cumulative career risk of HIV infection. Annals of emergency medicine, 1991, 20:749–53.

8. Gounden YP, Moodley J. Exposures to human immunodeficiency virus among healthcare workers in South Africa. International journal of gynecology and obstetrics, 2000, 69(3):265–70.

9. Lymer UB, Schutz AA, Isaksson B. A descriptive study of blood exposure incidents among healthcare workers in a university hospital in Sweden. Journal of hospital infection, 1997, 35:223–5.

10. Centers for Diseases Control and Prevention. HIV/AIDS surveillance report, 1993, 5(3):13.

11. Turner JG. AIDS-related knowledge, attitudes, and risk for HIV infection among nurses. Annual review of nursing research, 1993, 11:205–24.

12. Beeckmann SE et al. Temporal association between implementation of universal precautions and a sustained, progressive decrease in percutaneous exposures to blood. Clinical infectious diseases, 1994, 18:562–9.

13. Wong ES et al. Are universal precautions effective in reducing the number of occupational exposures among healthcare workers? A prospective study of physicians on a medical service. Journal of the American Medical Association, 1991, 265:1123–8.

14. Gershon RR et al. Compliance with universal precautions among healthcare workers at three regional hospitals. American journal of infection control, 1995, 23:225–36.

15. Nelsing S, Nielsen TL, Nielsen JO. Noncompliance with universal precautions and the associated risk of mucocutaneous blood exposure among Danish physicians. Infection control and hospital epidemiology, 1997, 18:692–8.

16. Gershon RR, Karkashian C, Felknor S. Universal precautions: an update. Heart and lung, 1994, 23:352–8.

17. Gould D, Wilson-Barnett J, Ream E. Nurses' infection-control practice: hand decontamination, the use of gloves and sharp instruments. International journal of nursing studies, 1996, 33(2):143–60.

18. Hersey JC, Martin LS. Use of infection control guidelines by workers in healthcare facilities to prevent occupational transmission of HBV and HIV: results of a national survey. Infection control and hospital epidemiology, 1994, 15:243–52.

19. Marcus R. The Centers for Disease Control cooperative needle stick surveillance group. Surveillance of healthcare workers exposed to blood from patients infected with HIV. New England journal of medicine, 1988, 319:1118–23.

20. Gerberding JL, Lewis FR, Schecter WP. Are universal precautions realistic? Surgical clinics of North America, 1995, 75:1091–104.

21. Ryan ME et al. Integrating HIV/AIDS policies and curricular content into baccalaureate nursing programs. Journal of nursing education, 1991, 30(8):347–51.

22. Van Wissen KA, Siebers RWL. Nurses' attitudes and concerns pertaining to HIV and AIDS. Journal of advanced nursing, 1993, 18:912–7.

23. Steele A, Melby V. Nurses' knowledge and beliefs about AIDS: comparing nurses in hospital, community and hospice

settings. Journal of advanced nursing, 1995, 22:879–87.

24. Young EW, Forti EM, Preston DB. Rural nurses' use of universal precautions in relation to perceived knowledge of patient's HIV status. International journal of nursing studies, 1996, 33(3):249–58.

25. Meunier O et al. Accidents d'exposition au sang chez les étudiants en médecine. [Blood exposure accident among medical students.] Médecine et maladies infectieuses, 2001, 31(9):537–43.

Community-based initiatives

Investing in health, particularly the health of the poor, is central to the achievement of the Millennium Development Goals. In support of this strategy, WHO Regional Office for the Eastern Mediterranean is actively promoting in the countries of the Region community-based initiatives (CBI) such as Basic Development Needs, Healthy Cities, Healthy Villages and Women in Health and Development. These approaches are based on the principle that good health status is central to creating and sustaining the capabilities of poor people to meet their basic needs and to escape from poverty.

Currently, all the countries in the Region have implemented at least one of the CBI initiatives. Under varying sociopolitical conditions, these initiatives have proved their effectiveness and sustainability through flexible and locally-sensitive mechanisms. The CBI approach has resulted in improved nutritional status, lowered mortality during epidemics, effective malaria and tuberculosis control measures, increased use of safe drinking water, higher school enrolment and promotional activities leading to healthy lifestyles in the communities where projects have been implemented. Further information can be found on the CBI homepage at http://www.emro.who.int/cbi/index.htm.

Job burnout in psychiatric and medical nurses in Isfahan, Islamic Republic of Iran

A.R. Yousefy[1] and Gh.R. Ghassemi[2]

الإحباط المهني لدى ممرضات الرعاية النفسية وممرضات الرعاية الطبية في أصفهان، جمهورية إيران الإسلامية

علي رضا يوسفي، غلام رضا قاسمي

الخلاصة: وفقاً للقائمة التفقُّدية التي وضعها ماسلاك للإحباط المهني، قمنا بدراسة الإحباط المهني بين مجموعة منتقاة عشوائياً من الممرضات العاملات في وحدات الرعاية النفسية (55 ممرضة) ووحدات الرعاية الطبية (51 ممرضة) في اثنين من المستشفيات الجامعية في أصفهان خلال عام 2003. وقد تبيَّن أن ممرضات الرعاية النفسية قد تعرَّضْنَ لدرجة أكبر من الإجهاد الانفعالي مُقارنةً بممرضات الرعاية الطبية ($P < 0.05$). وقد لاحظ الباحثان ترابطاً إيجابياً يُعْتَدّ به إحصائياً بين العمر، وسنوات الخبرة، وتكرار الاستدعاء، ومعدل الإجهاد الانفعالي لدى ممرضات الرعاية النفسية. فتكرار الاستدعاء يصاحبه شعور بعدم الإنجاز، كما أن فترات الخدمة الطويلة ترتبط بدرجة أعلى من التباعد الشخصي الانفعالي من قِبَل ممرضات الرعاية الطبية.

ABSTRACT By means of the Maslach Burnout Inventory, we examined job burnout among randomly selected nurses working on psychiatric (55 nurses) and medical units (51 nurses) at 2 university hospitals in Isfahan during 2003. Psychiatric nurses experienced a greater degree of emotional exhaustion than the medical nurses ($P < 0.05$). Significant positive correlation was noted between age, years of experience and frequency of on-calls and emotional exhaustion for the psychiatric nurses. Frequency of on-calls was also significantly associated with a sense of non-accomplishment. Longer duration of service was accompanied by higher degree of emotional depersonalization for the medical nurses.

L'épuisement professionnel chez les infirmières psychiatriques et médicales à Ispahan (République islamique d'Iran)

RÉSUMÉ Au moyen de l'inventaire d'épuisement professionnel de Maslach, nous avons examiné l'épuisement professionnel chez des infirmières choisies au hasard dans les services psychiatriques (55 infirmières) et les services médicaux (51 infirmières) de deux hôpitaux universitaires à Ispahan en 2003. Les infirmières psychiatriques connaissaient un degré plus important d'épuisement psychologique que les infirmières médicales ($p < 0,05$). Une corrélation positive significative a été constatée entre l'âge, les années d'expérience, la fréquence des astreintes et l'épuisement émotionnel des infirmières psychiatriques. La fréquence des astreintes était également associée de manière significative à un sentiment de non-accomplissement. Une plus longue durée du service s'accompagnait d'un degré plus élevé de dépersonnalisation pour les infirmières médicales.

[1]Medical Education Research Centre, Isfahan University of Medical Sciences, Isfahan, Islamic Republic of Iran.

[2]Department of Psychiatry, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Islamic Republic of Iran (Correspondence to Gh.R. Ghassemi: ghassemi@med.mui.ac.ir).

Received: 29/04/03; accepted: 26/01/05

Introduction

As a prototype of stress, job burnout is being increasingly recognized as one of the most serious occupational health hazards, resulting in job dissatisfaction, lowered productivity, absenteeism, high turnover, and a state of disequilibrium [*1*]. Work-related factors such as work pressure without support, ever-changing expectations, new job requirements, role conflict, and role ambiguity comprise some of the stressors which can cause job burnout syndrome [*2*]. Personality traits such as idealism and a need for self-affirmation and work orientation can increase the risk of job burnout [*3*]. Maslach views job burnout as a response to chronic interpersonal and emotional stressors on the job, resulting in negative feelings such as incompetence, lack of achievement and productivity at work [*4*]. Emotional exhaustion ranging from mild boredom to severe depression, depersonalization and treating people in an unfeeling way and poor sense of personal accomplishment are viewed as the key elements of job burnout [*5*]. As a result of burnout people develop negative self-concept and become detached, apathetic, angry or hostile in their work place [*5*]. Job burnout has cumulative effects on mental health, quality of life, family life and last but not least on productivity [*5*].

Burnout is a major problem in the helping professions such as nursing, medicine, social work, law enforcement and education [*6*]. Nursing staff face working places with blood and urine, disturbed sleeping pattern, frequent emergency situations, inappropriate expectations from patients and their relatives, insufficient nursing staff and lack of authority in decision-making, all of which can cause job burnout for nurses [*7–9*]. Bearing in mind the nature of the nursing profession, attempts have been made over the past 2 decades to investigate the magnitude and implications of job burnout among nurses working in various departments [*8–19*]. Some of the factors that have been reported to be associated with job burnout are: individual characteristics, threats to job control, hardness of training, workload, interpersonal relationships with colleagues, knowledge of nursing, bureaucratic-political constraints, level of education, night shifts, being hospital-based, working on medical and surgical wards and negative work–home interference. Stress management had a pivotal role in controlling job-induced stress and burnout [*20*].

Attempts have also been made to study the phenomenon of burnout among nurses working in mental health fields, yielding interesting findings. In studying 296 nurses working with medical units, critical units, operation rooms, and psychiatric units in different hospitals, Cronin-Stubbs and Rooks observed significant differences in the frequency and intensity of occupational stress and burnout among the subjects [*21*]. Critical and medical nurses in this study encountered occupational stressors more frequently and intensely than psychiatric and operation room nurses. Stress in psychiatric nurses is further attributed to administrative and organizational factors. Fagin and coworkers (1996) attributed burnout among psychiatric nurses to staff shortages, health service changes, poor morale and not being notified of changes before they occurred [*22*]. As regards sex, female nurses were characterized by fewer symptoms of burnout, relatively high emotional intelligence profiles, and lower social skills than male nurses [*23*].

Most of these studies were conducted in Europe and the United States and have focused primarily on nurses in general. There is a dearth of literature about working conditions and job burnout among psychiatric nurses in the Iranian context. With special

reference to psychiatric nurses, most studies suggest that they deal with atypical patients and receive less recognition by the administrative authorities and community in general [*23*]. It is argued that psychiatric nurses face unique job challenges compared to their counterparts who work in non-psychiatric wards. Given the lack of information, the present study was an attempt to gauge and compare burnout experience between hospital nurses working in psychiatric and non-psychiatric units in Isfahan, Islamic Republic of Iran.

Methods

This study was based on a sample drawn from the nursing staff working with 2 major university hospitals in Isfahan during May–December 2003 (Khorshid Medical Centre and Al Zahra Medical Centre). The former is a general hospital with a psychiatric ward and the latter is a postgraduate hospital with critical care unit and intensive care unit where the medical nurses were working.

Adopting a random sampling method, nurses working in psychiatric and general wards with more than 1 year of work experience were approached. While assuring them about the confidentiality, their participation in the study was made voluntary. Thus, 55 nurses working in psychiatric units and 51 nurses working in general wards were recruited and completed the questionnaire satisfactorily. The participants were matched for age, sex, education, marital status and years of experience. Data were collected by means of the Maslach Burnout Inventory (MBI) which was originally designed by Maslach and Jackson in 1981 [*24*]. Personal data (such as age, years of experience, education) were collected in a separate interview with close- and open-ended questions.

The MBI, which is originally in English, was translated into Farsi by a group of 5 professors from nursing and medicine fields. In order to test language validity, the Farsi version obtained was translated back to English by another group of 5 professors. Then the Farsi version was reviewed and revised. The final Farsi version was pilot tested on a sample group of nursing lecturers. It was concluded that the Farsi version obtained was highly valid for use. There were 22 items for which the minimum score was 0 and the maximum possible score was 96. A score of at least 48 was considered a case of burnout. Higher score indicated higher chances of burnout. The nurses completed questionnaire by themselves and anonymously.

The MBI has 3 sub-scales: Emotional Exhaustion (EE), Depersonalization (DP), and Personal Accomplishment (PA). EE consists of 9 items measuring the perception of being used up, frustrated, tired or stressed. DP consists of 5 items which pertain to perceptions of treating others impersonally, becoming callous and/or hardened emotionally. PA consists of 8 items which measure perceptions of having an influence on others, working well with others and dealing well with patients and their problems. High EE and DP, and low PA are considered to indicate burnout [*25*]. Each item consisted of a 5-point rating scale (0 = never; 1 = a few times a year; 2 = a few times a month; 3 = a few times a week; 4 = every day).

Attempts have been made to establish a relationship between certain ascribed and achieved characteristics of an individual in an organization and job burnout. To this end we attempted to establish the correlation between certain work and the demographic characteristics of the participants with the parameters of burnout.

Cronbach alpha reliabilities for the 3 sub-scales ranged from 0.72 to 0.89 and

test–retest reliabilities ranged from 0.61 to 0.82. Data were analysed using *SPSS*, version 10 and the Student *t*-test, Pearson correlation coefficient (*r*) and analysis of variance were computed.

Results

The sample comprised 55 psychiatric nurses as the study group and 51 medical nurses as the control group. The mean age (standard deviation) for the study group was 35 (4.6) years and 33.2 (4.5) years for the whole group. The nurses were typically female, unmarried and graduates in nursing. The majority of the nurses working with psychiatric and general units were graduates; a small percentage of them were not graduates, but they had had long working experience (about 12 years) in their field. The average number of years of work experience for the psychiatric nurses was 12.8 (3.9) years and for controls it was 10.7 (4.6) years. Demographic characteristics of the participants are given in Table 1.

As per the operational definition, EE, DP, PA constituted the 3 aspects of job burnout. Analysis of the data showed that nurses working in psychiatric units experienced a higher degree of EE [21.07 (SD 8.87)] as compared to those who worked in other units [16.64 (SD 7.54)], indicating the feelings of being used up, frustrated, tired or stressed ($P < 0.05$). In terms of DP, the mean score for non-psychiatric nurses was higher [4.96 (SD 5.5)] than that of psychiatric nurses [4.38 (SD 5.1)] but this was not statistically significant. The mean score for PA was higher among psychiatric nurses [15.87 (SD 11.63)] compared to non-psychiatric nurses [13.82 (SD 9.83)] indicating that psychiatric nurses felt that they had less influence over their patients and units, or could not work well or the way they wanted to be with their patients. However, this difference was not statistically significant (Table 2).

Table 3 shows the correlation between job burnout and the demographic characteristics of the nurses. For psychiatric nurses,

Table 1 Frequency distribution of the participants by demographic characteristics

Characteristic	Psychiatric nurses (n = 55)		Medical nurses (n = 51)	
	No.	%	No.	%
Sex				
Male	24	43.6	16	31.4
Female	31	56.4	35	68.6
Marital status				
Married	5	9.1	11	21.5
Single	50	90.9	39	76.5
Education				
University graduate	22	40.0	18	35.3
High-school graduates	33	60.0	33	64.7
Mean age (SD) (years)	35 (4.6)		31.2 (5.4)	
Mean work experience (SD) (years)	12.8 (3.9)		10.7 (4.6)	

SD = standard deviation.

Table 2 Differences between psychiatric and non-psychiatric nurses in mean scores for the 3 dimensions of job burnout

Dimensions	Psychiatric nurses (n = 55)	Medical nurses (n = 51)	t-value	P-value
Emotional exhaustion			5.06	0.001
Mean (SD)	21.07 (8.87)	16.64 (7.54)		
Depersonalization			0.58	0.423
Mean (SD)	4.38 (5.10)	4.96 (5.50)		
Personal accomplishment			1.96	0.213
Mean (SD)	15.87 (11.63)	13.82 (9.83)		

SD = standard deviation.

there was significant positive correlation between age ($r = 0.3$), years of work experience ($r = 0.3$), and frequency of on-calls ($r = 0.6$) with degree of EE and PA. In the case of non-psychiatric nurses, there was a negative correlation between their years of work experience and emotional exhaustion ($r = –0.5$).

Discussion

It is reported that at the global level nurses face several challenges and are ranked 27th among 130 professionals requesting psychological counselling [*8*]. This study was an endeavour to assess the magnitude and extent of job burnout among hospital nurses working in psychiatric and non-psychiatric units in Isfahan. There is ample evidence to show the implications and cumulative effects of job burnout on mental health, quality of life, family life and work life. Job burnout can typically manifest itself in the form of boredom, severe depression, negative self-concept, sense of detachment, apathy, anger and hostility in the affected individual's work place [*26*]. Job burnout is a response to chronic interpersonal and emotional stressors on the job, resulting in negative feelings such as incompetence, lack of achievement and productivity at work [*4*].

The results of this study reveal high levels of job burnout in 2 dimensions of the job burnout syndrome among our sample of nurses, EE and PA. Also, significant differences were observed in the EE dimension of burnout syndrome between nurses

Table 3 Significant relationships between demographic characteristics and the dimension of burnout syndrome

Characteristic	Dimension	No.	Group	r	P-value
Age (years)	EE	45	Psychiatric nurse	0.3	< 0.001
Years of experience	EE	32	Psychiatric nurse	0.3	< 0.001
Frequency of on-call	EE	55	Psychiatric nurse	0.6	< 0.001
Frequency of on-call	PA	55	Psychiatric nurse	0.5	< 0.001
Years of experience	DP	31	Medical nurse	0.5	< 0.001

EE = Emotional exhaustion; PA = personal accomplishment; DP = depersonalization.

working in psychiatric and non-psychiatric units. EE experienced by nurses is generally attributed to the nature of their job in terms of patient's behaviour as well as the interaction of the superiors with the nurses. This observation may be attributed to the overall environment which prevails in psychiatric wards.

Our study showed a positive correlation between age and years of experience with EE. It is possible this observation is related to the very fact that with age one's tolerance for demanding situations and stressful work environment decreases. In the beginning of their career, nurses may be more motivated but in due time their eagerness to continue as an ordinary nurse may decline, as they do not see coherence between their needs and the stresses which they experience. Comparison of male and female nurses working in psychiatric units showed that male nurses experienced a higher degree of EE. This difference, though statistically not significant, may be attributed to nurse's expectations from their job and their adjustment in their work place. Krausz and associates hold the view that male nurses have poorer coping ability as compared to their female counterparts [*27*]. It has been reported that work-setting satisfaction is the most significant predictor of EE, of DP, of job pressure, of job satisfaction, and of PA [*28*].

In terms of health service delivery, job burnout in health professionals and especially in nurses has a direct impact on the health care system. These include poor quality of health care delivery and loss of people's lives and material resources. To this end, several measures have been proposed to prevent the harmful consequences of this phenomenon. Jansen and co-workers believe that instead of changing the work content we can decrease the feelings of burnout by paying attention to supervisory support, peer relationships and individual training programmes [*29*]. Health authorities are particularly advised to undertake a systematic and continuous assessment of the nursing staff work performance. Results of Jansen and co-workers' study once again confirm that stress is a problem for ward-based mental health nurses. These observations have 2 main implications: first, we need models of the stress process that are empirically based and which help us identify the moderating variables that can reduce the impact of stressors on nurses. Secondly, we need to use their knowledge to deliver stress management interventions for staff. Employee stress can have profound effects on an organization, such as increases in worker's compensation claims and cost of production.

Both health and legal experts assert that the time to deal with workplace stress is before it manifests itself in the costly worker compensation claims. Knowing the negative consequences of job burnout, it is imperative to combat stress in the work place. Health managers are expected to determine if their employees are experiencing harmful stress in the work place before it is too late. They should provide a conductive environment for the employees to talk freely and confidently about their problems and by, introducing wellness programmes, involve them in appropriate physical activities to vent out their anger and hostility. Hospitals are strongly advised to conduct regular training courses for the nursing staff in order to manage the art of stress management and develop healthy coping strategies to neutralize the negative impacts of workload. Prior organizational commitment, self-efficacy, and healthy coping skills have a key role in predicting high risk nurses for job burnout [*1,30*]. Some suggest involvement of psychiatric liaison service as a possible method to provide support to the nurses [*31*]. Adequate supervisory and

organizational support, peer relationships and individual training courses are able to improve the quality of patient care and diminish the chances of post-traumatic stress disorder, job dissatisfaction and burnout [*15,18,32*].

References

1. Greenglass ER, Burke RJ. Hospital restructuring and burnout. Journal of health and human services administration, 2002, 25(1):89–114.
2. Constanti A et al. Relationship between hardiness and risk of burnout in a sample of 92 nurses working in oncology and AIDS wards. Psychotherapy and psychosomatics, 1997, 66(2):78–82.
3. Crotty M. Burnout and its implications for the continuing education of nurses. Nurse education, 1987, 7(6):278–84.
4. Maslach C, Schaufeli WB, Leiter MP. Job burnout. Annual review of psychology, 2001, 52:397–422.
5. Maslach C, Leiter MP. The truth about burnout. San Francisco, CA, Jossey–Bass, 1997:36–60.
6. Hellesøy O, Grønhaug K, Kvitastein O. Burnout: conceptual issues and empirical findings from a new research setting. Scandinavian journal of management, 2000, 16:233–47.
7. McAbee R. Occupational stress and burnout in nursing profession: a model of prevention. American association of occupational health nurses journal, 1999, 39(12):568–75.
8. Leiter MP, Maslach C. The impact of interpersonal environment on burnout and organizational commitment. Journal of organizational behavior, 1988, 9(9):297–308.
9. McGrath A, Reid N, Boore J. Occupational stress in nursing. International journal of nursing studies, 2003, 40(5):555–65.
10. Laschinger HKS, Shamin J, Thomson D. Impact of magnet hospital characteristics on nurses' perceptions of trust, burnout, quality of care, and work satisfaction. Nursing economics, 2001, 19(5):209–16.
11. Jansen PGM et al. The effects of job characteristics and individual characteristics on job satisfaction and burnout in community nursing. International journal of nursing studies, 1996, 33(4):407–21.
12. McKnight JD, Glass DC. Perceptions of control, burnout, and depressive symptomatology: A replication and extension. Journal of consulting and clinical psychology, 1995, 63(3):490–4.
13. Leiter MP, Harvie P, Frizzel C. The correspondence of patient satisfaction and nurse burnout. Social sciences & medicine, 1998, 47(10):1611–7.
14. Aiken LH, Clarke SP, Sloane DM. Hospital staffing, organization, and quality of care: Cross-national findings. Nursing outlook, 2002, 50(5):187–94.
15. Brown LK et al. Predictors of retention among HIV/hemophilia health care professionals. General hospital psychiatry, 2002, 24(1):48–54.
16. Demir A, Ulusoy M, Ulusoy MF. Investigation of factors influencing burnout levels in the professional and private lives of nurses. International journal of nursing studies, 2003, 40(8):807–27.
17. Laposa JM, Alden LE, Fullerton LM. Work stress and post-traumatic stress disorder in ED nurses/personnel (CE). Journal of emergency nursing, 2003, 29(1):23–8.
18. Burke RJ. Survivors and victims of hospital restructuring and downsizing: who are the real victims? International journal of nursing studies, 2003, 40(8):903–09.

19. Janssen PPM et al. Specific relationships between job demands, job resources and psychological outcomes and the mediating role of negative work-home interference. Journal of vocational behavior, 2004, 65(3):411–29.

20. Taris TW et al. Stress management interventions in the Dutch domiciliary care sector: findings from 81 organizations. International journal of stress management, 2003, 10(4):297–325.

21. Cronin-Stubbs D, Rooks CA. The stress, social support, and burnout of critical care nurses. Heart & lung, 1985, 14(1):31–9.

22. Fagin L et al. Stress, coping and burnout in mental health nurses: findings from three research studies. International journal of social psychiatry, 1996, 42(2):102–10.

23. Gerits L et al. Emotional intelligence profiles of nurses caring for people with severe behaviour problems. Personality and individual differences, 2005, 38(1):33–43.

24. Maslach C, Jackson SE. The measurement of experienced burnout. Journal of occupational behavior, 1981, 2:99–113.

25. Mayou R. Burnout, British medical journal, 1987, 295:284–5.

26. Musick JL. How close are to burnout you? Family practice management, 1997, April:30–46.

27. Krausz M, Sagie A, Bidermann Y. Actual and preferred work schedules and scheduling control as determinants of job related attitudes. Journal of vocational behavior, 2000, 56(1):1–11.

28. Cam O. The burnout in nursing academicians in Turkey. International journal of nursing studies, 2001, 38:201–7.

29. Jansen PGM et al. The effects of job characteristics and individual characteristics on job satisfaction and burnout in community nursing. International journal of nursing studies, 1996, 33(4):407–21.

30. Cejka S. How to ban job burnout. Medical economics, 1999, 76(1):31, 34, 37.

31. Fawzy FI et al. Preventing nursing burnout: A challenge for liaison psychiatry. General hospital psychiatry, 1983, 5(2):141–9.

32. Armstrong-Stassen M. The influence of prior commitment on the reactions of layoff survivors to organizational downsizing. Journal of occupational health psychology, 2004, 9(1):46–60.

Hospital financial performance in the United States of America: a follow-up study

M.Z. Younis,[1] H.Z. Younies[2] and F. Okojie[3]

الأداء المالي للمستشفيات في الولايات المتحدة الأمريكية: دراسة للمتابعة

مصطفى زيدان يونس، حسان يونس، فيلكس أوكوجي

الخلاصة: قام الباحثون باستخدام تصميم شامل لعدَّة قطاعات في اختبار معطيات سنة 1998 بهدف توضيح العوامل التي تؤثِّر على ربحية المستشفيات في الولايات المتحدة الأمريكية، والتحقُّق منها. وقد أثَّر العديد من التغيرات والنظم الحكومية التي أدخلت في مستهل التسعينيات على أداء المستشفيات. وقد قام الباحثون بإدراج هذه المتغيِّرات للمزيد من الإيضاح لنظام المدفوعات في المستشفيات. ومن بين المتغيِّرات الإيضاحية التي تم تناولها، اعتُبر الموقع الجغرافي، والمنافسة، وحجم المستشفى، ومعدل الإشغال، من أهم العوامل التي تُسهم في ربحية المستشفى.

ABSTRACT To clarify and validate the factors that influence hospital profitability in the United States of America, we used a cross-sectional design to examine data for 1998. Several changes and government regulations introduced in the early 1990s influenced hospital performance. We included those variables to give a better understanding of the hospital payment system. Among the explanatory variables considered, geographic location, competition, hospital size and occupancy rate were identified as the main contributors to hospital profitability.

Performance financière des hôpitaux aux États-Unis d'Amérique : étude de suivi

RÉSUMÉ Afin de clarifier et de valider les facteurs qui influencent la rentabilité hospitalière aux États-Unis d'Amérique, nous avons utilisé un modèle transversal pour examiner les données disponibles pour l'année 1998. Plusieurs modifications et réglementations gouvernementales introduites au début des années 90 ont influencé la performance des hôpitaux. Nous avons inclus ces variables pour permettre une meilleure compréhension du système de paiement hospitalier. Parmi les variables explicatives examinées, la situation géographique, la concurrence, la taille de l'hôpital et le taux d'occupation ont été identifiés comme les principaux éléments qui contribuent à la rentabilité hospitalière.

[1]Department of Health Policy and Management, Robert Stempel School of Public Health, Florida International University, Miami, Florida, United States of America.
[2]College of Business and Economics, United Arab Emirates University, Al Ain, United Arab Emirates.
[3]Department of Research and Development, Jackson State University, Jackson, Mississippi, United States of America (Correspondence to M.Z. Younis: mustafa.younis@ccaix.jsums.edu).
Received: 04/08/04; accepted: 20/02/05

Introduction

Many changes took place in hospitals in the United States of America (USA) after 1998 owing to the introduction of the Balanced Budget Act (Balanced Budget Act of 1997, PL 105-33). The provisions included an experimental payment programme that waived certain small rural hospitals from the prospective payment system mechanism and provided others with extra payment for providing services to uninsured and Medicaid patients. The prospective payment system, introduced in 1983, promised to change the way hospitals were reimbursed: payment was determined based on type of treatment or diagnostic related group. Since the introduction of this system, a large number of studies have examined its effect on hospital economic and financial performance and uncompensated care to the indigent population [*1–3,4*].

This report is a follow-up to the study conducted by Younis, Rice and Barkoulas which identified a number of economic and financial variables as significant contributors to hospital profitability for the years 1991 and 1995. Geographic region, ownership status, teaching affiliation and hospital size were the factors that determined hospital profitability [*1*]. That study, however, ignored the repeated measure to validate their result over a period of time since certain events or actions, e.g. technological advancements or new regulations which affect hospital performance, may have had an effect on the validity. Furthermore, additional variables crucial to hospital profitability such as critical access status (critical access hospitals are rural hospitals with < 30 beds and mean length of stay ≤ 96 hours), age of the facility and outlier payments to safety-net hospitals were not included.

A study done in Florida examined the issue of profitability in a sample of 50 investor-owned or for-profit hospitals and 60 not-for-profit hospitals (the legal distinction between for-profit and not-for-profit hospitals lies in issues related to tax exemption status, the ability to receive tax-deductible donations and limitation in the distribution of profits) during the period 1982–88 [*2*]. For-profit hospitals were more profitable than not-for-profit hospitals, and the average length of stay and wages per adjusted patient day were important in explaining hospital profitability. Using a logit regression model, Walker found that financial variables by themselves failed to discriminate between profitable and non-profitable hospitals and thus did not provide a complete explanation of financial conditions [*3*]. Watt et al. reported that for-profit hospitals had higher average revenues than their not-for-profit counterparts [*5*]. Herzlinger and Krasker found that not-for-profit hospitals neither perform as well financially nor compensate for this by returning higher levels of social benefits [*6*]. Those findings have, however, been disputed on conceptual and methodological grounds [*7–9*]. The not-for-profit hospitals were less profitable than the for-profit hospitals, but provided more access to care to the indigent population through the admissions to their emergency rooms. They showed that hospital performance varied according to ownership. In a study on a sample of hospitals in Florida in 1980, for-profit and not-for-profit hospitals were virtually identical in terms of profitability [*10*]. Two later studies found that for-profit hospitals tended to be half the size of not-for-profit hospitals, with a lower case mix, shorter length of stay, higher cost per day, lower cost per case, and greater profitability [*4,11*].

In the present study, we re-examined the issue of factors that influence hospital profitability by using more recent data and

adding other variables that affect hospital profitability in the USA. We considered a broad set of potential empirical determinants of hospital financial performance covering the year 1998. The sample period is in the prospective payment system era, under which payment is based on a predetermined rate. Our data set was comprehensive as it used a diverse and representative sample of hospitals from all 4 regions of the USA. The econometric methodology employed is piecewise, linear regression which accounts for the presence of a certain type of nonlinearity in the estimated relationships. The piecewise regression method provides the policy analyst with a simple way to examine and split off groups of hospitals by size.

Basic data for use in this report were supplied by Solucient LLC, Evanston, Illinois. Any analysis, interpretation or conclusions based on these data are solely those of the authors and Solucient LLC specifically disclaims responsibility for any analysis, interpretation or conclusions.

Methods

The dependent variable for economic performance of hospitals is the return on assets (ROA), a continuous financial status variable defined as net income divided by total assets. It reflects hospital operating revenue scaled by the size of the hospital. It is also a type of efficiency ratio as it relates hospital output to non-labour inputs [*12*].

To understand the factors affecting ROA, we estimated the following regression model:

ROA = *f*(LOCATION, OWNER, TEACH, CONVERTFP, CONVERTNFP, CAH, SOLE, AGE OF FACILITY, LENGTHSTAY, BEDCAPACITY, EMPLOYEES, OCCURATE, MEDIDAYS)

where:

- LOCATION = geographic location of hospital, modelled as a dummy variable as follows: SOUTH = 1 if a hospital is located in the southern region and 0 otherwise, MIDWEST = 1 if a hospital is located in the midwestern region and 0 otherwise, WEST = 1 if a hospital is located in the western region and 0 otherwise, with NORTHEAST being the reference category;
- OWNER = dummy variable indicating type of ownership, 1 for investor-owned or for-profit status, 0 for not-for-profit status;
- TEACH = dummy variable, taking the value of 1 if a hospital provides medical education (primarily graduate) and intern training, 0 otherwise;
- CONVERTFP = dummy variable, taking the value of 1 if a hospital was converted from not-for-profit to for-profit status between 1991 and 1998, 0 otherwise;
- CONVERTNFP = dummy variable, taking the value of 1 if a hospital was converted from for-profit to not-for-profit status between 1991 and 1998, 0 otherwise;
- CAH = dummy variable, taking the value of 1 if a hospital was designated as a critical access hospital, 0 otherwise;
- SOLE = dummy variable capturing the degree of competition facing a hospital, 1 if a hospital was the sole Medicare provider, 0 otherwise;
- AGE OF FACILITY = a proxy variable that influences the dominator (total assets) due to depreciation of buildings (expected to have positive coefficient);
- LENGTHSTAY = total number of acute care impatient days in a hospital divided by the total number of acute care

discharges from the hospital, adjusted for the complexity of the case mix of a particular hospital;

- BEDCAPACITY = number of beds in service, entering the regression equation as follows: BEDCAPACITY 0 to 100 = number of beds in service if BEDCAPACITY < 100, = 100 if BEDCAPACITY ≥ 100; BEDCAPACITY 100 to 500 = 0 if BEDCAPACITY < 100, = number of beds in service minus 100 if 100 ≥ BEDCAPACITY < 500, = 500 if BEDCAPACITY ≥ 500; BEDCAPACITY over 500 = 0 if BEDCAPACITY < 500, = number of beds in service minus 500 if BEDCAPACITY ≥ 500;
- EMPLOYEES = number of full-time-equivalent employees per 100 discharges, adjusted for case mix;
- OCCURATE = percentage of beds in service occupied, entering the regression equation as follows: OCCURATE 0 to 10 = number of beds in service if OCCURATE < 10, = 10 if OCCURATE ≥ 10; OCCURATE 10 to 50 = 0 if OCCURATE < 10, = number of beds in service minus 10 if 10 < OCCURATE < 50, = 50 if OCCURATE ≥ 50; OCCURATE > 50 = 0 if OCCURATE < 50, = number of beds in service minus 50 if OCCURATE ≥ 50;
- MEDIDAYS = the number of inpatient Medicaid days divided by the total hospital days.

While case mix-adjusted average length of stay does not take quality into account, it allows for high-level comparison between groupings related to hospital efficiency. Favourable values are below the median length of stay [case mix adjusted] = (total inpatient days, acute care/total discharge, acute care)/Medicare case mix index (Medicare case mix index is a measure of the complexity of the Medicare cases treated by an individual hospital relative to complexity of the average Medicare patient nationwide).

We assumed linearity in the functional relationship between ROA and all predictors except for BEDCAPACITY and OCCURATE. For these 2 regressors, we modelled their effect on ROA as piecewise linear with 2 changes in the slope coefficients. Such modelling is supported by the data and represents a relatively parsimonious way of relaxing the assumption of linearity in the relationship. Specifically we assumed the linear relationship between profitability and occupancy rate may differ over a certain range of occupancy rate. For example we hypothesize that profitability may increase (or decrease in case of diseconomy of scale) at a rate > 10% and < 50% of occupancy, i.e. the slope will change when occupancy rate = 10% and occupancy rate = 50%. Therefore, the model proposes a different linear relationship for a different interval over the range of the occupancy rate. The same applies for hospital size.

The estimation methodology, using *SAS*, version 7.1, used the ordinary least squares regression with heteroscedasticity adjustment to standard errors according to White [*13*].

Results

The data set contained 3461 hospitals (out of 5400 hospitals) for the year 1998. The source of the data was the Medicare Cost Report [*12*] (provided by Solucient LLC). Table 1 provides descriptive statistics for the variables of the sample year.

The empirical results from the piecewise linear regression are presented in Table 2. The *F*-test statistic was significant at the

Table 1 Descriptive statistics (mean) for dependent and some independent variables, 1998

Variable	Mean value
Return on assets (%)	2.46
OWNER: ownership status (hospitals)	857
TEACH: teaching status (hospitals)	942
CONVERT: conversion of ownership status during 1991–1998 (hospitals)	
From NFP to FP	189
From FP to NFP	54
Critical access hospitals (hospitals)	14
SOLE: sole community provider (hospitals)	368
LENGTHSTAY: length of stay per adjusted acute case mix (days)	3.28
EMPLOYEES: full-time employees per 100 adjusted discharges, adjusted for case mix (employees)	8.13
MEDIDAYS (days)	0.41
Regional distribution (hospitals)	
Total	3461
Northeast	1328
Midwest	619
West	838
South	676
BEDCAPACITY: hospital size (beds in service)	205.38
OCCURATE: occupancy rate (%)	49.96

NFP = not-for-profit.
FP = for-profit.
Source: Medicare Cost Report Data. Data provided by Solucient LLC, Illinois.

5% level, thus providing empirical support to our modelling strategy.

The dummy variable for hospital location in the south was statistically significant. SOLE, the dummy variable for competition was also statistically significant.

Hospital size, measured by the number of beds in service and denoted by BEDCAPACITY, varied nonlinearly with profitability. The relationship was non-monotonic, piecewise linear with threshold values at 100 and 500 beds.

Similarly, there was a piecewise linear relationship between OCCURATE and ROA with thresholds at 10% and 50%. Occupancy rates up to 50% were associated with increased profitability.

Discussion

In their 2001 study, Younis, Rice and Barkoulas concluded that teaching status and ownership status had a negative effect on profitability, while sole community provider hospitals were more profitable [*1*]. In this follow-up study, we found that teaching hospitals were more profitable than non-teaching hospitals and hospital monopoly did not improve profitability. We included several variables that were not discussed in the previous study, such as critical access hospitals and age of the facility. We consider our current study more comprehensive and providing a more up-to-date insight on this topic.

Regional differences in profitability appear to exist as the dummy variable for hospital location in the south of the USA was statistically significant. Given that the reference category was the northeast, the positive coefficient for the indicator variable for the south suggests that hospitals in that region were more profitable.

The indicator variable for ownership status, OWNER, does enter significantly in the regression equation, suggesting that the effect of ownership status (investor-owned versus not-for-profit) on the economic performance of hospitals was small. For-profit hospitals appear to have a higher ROA than not-for-profit hospitals. The small weight of

Table 2 Piecewise linear generalized least squares regression of return on assets on hospital characteristics for 1998 (n = 3461)

Independent variable	Coefficient estimate (t-statistic)
Constant (alpha value)	5.3789 (3.79)
OWNER	0.003 (1.98)
TEACH	0.0013 (2.24)
CONVERTFP	0.0034 (1.72)
CONVERTNFP	0.0068 (1.03)
CAH	0.0142 (0.94)
SOLE	0.00017 (–2.03)***
AGE of FACILITY	0.0047 (1.79)
LENGTHSTAY	0.00323 (0.920)
EMPLOYEES	0.0001 (0.36)
MEDIDAYS	0.0009 (0.49)
Geographic location dummy variable[a]	
Midwest	–0.0035 (–0.97)
West	–0.0018 (–0.57)
South	0.0014 (3.13)***
BEDCAPACITY	
0–99	0.000016 (1.65)
100–499	–0.0013 (–2.76)***
500	–0.0021 (–1.983)*
OCCURATE	
0–9	–0.0017 (–0.86)
10–49	0.0008 (2.35)***
50	0.00012 (0.79)
F statistic (marginal significance level)	3.84 (0.00821)
R^2 0.3521	

[a]Reference category northeast.
Sandard errors are adjusted for heteroscedasticity according to White [13].
CAH = critical access hospital.
BEDCAPACITY 0 to 100 = number of beds in service if BEDCAPACITY < 100, = 100 if BEDCAPACITY ≥ 100.
BEDCAPACITY 100–500 = 0 if BEDCAPACITY < 100, = number of beds in service minus 100 if 10 ≥ BEDCAPACITY < 500, = 500 if BEDCAPACITY ≥ 500.
BEDCAPACITY over 500 = 0 if BEDCAPACITY < 500, = number of beds in service minus 500 if BEDCAPACITY ≥ ⅔ 500.
OCCURATE = percentage of beds in service occupied, entering the regression equation as follows: OCCURATE 0 to 10 = percentage of beds in service occupied if OCCURATE < 10, = 10 if OCCURATE ≥ 10; OCCURATE 10 to 50 = 0 if OCCURATE < 10, = percentage of beds in service occupied minus 10 if 10 ≤ OCCURATE < 50, = 50 if OCCURATE ≥ 50.
The F-test statistic corresponds to the null hypothesis that the coefficient estimates for all variables included in the regression equation are jointly zero.
R^2 is the coefficient of determination.
***Statistically significant at the 1% level.
*Statistically significant at the 10% level.

type of ownership could be an effect of the strict regulations on the hospital industry and the universal set payment per diagnosis, (the prospective payment system). Type of ownership was, therefore, irrelevant to hospital profitability.

The conversion in ownership status from not-for-profit to for-profit and vice versa (CONVERTFP and CONVERTNFP) did not show a major effect on the economic performance of the hospitals, possibly owing to the culture of management and/or constraining regulation in the health care industry. It also is likely that the sample sizes for these groups were too small to obtain significant results (189 hospitals in CONVERTFP and 54 hospitals in CONVERTNFP).

The indicator variable for critical access hospitals [small rural hospitals having 15 or fewer acute care beds and at least 35 miles (15 miles in mountainous terrain or over secondary roads) from the next hospital] was not significant. The small number of critical access hospitals in our sample, however, did not allow for enough variation to detect statistical significance.

The dummy variable indicating whether a hospital is the sole community provider (measure of lack of competition, SOLE) enters negatively in the regression equation: profitability was lower for groups with monopoly power. It appears that the hospital power emanating from being a sole community provider produces managerial inefficiencies manifested in reduced profitability because the prospective payment system provided a uniform payment system. Owing to the uniform payment system and regulations, hospitals with monopoly status are not in general able to use market forces to their advantage. Furthermore, hospitals with such a market position had to offer uncompensated care to their communities regardless of their monopoly power in the market.

Hospitals with > 100 beds in service were less profitable than hospitals with < 100 beds. Small hospitals, usually located in rural areas, are characterized with no, or low, penetration of managed care. Moreover, rural hospitals usually face less competition and provide a wider range of services. Larger hospitals usually operate in urban locations with more local competition and a higher penetration of managed care, which puts substantial downward pressure on revenues and shifts a greater uncompensated charity care burden onto the hospitals [*14*].

The slope for the variable EMPLOYEES, the number of full-time employees adjusted for case mix, was not statistically significant. Number of employees was included to represent variable cost even though it has a low coefficient. Case mix index (CMI) is analogous to product mix in a manufacturing context. It is a measure of the mix of patient illness types treated in the hospital, relative to the national average, and proxies for relative resource consumption. Thus, a hospital with an above-average CMI is expected to consume more resources than a hospital with a lower CMI. Employee full-time-equivalents are divided by the CMI to provide an adjusted (standardized) full-time-equivalents measure. A full-time employee is a good proxy for the variable cost of the hospital. The lack of significance for EMPLOYEES in our study suggests that hospitals may have been operating on an optimal number of employees, and any reduction in the number of employees would not lead to significant improvement in profitability.

Occupancy rates up to 50% were associated with increased profitability. Increases in OCCURATE above the 50% level did not appear to make any significant contribution

to profitability. Therefore, a declining trend in occupancy rate would have an adverse effect on efficiency, profitability and liquidity. At a lower rate of occupancy, operating expenses per adjusted discharge will be greater which will hinder the ability to operate efficiently. Since the implementation of the prospective payment system and with the current decline in use of inpatient services in comparison with outpatient treatments, occupancy rate has been considered a key predictor of financial performance, which is confirmed by our empirical findings. The cut-off points at 10% and 50% produced the most significant results.

Conclusion

The prospective payment system dramatically influenced the profitability of the hospital industry. However, other factors also influenced profitability: geographic location, hospital size, occupancy rate and competition. The southern region appeared to be the most profitable, probably because there is less regulation in comparison with the other geographic regions [*15*]. Since the age of the equipment and facility will influence the magnitude of the ROA, it is suggested this ratio be used with other profitability ratios such as total profit margin and return on equity.

Hospital conversion did not have any effect on hospital profitability. Furthermore, hospitals with monopoly position did not have any advantage in generating abnormal profit in comparison to other hospitals owing to the federal and state regulations and the standardized prospective payment system. This should lessen the fear of civic groups regarding consolidations in the hospital industry.

References

1. Younis M, Rice J, Barkoulas J. An empirical investigation of hospital profitability in the post-PPS era. Journal of health care finance, 2001, 28(2):65–72.
2. Sear AM. Operating characteristics and comparative performance of investor-owned multihospital systems. Hospital and health services administration, 1992, 37(3):403–15.
3. Walker C. A cross-sectional analysis of hospital profitability. Journal of hospital marketing, 1993, 7(2):121–38.
4. Forgione DA, Schiff AD, Crumbley DL. Assessing hospital performance: an inventory of financial and nonfinancial metrics. International Association of Management journal, 1996, 8(2):65–83.
5. Watt JM et al. The effects of ownership and multihospital system membership on hospital functional strategies and economic performance. In: Gray BH, ed. For-profit enterprise in health care. Washington DC, National Academy Press, 1986:260–90.
6. Herzlinger R, Krasker W. Who profits from non-profits? Harvard business review, 1987, 65(1):93–105.
7. Fitzgerald J, Jacobson B. Study fails to prove for-profits superiority. Health progress, 1987, 32–7.
8. Haddock C, Arrington B, Skelton A. Who profits from not-for-profits: a reconsideration. Health services management research, 1989, 2(2):82–104.
9. Arrington B, Haddock CC. Who really profits from not-for-profits? Health services research, 1990, 25(2):291–304.
10. Sloan FA, Vraciu RA. Investor-owned and not-for-profit hospitals: addressing some issues. Health affairs, 1983, 2(1):25–37.
11. Forgione DA. Incentives and performance of the health care industry: the case of for/

non-profit multihospital systems [thesis]. Amherst, Massachusetts, University of Massachusetts Amherst, 1987.

12. Kane NM, Magnus SA. The Medicare Cost Report and the limits of hospital accountability: improving financial accounting data. Journal of health politics, policy and law, 2001, 26(1):81–105.

13. White H. A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity. Econometrica, 1980, 48:817–38.

14. Younis MZ. Length of hospital stay of Medicare patients in the post-prospective-payment-system era. Journal of health care finance, 2004, 31(1):23–30.

15. Needleman J, Chollet D, Lamphere J. Hospital conversion trends. Health affairs, 1997, 16(2):187–95.

Correction

Rate of hepatitis B seropositivity following mass vaccination in the Islamic Republic of Iran. M-R. Zali, K. Mohammad, A-A. Noorbala, B. Noorimayer and S. Sahraz. *Eastern Mediterranean Health Journal*, 2005, Vol. 11 Nos 1/2, pages 62–67.

The name of the fifth author should read: S. Sharaz.

Short communication

Alternative drugs against Trichomonas vaginalis

N.K. Mahdi,[1] Z.H. Gany[2] and M. Sharief[3]

الأدوية البديلة المضادة للمشعَّرة المهبلية

ناظم كاظم مهدي، زينب حميد غني، ميسون شريف

الخلاصة: للتعرُّف على أثر الأدوية الأخرى غير المترونيدازول، عولجت ثلاث حوامل مصابات بالعدوى بالمشعَّرة المهبلية بالدوكسي سيكلين بجرعتين يومياً مقدار كل منها 200 مغ ولمدة أسبوع، فيما عولجت ثلاث حواملٍ أخريات بالبرازيكوانتيل، بجرعة وحيدة مقدارها 40 مغ/كغ من وزن الجسم. ولم يكشف أيٌّ تأثير علاجي لأيٍّ من الدواءَيْن. أما في التجارب المختبرية، فقد أدى الأوكسي تتراسيكلين إلى موت المشعَّرة المهبلية بتركيز 15 مغ في 0.5 مل من المستنبت، كما أدت خلاصة شجر الآس الشائع إلى موت المشعَّرات المهبلية في درجة باهاء pH 4.65 ولكنها فشلت في قتلها في درجة باهاء pH 6.00. كما سببت خلاصة اليوكاليبتوس الكومالديني بتركيز 50 مغ في 0.1 مل من المستنبت وفي درجة باهاء pH 5.35 إلى موت المشعَّرات المهبلية بعد 24 ساعة.

ABSTRACT To investigate the effect of drugs other than metronidazole, 3 non-pregnant women infected with Trichomonas vaginalis were treated with doxycycline, 2 × 200 mg/day for 1 week. Another 3 women were treated with praziquantel, single dose, 40 mg/kg body weight. No therapeutic effect was detected for either drug. In vitro, oxytetracycline led to death of T. vaginalis at a concentration of 15 mg in 0.5 mL medium. Extract of Myrtus communis caused death of T. vaginalis at pH 4.65, but failed to do so at pH 6.00. Extract of Eucalyptus comaldensis (50 mg in 0.1 mL medium) at pH 5.35 caused death of T. vaginalis after 24 hours.

Traitements alternatifs contre Trichomonas vaginalis

RÉSUMÉ Afin d'examiner l'effet d'autres médicaments que le métronidazole, 3 femmes non enceintes infectées par Trichomonas vaginalis ont été traitées à la doxycycline, 2 x 200 mg/jour pendant une semaine. Trois autres femmes ont été traitées au praziquantel en dose unique de 40 mg/kg de poids corporel. Aucun effet thérapeutique n'a été détecté pour ces deux médicaments. In vitro, l'oxytétracycline a entraîné la mort de T. vaginalis à une concentration de 15 mg dans 0,5 mL de milieu. Un extrait de Myrtus communis a causé la mort de T. vaginalis à un pH de 4,65 mais pas à un pH de 6,00. Un extrait d'Eucalyptus comaldensis (50 mg dans 0,1 mL de milieu) à un pH de 5,35 a entraîné la mort de T. vaginalis après 24 heures.

[1]Department of Microbiology; [3]Department of Obstetrics and Gynaecology, College of Medicine;
[2]Department of Pharmacology, Toxicology and Allied Sciences, College of Pharmacy, University of Basra, Basra, Iraq (Correspondence to N.K. Mahdi: nadhammahdi@yahoo.com).
Received: 1/10/02; accepted: 06/07/04

Introduction

Trichomonas vaginalis is a flagellate protozoan which infects the urogenital tract of men and women [*1*]. It is transmitted by sexual intercourse [*2,3*], by non-venereal means such as sharing of contaminated towels or underclothing, or the use of non-sterile medical examination tools [*2,3*]. In women it causes vaginitis and cystitis and in men it causes urethritis and prostatitis [*4*].

Metronidazole is the mainstay of treatment for *T. vaginalis* infection and can be given as a single dose, 2 g orally (divided into 1 g in the morning and 1 g at night), or 250 mg 3 times/day for 7 days [*5,6*].

Appropriate treatment with metronidazole cures 60%–80% of cases with a single dose, but the cure rate increases to > 90% when sexual partners, who are usually asymptomatic, are treated simultaneously to prevent re-infection [*7*].

The chemotherapeutic trial presented in this study is the first attempt in Iraq to try to identify alternatives to metronidazole, the only currently available treatment for trichomoniasis. Under the circumstances of economic sanctions and shortage of drugs, it is essential to carry out therapeutic investigations on chemical and plant sources.

Tetracycline has an antiprotozoal effect against *Dientamoeba fragilis* and *Balantidium coli* [*9*]; therefore, tetracycline derivatives doxycycline and oxytetracycline were chosen for this investigation. Both are readily available, the treatment course is short, resistance has not been recorded and they do not have the bitter taste that is associated with metronidazole. In addition, oxytetracycline is the drug of choice in the treatment of *T. foetus* in cattle (veterinary use) [*10,11*]. The drug oxytetracycline and plant extracts of *Myrtus communis* and *Eucalyptus camaldulensis* were chosen for *in vitro* investigation because they have antiparasitic activity [*10–12*].

Methods

Samples were obtained from the vaginal discharges of infected women by sterile vaginal swab and cultured in selective medium, Bacto trichomonas broth, (Difco No. 0911.02, Difco Laboratories, Michigan), incubated at 37 °C and checked for the presence of *T. vaginalis* after 48–72 hours. This was done by taking a drop from the bottom of the culture using a sterile Pasteur pipette, transferring to a slide and examining under the high power objective for ≥ 10 minutes.

Two drugs were tested experimentally *in vivo*, and 1 drug and 2 plant extracts *in vitro*, in order to study their effect on *T. vaginalis*.

In vivo

This study was carried out in the first 6 months of 2001 in Basra Maternity Hospital, the main centre for gynaecology and obstetrics in the city. Diagnosis of *T. vaginalis* infection was made by 2 of the authors by wet preparation and *in vitro* cultivation. All 7 non-pregnant, infected women presenting during the study period were informed about the study and all but 1 agreed to participate in the *in vivo* study. The age range of the women was 23–45 years.

Two drugs were used, doxycycline and praziquantel. The diagnosis and treatment outcome were assessed by wet preparation microscopy and culture methods [*3*].

Three non-pregnant patients infected with *T. vaginalis* were treated orally with doxycycline 200 mg (Vidipha, Ho Chi Minh City, Socialist Republic of Viet Nam), 2 capsules/day for 1 week.

A second group of 3 non-pregnant patients infected with *T. vaginalis* were

treated with praziquantel (Shin Poong Pharmaceutical Company Ltd., Seoul, Republic of Korea), 40 mg/kg body weight in a single dose divided into 2 parts taken 5 hours apart. Re-examination was done on the 3rd and the 5th days after completing treatment.

In vitro

The antibiotic oxytetracycline, 100 mg/mL preparation (Ciba-Geigy Ltd., Basle, Switzerland), was added to tubes containing 0.5 mL Bacto trichomonas broth in the following amounts: 0.1 mL, 0.15 mL, 0.2 mL and 0.5 mL. The mixtures were used on the same day they were made up. They were inoculated with *T. vaginalis* (5×10^6 to 10×10^6 organisms/mL) and incubated at 37 °C. The tubes were examined for *T. vaginalis* activity immediately and over a 24-hour period.

Plant material and extraction

Two plants, *M. communis* L. (Myrtaceae) and *E. camaldulensis* L. (Myrtaceae) were investigated. Both of these are grown in Basra. Extraction was carried out according to the method described in Harborne [*8*]. Briefly:

- leaves were separated from other parts of the plant and washed with water;
- the leaves were then dried under sunlight with good ventilation and then ground finely in a mill;
- 10 g of the ground leaves was mixed with 100 mL of distilled water in a flask and heated on a magnetic stirrer at 40 °C–50 °C for 4 hours/day for 12 days;
- the suspension was then centrifuged at 6000 rpm for 30 minutes;
- the supernatant was decanted and clarified by filtration through a sterile filter paper (0.45 μ) then made up to 100 mL with distilled water.

The pH of the *M. communis* extract was 4.65 and that of the *E. camaldulensis* extract 5.35. The liquid plant extracts were tested at different concentrations with *T. vaginalis*, 10^6 organisms/mL.

Myrtus communis

Tubes were prepared with 0.1 mL of medium (Bacto trichomonas broth). Plant extract was added in the following amounts: 0.1 mL, 0.2 mL, 0.5 mL and 1.0 mL. Control tubes were prepared in a similar manner, omitting the extract. Since *T. vaginalis* is not viable at pH < 4.9, the pH of the extract (4.65) was adjusted to 6.00 with 10% NaOH, and a second series of tubes prepared. All samples were examined by the same investigator at 0.0 hours, 0.5 hours, 1.0 hour and 24.0 hours.

Eucalyptus camaldulensis

Test and control tubes were prepared and examined in a similar manner. Plant extract was added in the following amounts: 0.2 mL, 0.5 mL, 1.0 mL and 2.0 mL.

Results

In vivo

In the 3 women who were treated with doxycycline, *T. vaginalis* was still alive and active when they were re-examined after treatment.

Similarly, praziquantel had no effect on *T. vaginalis* infection.

In vitro

Oxytetracycline caused death of *T. vaginalis* immediately in the tubes which had 0.15 mL, 0.2 mL and 0.5 mL of the drug in

Table 1 Effect of oxytetracycline on viability of Trichomonas vaginalis examined immediately after inoculation

Oxytetracycline, amount added to 0.5 mL medium	Viability of T. vaginalis
0.0 mL (control)	Alive
0.1 mL (10 mg)	Active flagellae
0.15 mL (15 mg)	Dead
0.2 mL (20 mg)	Dead
0.5 mL (50 mg)	Dead

Alive = normal activity and movement of the organism and the flagellae.
Active flagellae = flagellae only moving.
Dead = no normal activity at all.

0.5 mL medium. Flagellae remained active only in the tube with 0.1 mL oxytetracycline in 0.5 mL medium (Table 1).

Aqueous extract (pH 4.65) of *M. communis* showed an effect against *T. vaginalis* (Table 2): the organism was dead immediately in the tubes containing 50 mg and 100 mg extract, and within 0.5 hours in the tube with 20 mg extract. At pH 6.00, however, *M. communis* extract had no effect against the organism (Table 3).

Aqueous extract (pH 5.35) of *E. camaldulensis* showed some effect on viability of *T. vaginalis*. After 24 hours, *T. vaginalis* was dead in the tubes containing 50 mg, 100 mg and 200 mg aqueous plant extract (Table 4).

Discussion

Interestingly, this study has shown that although doxycycline had no effect on *T. vaginalis* infection *in vivo*, oxytetracycline had a lethal effect *in vitro*. Since this drug is available in several countries other than Iraq as a broad spectrum antibiotic in human medicine [*12*], it is possible it could, after careful evaluation, be used as an alternative drug if it was available in the country, especially among women who cannot tolerate the bitter taste of metronidazole and those having resistant infection.

Even though praziquantel has a good therapeutic effect on the intestinal flagellate *Giardia lamblia* and the intestinal amoeba *Entamoeba histolytica* [*13*], no effect was observed in our study against the urogenital flagellate *T. vaginalis*.

Table 2 Effect of Myrtus communis extract (pH 4.65) on viability of Trichomonas vaginalis (in vitro)

Amount of extract added 0.1 mL medium	Viability of T. vaginalis in 0.1 mL medium Incubation period (hours) 0.0	0.5	1.0	24.0
0.0 mL (control)	Alive	Alive	Alive	Alive
0.1 mL (10 mg)	Active flagellae	Active flagellae	Active flagellae	Dead
0.2 mL (20 mg)	Active flagellae	Dead	Dead	Dead
0.5 mL (50 mg)	Dead	Dead	Dead	Dead
1.0 mL (100 mg)	Dead	Dead	Dead	Dead

Alive = normal activity and movement of the organism and the flagellae.
Active flagellae = flagellae only moving.
Dead = no normal activity at all.

Table 3 Effect of Myrtus communis extract (pH 6.00) on viability of Trichomonas vaginalis (in vitro)

Amount of extract added to 0.1 mL medium	Viability of T. vaginalis Incubation period (hours) 0	0.5	1	24
0.0 mL (control)	Alive	Alive	Alive	Alive
0.1 mL (10 mg)	Alive	Alive	Alive	Alive
0.2 mL (20 mg)	Alive	Alive	Alive	Alive
0.4 mL (40 mg)	Alive	Alive	Alive	Alive
0.5 mL (50 mg)	Alive	Alive	Alive	Alive
1.0 mL (100 mg)	Alive	Alive	Alive	Active flagellae
1.5 mL (150 mg)	Alive	Active flagellae	Active flagellae	Active flagellae
2.0 mL (200 mg)	Alive	Active flagellae	Active flagellae	Active flagellae
3.0 mL (300 mg)	Alive	Active flagellae	Active flagellae	Active flagellae

Alive = normal activity and movement of the organism and the flagellae.
Active flagellae = flagellae only moving.

As part of this study, 2 plants were investigated for the first time because they are known to have some antibacterial and antiparasitic activity [*14–17*]. We found that *M. communis* extract killed the organism at pH 4.65, but no such effect was observed at pH 6.00 (the optimal pH for growth of *T. vaginalis*).

Table 4 Effect of Eucalyptus camaldulensis extract (pH 5.35) on viability of Trichomonas vaginalis (in vitro)

Amount of extract added to 0.1 mL medium	Viability of T. vaginalis in 0.1 mL medium Incubation period (hours) 0	0.5	1	24
0.0 mL (control)	Alive	Alive	Alive	Alive
0.2 mL (20 mg)	Active flagellae	Active flagellae	Active flagellae	Less active flagellae
0.5 mL (50 mg)	Active flagellae	Active flagellae	Less active flagellae	Dead
1.0 mL (100 mg)	Active flagellae	Less active flagellae	Less active flagellae	Dead
2.0 mL (200 mg)	Active flagellae	Less active flagellae	Less active flagellae	Dead

Alive = normal activity and movement of the organism and the flagellae.
Active flagellae = flagellae only moving.
Dead = no normal activity at all.

Promising results were obtained with *E. camaldulensis* extract. Consequently, this plant extract needs further investigation. Research into other chemical and plant sources to look for alternative drugs against *T. vaginalis* is essential. The characteristics required of such drugs are: inexpensive; available in the country; not having a bitter taste (cf. metronidazole); no parasite resistance (cf. metronidazole); safe to use in pregnancy; and short treatment course.

References

1. Tanaka T, Kaneda Y. Seroepidemiology of urogenital trichomoniasis in Japan. Japan journal of parasitology, 1989, 38(5):296–300.
2. King A, Nicol C. Venereal disease, 3rd ed. London, Bailliere Tindall, 1975:283–9.
3. Sehgal VN. Venereal disease, 2nd ed. New Delhi, Jaypee Brothers, 1987:124–5.
4. Omer EE. Trichomoniasis in clinical practice. Postgraduate doctor, 1987, 10:33–40.
5. Fridrich EG. Vaginitis. American journal of obstetrics and gynecology, 1985, 152(3):247–51.
6. Nash TE, Weller PE. Protozoal intestinal infection and trichomoniasis. In: Braunwald E et al., eds. Harrison's principles of internal medicine, 14th ed. New York, McGraw Hill Book Company, 1998:1205.
7. Essential drugs for sexually transmitted diseases. WHO drug information, 1992, 61(1):19–26.
8. Harborne JB. Phytochemical methods, 2nd ed. New York, Chapman & Hall, 1984:4–7.
9. Beaver PC, Jung RC. Animal agents and vectors of human diseases, 5th ed. Philadelphia, Lea and Febiger, 1985:15–6.
10. Swan GE et al. The safety of dimetridazole alone and in conjunction with oxytetracycline in Hereford crossbred steers. Journal of the South African Veterinary Association, 1991, 62(2):55–9.
11. Arthur GH et al. Veterinary reproduction and obstetrics, 7th ed. Philadelphia, WB Saunders Company, 1998:405–8.
12. Dey NC, Dey TK, Sinha MD. Medical parasitology, 10th ed. Kolkata, India, New Central Book Agency Ltd, 1997:4.2–4.3.
13. Mohammed KA et al. Effectiveness of praziquantel in treatment of intestinal amoebiasis and giardiasis. Eastern Mediterranean health journal, 1998, 4(1):161–3.
14. Majeed SH. Mahmood MG. Iraqi plants between traditional medicine and scientific research. Baghdad, Dar Al-Thora Press, 1988:76 (in Arabic).
15. Al-Hakeem LM. The plants and public health. Baghdad, Al-Afaq Library Publishers, 1989:10–25 (in Arabic).
16. Ramezani H et al. Antifungal activity of the volatile oil of Eucalyptus citriodora. Fitoterapia, 2002, 73(3):261–2.
17. Cimanga K et al. Correlation between chemical composition and antibacterial activity of essential oils of some aromatic medicinal plants growing in the Democratic Republic of Congo. Journal of ethnopharmacology, 2002, 79(2):213–20.

Short communication

Hexadecyl-phosphorylcholine ointment for treatment of cutaneous leishmaniasis: an animal trial

J. Iqbal,[1] I. Bukhari,[1] M. Jamshid,[3] S. Bashir,[1] M. Masoom Yasinzai[2] and M. Anwar [4]

مرهم هيكساديسيل فسفوريل كولين في معالجة داء الليشمانيات الجلدي: تجربة على الحيوانات

جاويد إقبال، عشرت بخاري، محمد جمشيد، ساجد بشير، معصوم ياسينازي، محمد أنور

الخلاصة: تقارن هذه الدراسة المشهَّدة بالدواء الغفل تأثير مرهم هيكساديسيل فسفوريل كولين بتركيز 6٪ ممزوجاً مع كلوريد البنزونيوم بالمرهم الغفل في معالجة داء الليشمانيات في 60 من حيوانات القداد الذهبية، إذ عولج بالمرهم الدوائي أربعون من هذه الحيوانات في حين طبّق مرهم غُفُل مرتين يومياً على العشرين حيواناً الآخرين. وبعد المعالجة لوحظ تقلُّص ملحوظ في مساحة وحجم الآفات في الحيوانات المعالجة بالمرهم الدوائي مقارنةً بالحيوانات التي طبّق عليها المرهم الغُفل؛ و لم تُلاحَظ الطفيليات الليشمانية في اللطاخات المأخوذة من 35 حيواناً من بين الحيوانات الأربعين التي عولجت بالدواء و لم يحدث أيضاً أيُّ نُكْس خلال فترة ملاحظة استمرت 120 يوماً.

ABSTRACT A placebo-controlled trial compared 6% hexadecyl-phosphorylcholine (HePC) and 12% benzethonium chloride ointment with placebo ointment for treatment of cutaneous leishmaniasis. Cutaneous lesions were experimentally induced by inoculation with leishmania promastigotes in 60 golden hamsters. Forty (40) animals were treated with drug and 20 with placebo ointment applied twice daily for 15 days. After treatment, all lesions were significantly reduced in size in the treatment group compared with the placebo ointment. No parasites were detected in smears from 35/40 of the drug-treated lesions and no relapses occurred over 120 days of observation.

La pommade d'héxadécylphosphocholine pour le traitement de la leishmaniose cutanée : essai sur l'animal

RÉSUMÉ Un essai contrôlé contre placebo a comparé une pommade contenant 6 % d'héxadécylphosphocholine et 12 % de chlorure de benzéthonium avec une pommade placebo pour le traitement de la leishmaniose cutanée. Les lésions cutanées ont été induites expérimentalement par inoculation de promastigotes de leishmania sur 60 hamsters dorés. Quarante (40) animaux ont été traités avec le médicament et 20 avec la pommade placebo appliquée deux fois par jour pendant 15 jours. Après le traitement, toutes les lésions ont significativement diminué en taille dans le groupe du traitement par rapport à la pommade placebo. Aucun parasite n'a été détecté dans les frottis de 35 des 40 lésions traitées par le médicament et aucune rechute ne s'est produite pendant 120 jours d'observation.

[1]Department of Pharmacy; [2]Institute of Biochemistry; [4]Department of Chemistry, University of Balochistan, Quetta, Pakistan.

[3]Faculty of Pharmacy, University of the Punjab, Lahore, Pakistan (Correspondence to J. Iqbal: drjaveidiqbal@hotmail.com).

Received: 03/08/04; accepted: 26/10/04

Introduction

The principal causative agents of leishmaniasis in Asia, Middle East, Africa and parts of Europe are *Leishmania donovani*, *L. major*, *L. tropica* and *L. infantum* [*1*]. Currently, the disease appears to be on the rise in Pakistan. Both cutaneous and visceral leishmaniasis are prevalent. The cutaneous form of the disease is seen throughout the country, being highly endemic in Baluchistan, whereas the visceral form is prevalent in the northern part of the country [*2*]. The cutaneous form occasionally becomes epidemic.

In the absence of a vaccine, drug treatment with pentavalent antimonials is still the first line of treatment for leishmaniasis in Pakistan and worldwide. The major drawback associated with the treatment is that it is painful and costly, relapses occur and above all, resistance develops. During the last 2 decades, many attempts have been made to develop effective new compounds for treating cutaneous leishmaniasis (CL) that would be economical, that could be applied topically to lesions and that would avoid the development of resistance. Many other drugs have been tested for leishmanicidal activity, including allopurional, ketaconazole and dapsone [*3*]. Paromomycine, an aminoglycoside, has been tested as a topical ointment for the possible treatment of CL but more clinical trials are needed against the main parasite causing CL [*4*].

Hexadecyl-phosphorylcholine (HePC), an alkylphosphorylcholine compound, is the most promising of the new class of anti-tumour agent. The compound is an inhibitor of mammalian protein kinase and has been applied topically for the treatment of skin metastasis showing good local tolerability [*5*]. HePC also appears to be useful for CL [*6–8*]. We have shown that this compound has potent anti-leishmanial activity *in vitro* [*6*]. The toxicity data of protein kinase inhibitors in humans is also well established [*5*]. In order to investigate the effectiveness of HePC ointment as a topical anti-leishmanial preparation, we tested its efficacy on experimentally induced lesions in hamsters.

Methods

Preparation of HePC ointment

An ointment containing 6.0% HePC and 12.0% benzethonium chloride was prepared according to the British Pharmacopoeia and British Pharmaceutical Codex methods by fusion techniques. Benzethonium chloride (Sigma, USA) was used as a surfactant and penetration enhancer. HePC was generously gifted by Asta Pharma, Germany. Other chemicals and reagents used were of Analar grade.

Parasite cultures

For primary isolation of parasites for inoculation into experimental animals a drop of aspirate was taken from underneath a cutaneous leishmaniasis lesion infected with *L. tropica* and inoculated onto 1% agar base containing 0.9% saline and 10% rabbit defibrinated blood. This was supplemented with an overlay of Medium 199 + antibiotic + 1% sterile human urine. Parasites were grown to a density of 5×10^7 parasites/mL, spun down, reconstituted in Medium 199 (Gibco, Eggenstein, Germany) at a density of 10 million parasites/20 µL.

Parasites were initially maintained in modified Tobies medium overlaid with Medium 199, 10% heat inactivated fetal bovine serum (HIFBS) and 2% urine at 20 ºC in a cooled incubator. Parasites were subsequently bulk cultivated in monophasic liquid culture Medium 199 supplemented with 10% HIFBS and 2% urine at 20 ºC in a cooled incubator.

Induction of lesions

Sixty (60) golden hamsters (*Mesocricetus auratus*) aged 8 to 25 weeks were obtained from the Institute of Health, Islamabad, Pakistan.

Parasites maintained in Medium 199 were sedimented down at 3000 rpm for 15 min and washed twice with sterile phosphate buffered saline. The washed parasites were resuspended in sterile phosphate buffered saline to a final concentration of 10^7 parasites/mL. The parasite culture was used at a concentration of 5×10^6 cells/mL to inoculate the hamsters on their nose.

Hamsters were monitored for lesion development and the size of lesions was measured daily with vernier callipers until they were full developed (15 days on average).

Treatment

Two preparations were compared as treatments: HePC ointment containing 6.0% HePC with 12% benzethonium chloride in a simple ointment base, and placebo ointment containing simple ointment base only. The hamsters were divided into 6 groups of 10 animals and were kept in different cages: 4 groups received the HePC ointment and 2 groups received placebo ointment. A standard amount of ointment was applied to lesions twice daily at 09.00 and 18.00 h and the lesions left uncovered. At the end of the study all hamsters had received 15 consecutive days of treatment with HePC or placebo ointment.

The size of the lesions was inspected visually every day during treatment and were measured using callipers after the end of treatment at 120 days. The mean lesion size was determined by measuring the lesion diameter at its widest point and then at right angles and taking the average diameter.

Samples were taken from the lesions, stained and examined under the microscope for Leishmania parasites.

Analysis was made using analysis of variance.

Results

In the 4 treatment groups the mean lesion size decreased significantly after treatment with HePC ointment (Table 1). In the 2 control groups, mean lesion sizes also decreased significantly (from 0.6 cm to 0.4 cm) in one group and increased slightly (from 0.5 cm to 0.6 cm) in the other group.

On day 7 of treatment, the lesions of most of the hamsters in the experimental groups were parasitologically negative as assessed by *in vitro* culture. After 7 weeks, the lesions in 35 out of 40 treated rodents were totally cured, while in the placebo groups, still no healing was observed after 120 days of observation. There were no relapses in the experimental groups of animals.

Discussion

The results of topical HePC in cutaneous leishmaniasis were encouraging. HePC ointment significantly reduced the size of cutaneous lesions produced by experimentally induced infection with *L. tropica* in susceptible golden hamsters. Most of the lesions were parasitologically negative after treatment and there were no relapses after 120 days of observation.

The ED50 value of 20 µM for HePC was obtained for *Leishmania* isolates from Baluchistan [*7,8*]. HePC also suppressed the differentiation of amastigotes to promostigotes, even at a concentration as low as 1.0 µM [*9*]. We have found that this

Table 1 Effect of hexadecyl-phosphorylcholine (HePC) ointment on golden hamsters inoculated with promastigotes. HePC and placebo ointment was applied twice daily to experimentally induced lesions for 15 days

Group	Treatment	Days of treatment	Lesion size (cm)			
			Before treatment		After treatment	
			Mean	SD	Mean	SD
1 (n =10)	HePC	15	0.6	0.11	0.0*	0.02
2 (n =10)	HePC	15	1.0	0.27	0.0*	0.003
3 (n =10)	HePC	15	0.7	0.18	0.1*	0.29
4 (n =10)	HePC	15	0.7	0.20	0.2*	0.006
5 (n =10)	Placebo	15	0.6	0.16	0.4*	0.18
6 (n =10)	Placebo	15	0.5	0.32	0.6	0.009

*P > 0.01, comparing lesion sizes before and after treatment.
n = number of hamsters per cage.
SD = standard deviation.

compound shows potent anti-leishmanial activity *in vitro* [*6*]. However, further study of its mechanism of action is needed in the mammalian system as this compound is known to be a protein kinase inhibitor. We tried to find out if the mechanism was the same in the case of leishmania. The leishmanial protein kinase was isolated, partially purified and the effect of HePC studied on the partially purified enzyme. It was observed that HePC effectively inhibited the activity of leishmanial protein kinase [*5*]. The inhibitory effect was stronger than the other known protein kinase inhibitors.

The study needs to be repeated with a larger group of animals before any conclusion about the efficacy of HePC can be reached. Plans are underway to test HePC ointment in human patients.

References

1. Sukkar F et al. Leishmaniasis in the Middle East, USSR, India, North Africa and China. In: Chang KP, Bray RS, eds. Leishmaniasis. Amsterdam, Elsevier, 1985: 353–478.
2. Control of the leishmaniases. Report of a WHO Expert Committee. Geneva, World Health Organization, 1990 (WHO Technical Report Series, No. 793).
3. Grimaldi G, Tesh RB. Leishmaniasis of the New World: current concepts and implications for future research. Clinical microbiology reviews, 1993, 6(3):230–50.
4. Burney MI, Lari FA. Status of cutaneous leishmaniasis in Pakistan. Pakistan journal of medical research, 1986, 25(2):101–8.
5. Unger C et al. Hexadecylphosphocholine in the topical treatment of skin metastasis in breast cancer patients. Cancer treatment reviews, 1990, 17:243–6.
6 Nagi AG, Nasimullah M. Visceral leishmaniasis in Balochistan. Pakistan pediatric journal, 1993, 17:7–10.

7. Kuhlencord A et el. Hexadecylphosphocholine: oral treatment of visceral leishmaniasis in mice. Antimicrobial agents and chemotherapy, 1992, 36:1630–4.

8. Herwaldt BL, Berman JD. Recommendations for treating leishmaniasis with sodium stibogluconate (Pentostam) and review of pertinent clinical studies. American journal of tropical medicine and hygiene, 1992, 46:296–306.

9. Pareek SS. Combination therapy of sodium stibogluconate and rifampin in cutaneous leishmaniasis. International journal of dermatology, 1984, 23:70–1.

Leishnet: web-based database and information system on Leishmania/HIV co-infection

There is an emerging problem related to the increased overlap between leishmaniasis and AIDS. A WHO surveillance network for Leishmania/HIV co-infections already exists and includes 28 member institutions worldwide. The Leishnet database has recently been created on the basis of a standardized case report form used by each member institution to report to WHO/HQ. The problem, initially restricted to southern Europe, has now moved to eastern Africa and Asia.

Objectives:

- to improve the reliability and standardization of collected epidemiological information through frequent updates;
- to make the information accessible, not only to the network members but also to other interested persons through the web using a decentralized database (graphs, maps and tables);
- to improve coordination between the member institutions and between the institutions and WHO;
- to involve each centre more directly in the process of surveillance and to implement remote data entry;
- to evaluate the dynamics of the Leishmania/HIV co-infection worldwide.

Further information can be obtained from leishnet@who.int, or on the home page at http://www.who.int/leishmaniasis/home_leishnet/en/.

Short communication

Urinary tract infection in infants and children with diarrhoea

M.H. Fallahzadeh[1] and F. Ghane[2]

عدوى المسالك البولية لدى الأطفال والرضَّع المصابين بالإسهال

محمد حسين فلاح زاده، فاطمة قانع

الخلاصة: قام الباحثان بدراسة على 120 مريضاً و120 شاهداً صحيحاً من نفس السن ومن نفس الجنس، تتراوح أعمارهم بين 4 أسابيع و5 سنوات، لتحديد متى يجب الفحص عن عدوى المسالك البولية لدى الأطفال المصابين بالإسهال. وقد تم تكرار المزارع البولية للبيلة القيحية والبيلة الجرثومية للأطفال المشكوك في مزارعهم البولية أو الإيجابيِّي النتائج. وقد اكتشفت عدوى المسالك البولية لدى 8 مريضات (جميعهن دون السنة الثانية) وطفل ذكر واحد في المجموعة الشاهدة؛ فوُجد في المصابين بعدوى المسالك، بهم حالة مصابة بإسهال جائر invasive، و7 حالات مصابة بالحمى، و5 حالات مصابة بالقيء. لذلك يوصي الباحثان في حالة الأطفال المصابين بإسهال حاد، بالفحص عن عدوى المسالك البوليَّة للرضع من الإناث المصابات بالحمَّى، واللاتي تتراوح أعمارهن بين 5 و15 شهراً.

ABSTRACT To determine when children with acute diarrhoea should be investigated for urinary tract infection (UTI), we studied 120 patients and 120 healthy age- and sex-matched controls aged 4 weeks to 5 years. In those with positive or suspicious urine cultures, bacteriuria or pyuria, urine culture was repeated. We detected UTI in 8 patients (all < 2 years) and 1 boy in the control group. In those with UTI, invasive diarrhoea was observed in 1, fever in 7 and vomiting in 5 patients. In children with acute diarrhoea, investigation for UTI is only recommended for febrile, female infants aged 5–15 months.

L'infection urinaire chez le nourrisson et l'enfant présentant une diarrhée
RÉSUMÉ Afin de déterminer le moment où l'enfant présentant une diarrhée aiguë devrait être examiné à la recherche d'une infection urinaire, nous avons étudié 120 patients et 120 sujets témoins sains appariés selon l'âge et le sexe, âgés de 4 semaines à 5 ans. Pour ceux qui avaient une uroculture positive ou douteuse, une bactériurie ou une pyurie, une nouvelle uroculture a été effectuée. Nous avons détecté une infection urinaire chez 8 patients (tous âgés de moins de 2 ans) et chez 1 garçon dans le groupe témoin. Dans le groupe de patients ayant une infection urinaire, une diarrhée invasive a été observée chez 1 patient, une fièvre chez 7 patients et des vomissements chez 5 patients. Chez les enfants présentant une diarrhée aiguë, la recherche d'une infection urinaire n'est recommandée que pour les nourrissons de sexe féminin, âgés de 5 à 15 mois, qui sont fébriles.

[1]Department of Paediatrics; [2]Department of Paediatric Nephrology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Islamic Republic of Iran (Correspondence to M.H. Fallahzadeh: fallahzadeh@dr.com).
Received: 29/03/04; accepted: 02/12/04

Introduction

Diarrhoea is common in infants and children, and urinary tract infection (UTI) is the second most common bacterial infection [*1*]. Diarrhoea may be the presenting symptom in younger children with UTI [*2,3*].

There have been a limited number of studies on the correlation between UTI and acute diarrhoea [*4,5*], and it is still not clear when to investigate for UTI in young children presenting with diarrhoea. Therefore, this study aimed at answering this question.

Methods

In this study 120 infants and children referred to the 2 teaching hospitals at Shiraz University were studied. The study was carried out over a 3-month period, August–October 2002. Patients were selected consecutively. Informed consent was obtained from the parents. There were no refusals to participate.

In addition to diarrhoea, 92 patients had vomiting and 32 had fever. Sample size was determined based on the incidence of UTI in the general population and in previous reports [*5,6*]. The exclusion criteria were:

- age < 4 weeks or > 5 years;
- duration of diarrhoea > 2 weeks;
- use of antibiotics or antiseptics during the preceding 48 hours;
- bladder extrophy or colostomy.

Nine patients were excluded.

A complete history was taken and a physical examination done for each patient by a paediatrician who had training in nephrology. A stool sample was evaluated. If the number of pus cells and/or red blood cells was > 5/high power field, a stool culture was done. If the number of pus cells was > 10/high power field or a stool sample cultured using routine methods on selenite EMB agar and SS agar (Merck, Darmstadt, Germany) was positive for a pathogenic organism, it was considered invasive diarrhoea [*5*].

A urine sample was taken for all the patients. This was midstream in those who were toilet trained and by bag collection in the others. The urine samples were transported immediately at 4 °C to the research laboratory in Nemazee hospital. All positive or suspicious urine cultures were repeated; if at least 2 positive cultures with similar sensitivities were found, the sample was accepted as UTI (associated with abnormal enhanced urinalysis or UTI symptoms).

In addition to routine urine culture, enhanced urinalysis and Gram stain were done for all uncentrifuged samples. If the number of white blood cells was $\geq 10/mm^3$ in uncentrifuged urine, it was considered pyuria. If ≥ 1 microorganism was found in 10 oil immersion fields, it was labelled as bacteriuria [*7*]. For the patients with pyuria, mixed growth or 10^3–10^5 colonies/mL of urine, 2 separate urine samples were taken for routine culture before starting antibiotic therapy.

UTI was defined as 2 positive urine cultures with $> 10^5$ colony-forming units/mL with similar sensitivity patterns.

In the control group, 120 infants and children from kindergartens, matched for sex and age with the study group, were selected. Those who had diarrhoea or had used antibiotics during the preceding 48 hours were excluded from the control group. Urine samples for routine culture were taken as for the patients. If the urine culture was positive, it was repeated and enhanced urinalysis was also done.

Statistical analysis was done using Fisher's exact test.

Results

In both the patient and control groups, male to female ratio was 1.03:1. Mean age was 17.15 (standard deviation 14.5) months for boys and 17.78 (standard deviation 14.1) months for girls; 91 patients (43 males and 48 females) were ≤ 2 years old and there were 17 males among those who were 3–5 years of age.

In 27 (22.5%) patients, duration of diarrhoea was > 5 days. Only 8 patients (6.7%) were identified as having UTI (Table 1) and in the control group UTI was documented in only 1 boy (20 months old, uncircumcised) (0.8%, $P = 0.02$). He also had pyuria and bacteriuria and the microorganism isolated was *Escherichia coli*.

The characteristics of the 8 patients (6.7%) with UTI in the study group are illustrated in Table 2.

Pyuria was present in 14 patients with diarrhoea but whose urine culture was negative (10 with dehydration, 2 with fever and 2 with undetermined cause). Both urine and stool cultures were positive in only 1 patient, but with different organisms (*Shigella* sp. in stool and *E. coli* in urine).

Table 1 Symptoms and clinical findings in 120 children with acute diarrhoea

Condition	All patients (n = 120)		UTI patients (n = 8)	
	No.	%	No.	%
Diarrhoea > 5 days	27	22.5	2	25.0
Vomiting	92	76.6	5	62.5
Pyuria	22	18.3	8	100.0
Invasive diarrhoea	15	12.5	1	12.5
Bacteriuria	11	9.2	7	87.5
UTI	8	6.7	8	100.0

UTI = urinary tract infection.

Three samples had mixed growth. All were negative when the tests were repeated.

The proportion of girls was high in the patients who had UTI (87.5%; $P < 0.05$), and also the proportion which occurred in infants < 1 year (87.5%; $P < 0.05$). Fever was observed in 15.5% of the patients with non-invasive diarrhoea and 87.5% of those with UTI ($P < 0.05$). The presence of vomiting in the group with or without UTI was not statistically significant.

For pyuria, sensitivity was 100% and specificity 87.5%; for positive Gram stain in uncentrifuged urine, sensitivity was 87.5% and specificity 95.6% in those with UTI.

Discussion

When an infant or child presents with diarrhoea, the physician wonders when to consider UTI. Even if UTI is documented in such a patient, it may have no relation to the diarrhoea (asymptomatic bacteriuria) or the microorganism causing the diarrhoea may also produce UTI [*5,8*]. In some patients with acute or persistent diarrhoea, the UTI may present with parenteral diarrhoea [*4–6,9*] as was found in our study. Because none of the patients with UTI in our study had positive stool culture with the same microorganism, we did not consider diarrhoea as the cause of the UTI.

Compared to the control group the incidence of UTI in patients with diarrhoea was higher and this was statistically significant. The incidence of UTI in our study was comparable to that in 2 other reports (7.3% and 8.0%) [*4,5*].

The presence of pyuria and/or bacteriuria by enhanced urinalysis can be suggestive of UTI [*2,5*]. Duration of diarrhoea was not

Table 2 Characteristics of diarrhoea patients who had urinary tract infection

Patient no.	Age (months)	Vomiting	Fever	Duration of diarrhoea (days)	Pyuria	Bacteriuria	Organism (urine)
1	5	–	+	2	+	+	Pseudomonas sp.
2[a]	7	+	+	2	+	+	E. coli
3	8	+	–	8	+	+	E. coli
4	8	+	+	1	+	+	E. coli
5	10	+	+	3	+	+	E. coli
6[a,b]	10	+	+	4	+	+	E. coli
7[c]	11	–	+	1	+	–	E. coli
8	15	–	+	10	+	+	E. coli

[a]Invasive diarrhoea.
[b]Patient 6 was male; all the others were female.
[c]Urinary symptoms present (irritability during voiding).

predictive of the presence of UTI in this study.

Therefore, in children presenting with acute diarrhoea, we do not recommend routine investigation for UTI except for female infants with fever in the age range 5–15 months.

Acknowledgement

This work has been supported by the vice-chancellor of research, Professor Alborzi, Clinical Research Centre, Shiraz University of Medical Sciences (Grant No. 80-1213).

References

1. Synder HM. Urologic emergencies. In: Fleisher GR, Ludwig S, eds. Textbook of pediatric emergency medicine, 4th ed. Baltimore, Lippincott, Williams & Wilkins, 2000:1585–93.
2. Shaw KN, Gorelick MH. Urinary tract infection in the pediatric patient. Pediatric clinics of North America, 1999, 46(6):1111–23.
3. Dairiki Shortliffe LM. Urinary tract infections in infants and children. In: Walsh PC et al. Campbell's urology, 8th ed. Philadelphia, WB Saunders, 2002:1846–84.
4. Pryles CV, Luders D. The bacteriology of the urine in infants and children with gastroenteritis. Pediatrics, 1961, 28:877–84.
5. Thakar R et al. Urinary tract infection in infants and young children with diarrhea. Indian pediatrics, 2000, 37(8): 886–9.
6. Sibal A et al. Associated infections in persistent diarrhoea—another perspective. Journal of tropical pediatrics, 1996, 42(2):64–7.
7. Hoberman A et al. Is urine culture necessary to rule out urinary tract infection in young febrile children? Pediatric infectious disease journal, 1995, 15(4):304–9.
8. Allerberger FJ et al. Urinary tract infection caused by nontyphoidal salmonella: report of 30 cases. Urologia internationalis, 1992, 48(4):395–400.

9. Jeena PM, Coovadia HM, Adhikari MA. Bacteriuria in children attending a primary heath care clinic; a prospective study of catheter stream urine samples. Annals of tropical pediatrics, 1996, 16(4):293–8.

Child-related millennium development goals

Of direct relevance to the work that the Child and Adolescent Health and Development unit of WHO's Regional Office for the Eastern Mediterranean is pursuing in the Eastern Mediterranean Region is millennium development goal 4 "Reduce child mortality", for which the target set is to "reduce by two-thirds, between 1990 and 2015, the under-five mortality rate". For this target, three indicators have been selected to help track progress:

- under-five mortality rate,
- infant mortality rate,
- proportion of 1-year-old children immunized against measles.

Of the total list of 18 targets, those of key importance to our work in the Region are:

- Target 2 "Halve between 1990 and 2015, the proportion of people who suffer from hunger", with indicator 4 on "Prevalence of underweight children under 5 years of age";
- Target 8 "Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases", with indicators 21 on "Prevalence and death rates associated from malaria" and 22 on "Proportion of population in malaria risk areas using effective malaria prevention and treatment measures".

Short communication

Support for cancer patients: the Bahrain experience

M.S. Awadallah[1]

دعم مرضى السرطان: تجربة البحرين

ميسَّر صبري عوض الله

الخلاصة: يعتبر السرطان، وهو مرض يتفادى الناس الحديث عنه، ثاني أكبر أسباب الوفيات في البحرين. وقد قامت جمعية مكافحة السرطان البحرينية بتشكيل مجموعة لدعم مرضى السرطان في عام 1993 بهدف مساعدة المرضى وأُسَرهم على التأقلم مع هذا المرض، وتوعية الجمهور بأهمية التبكير باكتشافه. وتضمنت خدمات هذه المجموعة عقد ندوة أسبوعية على مدى ساعتين لتشجيع المرضى على التعبير عن شعورهم ومخاوفهم، وتوزيع كتيبات إعلامية، والقيام بزيارات للمرضى في المستشفيات وفي منازلهم. كما قامت المجموعة بتنظيم الأنشطة الترفيهية للأطفال المصابين بالسرطان. ويمكن للمرضى والأُسَر حث هذه المجموعة على مناقشة مشاكلهم. وتهدف هذه الورقة البحثية إلى الإفادة من تجربة البحرين في دعم مرضى السرطان وأُسَرهم وأصدقائهم.

ABSTRACT Cancer, a disease people avoid talking about, is the second leading cause of death in Bahrain. The Bahrain Cancer Society established a support group in 1993 with the goals of helping patients and their families cope with this disease and increasing public awareness concerning early detection. Services provided by the group include a weekly 2-hour session to encourage patients to express their feelings and concerns, distribution of informational booklets and visits to people at home and in hospital. Furthermore, the group organizes recreational activities for children with cancer. Patients or their families can also page the group to discuss their problems. The main goal of this paper is to share the Bahrain experience of supporting cancer patients, their families and friends.

Soutien aux patients cancéreux : l'expérience de Bahreïn

RÉSUMÉ Le cancer, maladie dont les gens évitent de parler, est la deuxième cause de décès à Bahreïn. La Société bahreïnie de lutte contre le cancer a mis en place un groupe de soutien aux patients cancéreux en 1993 avec pour objectifs d'aider les patients et leurs familles à faire face à la maladie et de sensibiliser au dépistage précoce. Les services fournis par le groupe comprennent une session hebdomadaire de 2 heures visant à encourager les patients à exprimer leurs sentiments et leurs préoccupations, la distribution de brochures d'information et des visites à domicile ou à l'hôpital. Par ailleurs, le groupe organise des activités récréatives pour les enfants cancéreux. Les patients ou leurs familles peuvent aussi contacter le groupe par alphapage pour discuter de leurs problèmes. Le présent article vise principalement à faire partager l'expérience de Bahreïn en matière de soutien aux patients cancéreux, à leurs familles et leurs amis.

[1]College of Health Sciences, Nursing Programme, Ministry of Health, Manama, Bahrain (Correspondence to M.S. Awadallah: muyassar@yahoo.com).

Received: 13/06/04; accepted: 24/11/04

Introduction

In Bahrain, cancer is the second leading cause of death after circulatory heart disease. However, with improved cancer services, the 5-year survival rate may increase. The reported number of cancer cases has increased over the past 5 years. This is because of improvements in early detection as well as extended life expectancy, leading to an increase in the number of elderly people, who are more prone to cancer than the younger age group [*1*].

Diagnosis of cancer, a life-threatening disease, initiates a period of crisis accompanied by considerable psychological distress such as fear and anxiety. The following is a quote from a patient talking about her reaction when she was informed by her physician that she had been diagnosed with cancer: "The first time I heard that I had breast cancer, I panicked. I could not stop crying. Why me, I am still too young to leave my children? All I could think about was my husband and children and how my family was going to take it if I died."

A diagnosis of cancer makes patients feel emotionally distressed, angry and uncertain about the future [*2*]. In addition 25% of patients experienced depression at the time of diagnosis [*3*], and approximately 50% may experience depression and anxiety while receiving anticancer treatment [*4,5*]. Furthermore, the psychological effects of cancer can affect the quality of life and increase the length of hospitalization [*6*]. Thus, living with cancer is an experience of great suffering for the patient, mainly arising from his reminiscence of a healthy past. Therefore, most people do not like to discuss or talk about cancer; and as soon as they hear someone has got cancer, they believe that this person will suffer and die. For these reasons, patients and their families seek available resources to help with coping with cancer diagnosis and treatment in order to restore their overall equilibrium.

Coping with cancer

A major illness like cancer may have a devastating impact, not only on patients but also on the immediate family and others with whom the patient has a relationship. Many patients report that a confirmed diagnosis, or even waiting for the result of a biopsy, provokes feelings of uncertainty and fear of death and dying, prompting them to reorder the priorities in their life. These patients go through the common stages of reaction such as denial, bargaining, depression and guilt.

Most cancer patients will require prolonged treatment; so coping with the disease is an exhausting process. Support groups are an important source of help for people coping with the emotional and physical impact of cancer [*7*]. Furthermore, it as been shown that cancer support groups help to prolong survival [*8*], decrease psychological symptoms and reduce the number of visits to hospital or oncology clinics [*9*]. Patients with cancer need help, and patients with strong support systems have better coping mechanisms. Face-to-face (traditional) support groups are used to help patients deal with their illness by fostering effective coping mechanisms [*10*]. This also helps people feel less lonely and they are able to express a positive change in attitudes towards their illness [*11*]. Access to a support group may thus serve as an effective psychotherapeutic tool for the coping process.

Support group in Bahrain

The cancer support group was established in 1993 by a television broadcaster and cancer victim. The Bahrain Cancer Society was formed 1989 with a mission to support cancer patients. The group is now a committee

under the Bahrain Cancer Society. It is composed of a small group of volunteers, some of whom are cancer survivors, their relatives and friends, and other people involved with cancer patients such as doctors, nurses and social workers. Cancer survivors often feel a desire to share their experiences with others. The support group plans gatherings of individuals in face-to-face encounters. The meetings are held regularly and are designed to accomplish common goals: to help people cope with cancer, provide emotional support, offer information on cancer and its treatment, facilitate psychosocial adjustment and increase public awareness about preventive measures against cancer.

Reasons for seeking a cancer support group

People seek support groups because they want to belong to a group sharing the same problems, and because they need to get support from others with similar experiences. This process will also enhance their security and comfort in coping with their disease. People may also seek a support group to get assistance in formulating a plan of action during a stressful time.

In Bahrain, women use the support group more than men: the Bahrain Cancer Society records show that around 90% of their attendees were women (unpublished report, Bahrain Cancer Society, 2005). Men may feel they are stronger and think they can cope on their own. Samarel et al. studied a group of women attending a cancer support group and found that the women reported that the group helped them to verbalize their feelings, reduce loneliness and gain useful information [*11*].

In addition, over the past 2 years (2004, 2005) the Bahrain Cancer Support Group has provided telephone support; during 2005 they received approximately 1000 calls. The majority of callers were suffering breast, colon, lung or kidney cancer.

Non-Bahrainis attend the group sessions more often than Bahrainis, possibly due to lack of family support systems. Patients join to find answers to their questions and concerns about the disease process, treatment and prognosis. Some cancer patients ask for assistance and advice on how to inform their children. When children are properly and accurately informed, their uncertainty, fear and anxiety will be reduced. Accurate information, for example will explain when one of the family members goes bald suddenly.

Finally, attending group meetings is an affirmation of the patient's need to face reality, restore self-esteem and find hope.

Methods of supporting cancer patients

The Bahrain cancer support group generally uses the traditional method of face-to-face support group meetings. People are allowed to verbalize their feelings, which will help them feel better and more able to cope with their illness, which will in turn decrease distress. Other choices are available regarding means of receiving support. Individuals can contact the group by pager, or they can come to a weekly 2-hour group meeting at one of the local hospitals. Those who prefer not to join the weekly sessions may receive support via telephone. The support group is designed to meet the need for reassurance of worth, answer questions and concerns and provide guidance or required information. They distribute booklets in Arabic or English with information related to the diagnosis and treatment of cancer. Support group members visit patients on national and religious holidays and generally spend time with them and distribute gifts. The group organizes recreational activities for children

who have cancer and their families. These include drawing competitions for greeting cards that are sold by the Bahrain Cancer Society for fund raising. Other activities include musical events or dinner parties in restaurants, which may help reduce stress, anxiety and fear.

The group may assist in putting people in touch with the Bone Marrow Donor Registry in San Francisco, California; providing prostheses for patients who are unable to afford their own; raising funds for patients who need treatment abroad; and visiting and giving condolences to the patient's family on their death.

Group dynamics

The support group deals with a variety of topics during their meetings. The topics reflect the attendees' experiences and feelings and what they want to share with the group. This enables patients and their families to decrease their psychological trauma and adopt an effective coping behaviour.

During support group meetings, the side-effects of chemotherapy are discussed and patients share their feelings and experiences. For example, one lady who received support before starting chemotherapy and then experienced fewer side-effects stated, "I never realized with my busy life that there were people to help me face the disease and have a positive attitude, which helps a lot while I am taking my chemotherapy."

This is a dialogue illustrating how patients support each other sharing a common experience: One patient stated, "I can't stop crying. I look at myself in the mirror most of the time. I am a weak person. I cry anytime, anywhere." Another one responded, "I understand your pain, I have been through the same experience, but look at me: I got hair and wear a prosthesis. I look normal." A third patient responded, "I can get some more hair, but I can't get another life." Someone also stated, "I am lucky to be alive, taking care of my family."

The cancer support group respects patients' religious backgrounds and encourages their faith. The group increases hope in cancer patients by focusing on patients' belief in themselves, their individual abilities, relationships with others and active involvement, while acknowledging that they also have a future. This allows patients to see things around them differently. One patient reported, "The support helped me enjoy my life today. I see how nice it is to walk on the seaside and enjoy the sea and watch the sunset." Another explained his reasons for coming to the group session, "I feel weak today. I came to the meeting to get the spiritual energy that I need."

The following statement reflects the taboo of cancer: "My neighbour is my friend. She started to hide from me once she knew that I was a cancer patient. She does not like to visit me. When I discussed this with her, she said, 'I do not like to see you suffering like my daughter. Then you will leave like my daughter'."

It is also one of the responsibilities of the support group to recognize dying patients, meet their spiritual needs and try to support them in order to assist them to die peacefully and with dignity. This is a quote from a patient, expressed just a few hours before she died: "Stay with me. I feel that someone is here when you hold my hand."

Conclusion

Hope is considered an important factor for people coping with cancer. Support groups may give hope and act as sources of information for cancer patients, their families and significant others. The Bahrain Cancer Support Group encourages people to share their feelings and provides an atmosphere

of courage, humour and hope. The group now needs to realize its full potential by developing an active volunteer support network in order to continue being a significant resource. In addition, public awareness of the group needs to be enhanced and more people encouraged to use the service, both within and outside the network. No one need suffer alone.

References

1. Ministry of Health. Health statistics. Manama, Bahrain. 1999:3–5.
2. Ferrell BR et al. Quality of life in breast cancer survivors: implications for developing support services. Oncology nursing forum, 1998, 25(5):887–95.
3. Mermelstein HT, Lesko L. Depression in patients with cancer. Psycho-oncology, 1992, 1:199–215.
4. Carroll BT et al. Screening for depression and anxiety in cancer patients using the Hospital Anxiety and Depression Scale. General hospital psychiatry, 1993, 15(2):69–74.
5. De Walden-Galuszko K, Prevalence of psychological morbidity in terminally-ill cancer patients. Psycho-oncology, 1996, 5:414–9.
6. Sellick SM, Crooks DL. Depression and cancer: an appraisal of the literature for prevalence, detection and practice guideline development for psychological interventions. Psycho-oncology, 1999, 8:315–33.
7. Brag FK, Gullatte MM. Cancer support group: meeting the needs of African Americans with cancer. Seminars in oncology nursing, 2001, 17(3):171–8.
8. Spiegel D et al. Effect of psychosocial treatment on survival of patients with metastatic breast cancer. Lancet, 1989, 2(8668):888–91.
9. Stanton AL et al. Emotionally expressive coping predicts psychological and physical adjustment to breast cancer. Journal of consulting and clinical psychology, 2000, 68(5):875–82.
10. Klemm P, Hardie T. Depression in internet and face-to-face cancer support groups: a pilot study. Oncology nursing forum, 2002, 29(4):E45–51.
11. Samarel N et al. Women's perceptions of group support and adaptation to breast cancer. Journal of advanced nursing, 1998, 28(6):1259–68.

Brief report

Muslim voices from the Eastern Mediterranean Region

F. Moazam[1]

Introduction

Muslim voices from the Eastern Mediterranean Region was a panel presentation given 7 August 2006 at the 8th Congress of the International Association of Bioethics (IAB), Beijing, China, 6–9 August, 2006. The presentation was sponsored by the World Health Organization Regional Office for the Eastern Mediterranean (EMRO), Cairo, Egypt, and coordinated by F. Moazam.

Speakers (in order of presentations) and topics

- G.I. Serour, Al-Azhar University, Cairo, Egypt: "Assisted reproductive technologies (ART) in Egypt: cultural, religious and ethical issues;"
- F. Moazam, Centre of Biomedical Ethics and Culture, Karachi, Pakistan: "Live, related kidney donation: cultural, religious, and socioeconomic influences on patient-family-physician dynamics;"
- A. Jafarey, Centre of Biomedical Ethics and Culture, Karachi, Pakistan: "Informed consent revisited: views of Pakistani physicians and public;"
- M. Bouhaimed, Kuwait University, Kuwait: "Cultural and religious dimensions in health research: 25 years of community medicine projects in Kuwait."

Description of session

Due to the inability of the EMRO representative (Dr Abdel Aziz Saleh) to travel to Beijing for the session, the group suggested that Dr Moazam chair the session. She welcomed the audience, and spoke of the great diversity (in history, traditions, ethnicity, indigenous culture, languages, literacy rates, socioeconomic realities, forms of government, etc.) that can be found among and within the 21 countries that constitute the Eastern Mediterranean Region of the World Health Organization. She noted that Muslims of this Region constitute a preponderance of the populations in these countries and are united by their shared belief in Islam. And yet these countries also present a many hued quilt of cultures, value systems, and ways of life that cannot be seen as uniform or homogenous. In recent debates on the clash of civilizations this fact has sometimes been forgotten, and Muslims and Islam are frequently portrayed as monolithic entities. By focusing on the experiences of speakers from Egypt, Kuwait, and Pakistan, she hoped that the session would highlight the kaleidoscope world of Muslims. She added that these "Muslim voices" would be transmitted to the audience through the medium of four physicians who work and live among the people in these countries

[1]*Centre of Biomedical Ethics and Culture (CBEC), Sindh Institute of Urology and Transplantation, Karachi, Pakistan (Correspondence to F. Moazam: famoz@mindspring.com).*

Dr Moazam then introduced the speakers and stated that each presentation would be followed by 10–15 minutes of discussion, and questions and answers from the audience.

To set the stage, Dr Serour began with a brief overview of the primary and secondary sources of sharia and broad principles of Islamic jurisprudence, and explained how Muslim ulema utilize these in a dynamic fashion to examine and address novel questions that arise with the advent of modern biomedical science and technology. In the second part of his talk, turning to his own experience as an obstetrics/gynaecology specialist, he elaborated on the cultural, religious and ethical issues facing Muslim physicians and patients with the advent of assisted reproductive technologies, and how these are being comprehended, handled and resolved, both within the discourse of Muslim scholars and jurists and by Muslim physicians and patients in Egypt.

In her presentation, Dr Moazam drew on her sociological and ethnographic research conducted in a busy transplantation institute in Karachi in which she focused on genetically-related Muslim kidney donors and recipients, their families, and the healthcare professionals involved in their care. The centrality of the extended family in Pakistani life, and shared cultural beliefs and religious values shape in profound ways the comprehension of what constitutes ethical conduct within healthcare systems. Her study demonstrated that the dominant moral ethos of the institute rests on the sense of duty and obligation of healthcare professionals to patients, and of family members to kin in renal failure, rather than on autonomy and individual rights, and these form the central pillars of contemporary bioethics. She alluded to the potential for distortion in analysing moral systems such as those of the Pakistani institute through the ethical prism of non-Asian societies.

Dr Jafarey presented the results of a quantitative and qualitative research project which he has conducted to assess attitudes of Pakistani physicians and lay public towards the process of sharing medical information and obtaining informed consent in clinical practice. His study highlighted the fact that that, in a society in which several generations of a family live deeply interdependent and family-centred lives, the term "autonomy" takes on a new meaning, different from the accepted meaning of the word in societies in which individual patients are seen as the locus for all decision-making connected to their medical care. He demonstrated that the majority of professionals and lay people interviewed in Karachi believe that families must play a central role both in discussions pertaining to the illness of a family member and in decision-making when therapeutic interventions are indicated.

The final presentation was made by Dr Bouhaimed. She provided an overview of the many community medicine projects conducted by medical students in Kuwait over the last two and a half decades, and analysed how many of these revealed cultural as well as broad religious dimensions and concerns. The themes students explored were diverse and extended from issues of women's health and reproduction to cosmetic surgery and professional ethics. She noted an increasing interest in bioethics in her country. In the latter half of her talk she detailed two surveys conducted by students on the understanding and attitudes of healthcare professionals in Kuwait, nationals and expatriates, towards the concept of euthanasia for terminally ill patients.

Comments

The general impression of the four speakers is that the session went well. This is based

on the fact that despite 5 sessions occurring at the same time, EMRO's "Muslim voices" session drew a respectable-sized audience, and included participants from Australia, Cambodia, China, Egypt, Malaysia, the Netherlands, Pakistan, and the United States of America. Each presentation was followed by interested and interesting questions from the participants about the talk in particular and aspects of Islam in general. Several people stayed behind following the end of the session to continue the discussion. Informally, some made a point of contacting speakers later to describe the session as having been interesting and informative.

Recommendations

This was the first time that a forum as large as the International Association of Bioethics (800 international delegates) had held a session devoted specifically to medical ethics as comprehended by Muslims, and in which the dynamic nature of sharia in responding to novel needs, and the rich diversity of Muslim lives was also demonstrated. In addition, we believe that the session served to make the important point that Muslims draw their sense of moral conduct and solutions for ethical dilemmas from a combination of human reason, religious values, and indigenous sociocultural norms. The speakers believe that there is a great need for encouraging similar presentations in future international bioethical conferences to enrich a bioethics discourse that has tended to remain largely secular and philosophical in nature.

Acknowledgements

The presenters would like to express their gratitude to the WHO Regional Office for the Eastern Mediterranean in Cairo, and especially to Dr Khayat, whose support made this session possible.

Letters to the Editor

Diabetic nephropathy

Sir

I read with great interest the article by Afifi and colleagues [*1*] in the Eastern Mediterranean health journal and I appreciate the authors' work. However, I would like to make a few comments because of the increasing prevalence of diabetes and its complications in the Arab world. Diabetic renal disease is a common complication and is the most prevalent cause of end-stage renal disease (ESRD) in the Western world [*2*]. According to the ESRD programme in the United States, the number of existing patients with terminal renal insufficiency caused by diabetes more than tripled between 1990 and 2001 [*3*].

The first question to pose here is: was this a 6-year study? The title possibly suggests it is a cohort study. However, it seems from the study design, tables and the results that it is a data review of an ambiguously selected sample of ESRD patients enrolled in the Egyptian renal data system. Both the sampling technique and the rationale behind the sample size are unclear. Moreover, in a cohort study we trace a risk factor to get an outcome, either prospectively or retrospectively. Here, the authors already know the outcome, i.e. ESRD, and the risk factor, diabetes, and the rates shown by the data are not in line with what cohort studies are supposed to reveal.

Moreover the results seem to be contradictory. The authors say that "the mean age of patients with diabetic nephropathy was higher than that of patients with other causes of ESRD in the years [they] studied". They then say that "mortality among diabetic patients with ERSD was higher than in patients with ERSD from other causes". If we want to know how long patients with ESRD due to diabetic nephropathy live in comparison to ESRD due to other causes, we must evaluate the interval between 2 events: the diagnosis of ESRD, whatever its cause, and death. In fact, the 2 events of interest – diagnosis and death – may not occur for all the study participants during the period they are observed and the actual period of observation may not be the same for all of them. These complicating factors rule out the possibility of simply calculating the average time between the 2 events or the mean age of the studied participants as the authors did in Table 3, where they compared the mean age of diabetic nephropathy patients and patients with ESRD from other causes. A special statistical technique, survival analysis [*4*], is needed to look at the interval between diagnosis and death when the first timing is not the same for everyone, the second does not necessarily happen to everyone, and hence the study participants are observed for different periods of time.

References

1. Afifi A, El Setouhy M, El Sharkawy M, Ali M, Ahmad H, El Menshawy O, Masoud W. Diabetic nephropathy as a cause of end stage renal disease in Egypt: a six

year study. *Eastern Mediterranean health journal*, 2004, 10(4/5):620–6.

2. Parmar MS. Recurrent hypoglycaemia in a diabetic patient as a result of unexpected renal failure. *British medical journal*, 2004, 328:883–4.

3. Excerpts from the United States Renal Data System 2003 Annual Data Report: atlas of end-stage renal disease in the United States. *American journal of kidney disease*, 2003, 42(6 suppl. 5):S1–226.

4 Norusis MJ. *SPSS base system user's guide*, Release 5.0. Chicago, SPSS Inc., 1990.

M. Afifi
Department of Research & Studies
Directorate General Planning
Ministry of Health
Muscat
Oman
Correspondence to: afifidr@yahoo.co.uk

Authors' response

We are glad that our work stimulated Dr Afifi from Oman to send his views. We believe that if he had read the article more thoroughly, he would have found answers to most of his criticisms. However, we would like to clarify the points he raised.

There was no need to repeat the extent to which diabetes is responsible for chronic kidney disease in the United States and Western countries. We, as well as all nephrologists are well aware of this issue and have quoted it in our work. We would like to draw his attention to the fact that what applies to Western countries does not necessarily apply to developing countries for a variety of reasons he should know. Indeed, differences exist between developed and developing countries and we should always investigate and analyse our problems rather than quoting data from the United States and Europe. In this respect he should read Table 1 that showed variations in the prevalence of this disease ranging from 4.7% in some countries to 50% in others.

Dr Afifi postulated that our study was a cohort study although we never said that it was. We clearly stated that it was a six-year multiple cross-sectional study. The writer should know that there are many limitations to a cohort study in Egypt and in most developing countries as well. The most important of these limitations is the unavailability of complete medical records and the reluctance of colleagues to share their records. We would be happy to share in data management and analysis with the writer if he has such data.

He suggested that we have contradictory results because "the mean age of patients with diabetic nephropathy was higher than that in patients having other causes of ESRD" and that "mortality among diabetic patients with ERSD was higher than in patients with ERSD from other causes". There is nothing contradictory in these findings. Indeed, the mean age of diabetic patients with ESRD was about 10 years higher than that due to other causes (Table 3) and this is simply explained by the fact that type 2 diabetes needs many years to develop into ESRD, whereas other causes of ESRD, particularly infections causing glomerulopathies, occur at a much younger age. The mortality among diabetics was

also much higher than in other causes of ESRD (Table 2). This does not need much explanation as we are sure that the writer agrees that diabetics suffer from increased mortality due to micro- and macrovascular complications.

A. Afifi
Department of Internal Medicine and Nephrology
Ain Shams University
Cairo
Egypt
Correspondence to: aafifi@idsc.net.eg

M. El Setouhy
Department of Public Health
Ain Shams University
Cairo
Egypt

Risk factors for hypertension in UAE

Sir

I have read with great interest the article by Sabri and colleagues [*1*] in the Eastern Mediterranean health journal and I appreciate the authors' work. However, I would like to make few comments because of the importance of hypertension and its risk or associated factors.

The authors mention in their abstract as well as in the results and discussion sections that hypertension among cases was high in low-income participants. Looking at the bivariate analysis (Table 1) and the multivariate analysis (Table 4), we would see the reverse. Table 4 shows that those with higher income (income equal 5000 dirhams or above) were 2.69 times more likely to be hypertensive than others.

The authors contradict themselves again where they show that the crude odds ratios for obese participants (BMI $\geq$ 30 kg/m^2), those with no physical activity, and those with positive family history of diabetes were 0.46, 0.72 and 0.28 respectively (Tables 1 and 2). This suggests these factors are protective against hypertension, whereas in Table 4 the adjusted odds ratios for the previously mentioned variables are 4.29, 1.8 and 2.58 respectively, suggesting that obesity, sedentary lifestyle and family history of diabetes are risk factors for hypertension.

The cause behind such contradiction is the order of rows in the Tables 2 and 3 from which the odds ratios were calculated in the bivariate analysis. The correct order is to put the exposed or the risk factor in the first row and the non-exposed in the next [*2,3*]. If the rows are reordered in the bivariate analysis tables, the correct odds ratios for variables studied are obtained and these would be 1/existing figure.

The authors mention in the sampling section that cases and controls were age, sex and nationality matched. They say that they recruited 500 hypertensive patients, 64 did not participate and thus 436 cases and 436 matched controls were included in the final analysis. From Table 1 the number of cases and controls varied markedly in sex, age group and slightly in nationality. The prob-

lem here is that hypertensive patients under 40 years were more reluctant to participate in the study in comparison to those aged 50 years and above where cases outnumbered controls. Could this raise the question of selection bias? Al-Shahi et al. [*4*] investigated the differences between consenters and non-consenters in demographic and clinical features at first presentation and outcome during follow-up. They found differences between adults who consent to participate in observational record-based research and those who do not or cannot. Accordingly, they recommended that further research should be directed towards exploring consent bias in other disease groups and other research designs to see if the bias is pervasive and remains unpredictable.

As regards the study tools, it is slightly ambiguous whether the authors used a self-reported questionnaire or a structured interview. Did the authors use a self-reported questionnaire to be filled by literate participants and resort to a structured interview for illiterate participants?

Finally, drawing the conclusion that "more expatriates than UAE nationals had hypertension is in keeping with previous findings of a Swedish study" (page 618), is flawed [*5*]. First, the difference in the Emirate study was not significant even in bivariate analysis (Table 1). Moreover, the Swedish study adjusted the foreign-born individuals for sociodemographic and lifestyle factors, which was not done in the Emirate study.

References

1. Sabri S, Bener A, Eapen V, Abu Zeid MSO, Al-Mazrouei AM, Singh J. Some risk factors for hypertension in the United Arab Emirates. *Eastern Mediterranean health journal*, 2004, 10(4/5):610–9.
2. Greenberg RS et al. *Medical epidemiology*, 2nd ed. Stamford, Appleton & Lange, 1996:126–8.
3. Fletcher RH, Fletcher SW, Wagner EH. *Clinical epidemiology: the essentials*, 3rd ed. Baltimore, Williams & Wilkins, 1996:215–8.
4. Al-Shahi R, Vousden C, Warlow C; Scottish Intracranial Vascular Malformation Study (SIVMS) Steering Committee. Bias from requiring explicit consent from all participants in observational research: prospective, population based study. *British medical journal*, 2005, 331(7522):942.
5. Sundquist J. Living conditions and health. A population-based study of labor migrants and Latin American refugees in Sweden and those who were repatriated A population-based study of labor migrants and Latin American refugees in Sweden and those who were repatriated. *Scandinavian journal of primary health care*, 1995, 13(2):128–34.

M. Afifi
Department of Research & Studies
Directorate General Planning
Ministry of Health
Muscat
Oman
Correspondence to: afifidr@yahoo.co.uk

Authors' response

Dr Afifi has raised some important points concerning our study [*1*]. We used a matched case–control design [*2–4*]. The method we employed was the one that adjusted for age, sex and nationality [*5*]. It is true that the association of risk factors may vary by age, sex and nationality, which are mostly fixed factors, but so long as the sample is adjusted equally among the cases and controls with sufficient sample size, the results will carry significant weight. In this regard, it should be noted that the differences between hypertensives and normotensives in terms of sex, age and nationality were not significant ($P < 0.154$, $P < 0.598$ and $P < 0.964$ respectively). The difference between males and females with regard to the age group was also not significant ($P < 0.210$). Furthermore, we do not think that there was a bias in patient selection because of the consent issue. The main reason for exclusion of subjects from the study was the presence of other chronic diseases rather than them not consenting to participate.

Regarding the questionnaire versus interview, questionnaires were used for those who could read and write, while the same questions were asked using a semi-structured interview format for illiterate subjects.

We agree the contradiction between the table and the text deserves clarification. Table 1 shows that 34.1% of the low income group had hypertension while only 25.1% of the control group had hypertension, indicating an association between low income and hypertension. Similarly, 41.4% of those in the obese group (BMI $\geq$ 30 kg/m^2) were hypertensives as compared to 25.1% of the non-obese group, suggesting an association between higher BMI and hypertension. In Table 3, the percentage of hypertensive subjects with positive family history of diabetes (19.6%) was significantly higher than the percentage (6.3%) of normotensive subjects with positive family history of diabetes. We believe that the confusion arose due to the fact that the direction of association was not clearly indicated in Table 4 while describing the odds ratio. While the different groupings are given in brackets, we failed to indicate which of the different subgroups the odds ratios referred to. The associations in Table 4 as follows: Odds of having hypertension for obese subjects was 4.29 times when compared to those subjects with BMI < 30 kg/m^2; the odds of having hypertension for the low-income group (< 5000 dirhams) was 2.69 times higher than the other group (5000+ dirhams); the odds of having hypertension for subjects with positive family history of diabetes was 2.58 times higher than the subjects with negative family history of diabetes; the odds of having hypertension in those who reported physical inactivity was 1.8 times higher than those who reported being physically active; and those with more than 3 children were 1.67 times at higher risk of having hypertension as compared to those with fewer than 3 children. Thus, there are no contradictions as such in the results.

References

1. Sabri S, Bener A, Eapen V, Abu Zeid MSO, Al-Mazrouei AM, Singh J. Some risk factors for hypertension in the United Arab Emirates. *Eastern Mediterranean health journal*, 2004, 10(4/5):610–9.
2. Bhopal R. *Concepts of epidemiology*. Oxford, Oxford University Press, 2002.
3. Schlesselmann JJ. *Case–control studies. Design, conduct, analysis*. Oxford, Oxford University Press, 1982.

4. Armitage P. *Statistical methods in medical research*. Oxford, Blackwell, 1982.

5. Matthews DE, Farrewell VT. *Using and understanding medical statistics*, 2nd ed. Basel Switzerland, Karger, 1988.

S. Sabri and V. Eapen
Department of Psychiatry, Faculty of Medicine & Health Science
UAE University
Al-Ain, UAE

A. Bener
Department of Medical Statistics and Epidemiology
Hamad General Hospital & Hamad Medical Corporation
Weill Cornell Medical College in Qatar
Doha
Qatar
Correspondence to: abener@hmc.org.qa

M.S.O. Abu Zeid
Primary Health Care Clinic
Oud Al Thoba
Ministry of Health,
Al-Ain, UAE

M. Al-Mazrouei
Khalifa Hospital
Abu Dhabi Health Authority
Abu Dhabi, UAE

J. Singh
Department of Biological Sciences
University of Central Lancashire
Preston, Lancashire
United Kingdom.

Guidelines for authors

1. Papers submitted for publication must not have been published or accepted for publication elsewhere. The Eastern Mediterranean Regional Office reserves all rights of reproduction and republication of material that appears in the *Eastern Mediterranean health journal* (EMHJ).

2. Original papers written in Arabic, English or French may be sent for consideration to the Editor-in-chief, *Eastern Mediterranean health journal*, WHO Regional Office for the Eastern Mediterranean, PO Box 7608, Nasr City (11371), Cairo, Egypt. Papers can also be submitted by email to EMHJ@emro.who.int. Papers will be abstracted in all three languages.

3. The subject of the paper should pertain to public health or some other related technical and scientific subject within the field of interest of the World Health Organization, with special reference to the Eastern Mediterranean Region.

4. Three copies of each manuscript should be provided. The text, together with the accompanying tables and figures, should not exceed 15 double-spaced typewritten or printed A4 pages (4500 words) and should be printed on one side only. When the manuscript is accepted or conditionally accepted, the author will be requested to submit a 3.5 inch computer diskette containing the text, tables, graphs and illustrations. For English and French papers, please provide the text, upon the editor's request, in both wordprocessed format (we prefer Microsoft Word for the PC but can translate most other formats) and also saved as a text/ASCII file. Papers submitted in Arabic should follow the same guidelines as papers written in English or French. If the paper is a translation of all or part of another unpublished work, a copy in the original language should be submitted too. Where possible, graphs should be provided in Harvard Graphics under Windows or Excel, and the illustrations and photographs should be provided in EPS or TIFF format. However, it is necessary to provide three sets of original photographs and figures with the background data. If there is any text or lettering on the photographs, an additional clean set should be provided without the text/lettering.

5. All papers received will be peer reviewed, and on the basis of the reviewer's comments, the Editorial Board reserves the right to accept or reject any paper. Papers are accepted on the understanding that they are subject to statistical and editorial revision as deemed necessary, including abridgement of the text and omission of tabular or graphic material.

6. The title of the paper should be as concise as possible, preferably around 10 words, and should be placed on a separate sheet, together with the full name(s) of the author(s), institutional affiliations(s) and highest scientific degrees obtained. The mailing address, as well as any other contact information (email address, fax, telephone) of the corresponding author should be provided. The number of authors should not exceed five. All authors should have made material contribution to either the design, analysis or writing of the study and have approved the final version submitted. Authors may be asked to verify their contribution. Other names may be included in the acknowledgements.

7. To facilitate the translation of abstracts and authors' names, authors whose mother tongue is written in Arabic characters and writing in English or French should supply their full names in Arabic script and provide transliterations.

8. Papers reporting original research findings should follow the IMRAD format: Introduction; Materials (subjects) and methods; Results; Analysis; and Discussion. An abstract of no more than 100 words should be supplied, clearly and briefly stating the objectives, context, results and conclusions.

9. Authors should verify where appropriate that all persons on whom research has been carried out have given their informed consent, and where participants (living or dead) were unable to give such consent, that surrogate consent was obtained.

10. Review articles should contain sections dealing with objectives, sources, methods of selection, compilation and interpretation of data and conclusions.

11. In-text citations of published works should be limited to essential up-to-date references. Apart from review articles, a maximum of 25 references is advisable. They should be numbered separately as they occur in the text with sequential Arabic numerals in parentheses [square brackets]. These references should appear in a numbered list on a separate page at the end of the paper. They should contain the following elements of information as appropriate: name(s) and initial(s) of author(s); title of paper or book in its original language plus translation; complete name of journal plus volume number and page range; name of publisher (commercial or institutional) and place of publication (city and country); and date of publication. Papers with inadequate references or references not arranged according to these principles will be returned to the author for correction. The following are examples of the Journal's preferred style:

Book: Al Hamza B, Smith A. *The fifth sign of identity*. Cairo, American University Press, 1990.

Journal article: Jones A et al. One day in Tibet. *Journal of tautology*, 1993, 13(5):23–7.

Document: Al-Itneen M, ed. *The principles of uncertainty*. Geneva, World Health Organization, 1985 (document WHO/DOC/537).

12. Figures and tables with appropriate captions should each be on a separate sheet, numbered sequentially with arabic numerals and attached to the end of the paper. Each figure and table should be referred to in the text and its placement in the text should be clearly indicated where appropriate. Where appropriate, sources should be given for each figure or table. If any figures, tables or other materials have been copied from other sources, authors have the sole responsibility for securing the necessary permission. In order to avoid layout problems in final production tables and figures should be limited as far as possible. Not more than one table or figure per 1000 words is preferable. Figures derived from data must be accompanied by those data to enable redrawing if necessary.

13. Original papers and diskettes will not be returned except upon request by the principal author.

14. On publication the authors will receive one copy each of the issue in which the article appears and the principal author will receive 50 reprints. Requests for further reprints and pricing information may be obtained from the Editor-in-chief.

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 الكلمات اللينة الدقيقة 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.

Directives à l'intention des auteurs

1. Les articles soumis pour publication ne doivent pas avoir été publiés ou acceptés pour publication dans d'autres revues. Le Bureau régional de la Méditerranée orientale se réserve tous les droits de reproduction ou de republication des matériels qui paraissent dans *La Revue de Santé de la Méditerranée orientale*.

2. Les articles originaux en anglais, arabe ou en français peuvent être soumis pour considération au Rédacteur en chef de *La Revue de Santé de la Méditerranée orientale*, Bureau régional de l'OMS pour la Méditerranée orientale, BP 7608, Cité Nasr (11371), Le Caire (Égypte). Les articles peuvent également être envoyés par courriel à l'adresse suivante : EMHJ@emro.who.int. Ils seront résumés dans les trois langues.

3. Le sujet de l'article doit concerner la santé publique ou d'autres domaines techniques et scientifiques connexes dans le champ d'intérêt de l'Organisation mondiale de la Santé, se rapportant plus particulièrement à la Région de la Méditerranée orientale.

4. Chaque manuscrit doit être fourni en trois exemplaires. Le texte, avec les tableaux et les figures qui l'accompagnent, ne devrait pas dépasser 15 pages, format A4, dactylographiées ou imprimées en double interligne (4500 mots) et devrait être imprimé sur le recto seulement. Lorsque le manuscrit est accepté, avec ou sans conditions, l'auteur doit soumettre une disquette informatique de 3,5 pouces, contenant le texte, les tableaux, les graphiques et les illustrations. Pour les articles en anglais et en français, à la demande de l'éditeur, le texte devra être fourni en format traitement de texte (de préférence Microsoft Word pour PC, mais la plupart des autres formats peuvent être convertis) et sauvegardé également dans un fichier texte ASCII. Les articles soumis en arabe devraient suivre les mêmes directives que les articles rédigés en anglais ou en français. Si l'article est une traduction, dans son intégralité ou en partie, d'un autre document non publié, une copie de ce document dans la langue d'origine devrait également être soumise. Si possible, les graphiques devraient être fournis en format Harvard Graphics pour Windows ou Excel, et les illustrations et photographies devraient être en format EPS ou TIFF. Toutefois, il est nécessaire de fournir trois jeux des photographies et figures d'origine avec les données de base. Si les photographies comportent un texte ou lettrage, un jeu supplémentaire doit être fourni sans ce texte/lettrage.

5. Tous les articles seront revus par des pairs, et sur la base des commentaires du réviseur, le Comité de rédaction se réserve le droit d'accepter ou de rejeter tout article. Les articles sont acceptés sous réserve de la révision dont ils feront l'objet au plan statistique et rédactionnel, comme jugé nécessaire, ce qui peut amener à abréger le texte et supprimer certaines données présentées sous forme de tableaux ou de graphiques.

6. Le titre de l'article devrait être aussi concis que possible, de préférence 10 mots environ, et devrait être mis sur une page séparée, avec le nom complet de l'auteur (ou des auteurs), l'organisme (ou les organismes) d'appartenance et le diplôme scientifique le plus élevé obtenu. L'adresse pour la cor-respondance, ainsi que toute autre information nécessaire (adresse courriel, télécopie, téléphone) pour contacter l'auteur correspondant devraient être fournies. Le nombre des auteurs ne devrait pas dépasser cinq. Tous les auteurs devraient avoir apporté une contribution matérielle à la conception, à l'analyse ou à la rédaction de l'étude et avoir approuvé la version finale soumise. Une vérification de cette contribution peut être demandée aux auteurs. Les noms d'autres personnes peuvent être inclus dans les remerciements.

7. Afin de faciliter la traduction des résumés et du nom des auteurs, les auteurs dont la langue maternelle s'écrit en caractères arabes et qui rédigent en anglais ou en français doivent fournir leur nom complet en écriture arabe ainsi qu'une transcription.

8. Les articles présentant des résultats de recherche originale devront suivre le format IMRAD : introduction, matériel (sujets) et méthodes ; résultats ; analyse ; et discussion. Un résumé de 100 mots maximum sera fourni, mentionnant clairement les objectifs, le contexte, les résultats et les conclusions.

9. Les auteurs devront vérifier, le cas échéant, que toutes les personnes sur lesquelles la recherche porte ont donné leur consentement éclairé, et lorsque des participants (vivants ou décédés) n'ont pas pu donner ce consentement, qu'un consentement de substitution a été obtenu.

10. Les articles d'analyse devront comporter des sections portant sur les objectifs, les sources, les méthodes de sélection, la compilation et l'interprétation des données et des conclusions.

11. Les citations dans le texte de travaux publiés devraient être limitées aux références essentielles récentes. Hormis les articles d'analyse, il est conseillé de ne pas dépasser 25 références. Elles devraient être numérotées en chiffres arabes placés entre parenthèses [crochets] selon l'ordre dans lequel elles apparaissent dans le texte. Ces références devraient figurer sous forme de liste numérotée sur une page séparée à la fin de l'article. Elles devraient contenir les éléments d'information suivants, selon le cas : nom(s) et initiale(s) de l'auteur/des auteurs ; titre de l'article ou de l'ouvrage dans sa langue originale ainsi que la traduction ; nom complet de la revue ainsi que le numéro du volume et les pages concernées ; nom de la maison d'édition (commerciale ou institutionnelle) et lieu de publication (ville et pays) ; et date de la publication. Les articles comportant des références inadéquates ou dont les références ne sont pas organisées conformément à ces principes seront renvoyés aux auteurs pour correction. Exemples du style préféré de *La Revue* :

Livre : Al Hamza B, Smith A. *The fifth sign of identity*. Cairo, American University Press, 1990.

Article de Revue : Jones A et al. One day in Tibet. *Journal of tautology*, 1993, 13(5):23–7.

Document : Al-Itneen M, ed. *The principles of uncertainty*. Geneva, World Health Organization, 1985 (document WHO/DOC/537).

12. Les figures et les tableaux avec les légendes appropriées devraient être placés chacun(e) sur une feuille séparée, numérotés en chiffres arabes selon l'ordre et joints à la fin du document. Chaque figure et chaque tableau devraient avoir une référence dans le texte et son emplacement dans le texte devrait être indiqué clairement le cas échéant. Au besoin, les sources devraient être mentionnées pour chaque figure ou tableau. Si des figures, tableaux ou d'autres matériels ont été copiés d'autres sources, les auteurs portent l'entière responsabilité d'obtenir l'autorisation nécessaire. Afin d'éviter les problèmes de mise en page lors de la production finale, le nombre de tableaux et figures devrait être limité autant que possible. Il est préférable de ne pas avoir plus d'un tableau ou d'une figure pour 1000 mots. Les figures établies à partir de données doivent être accompagnées de ces données pour permettre une recomposition, le cas échéant.

13. Les articles originaux et les disquettes ne seront pas renvoyés sauf si l'auteur principal en fait la demande.

14. Lors de la publication, les auteurs recevront chacun un exemplaire du numéro dans lequel l'article paraît et l'auteur principal recevra 50 tirés à part. Les demandes de tirés à part supplémentaires et les informations sur le prix peuvent être obtenues auprès du Rédacteur en chef.

WHO sales and discount policy

Objective

Within the financial obligations of the publishing and distribution process, prices of WHO publications are kept as low as possible in order to maximize their dissemination and reach readers for whom they are intended.

The price and discount policies for WHO/EMRO and WHO/HQ publications are as follows:

Price and discount policy for WHO/EMRO publications

- EMRO publications are priced in US dollars.
- Sales agents receive a 40% discount and 30 days credit. Credit limit is US$ 500.00.
- Bulk orders of individual books, i.e. 1000 copies per title, qualify the agent for a 50% discount instead of a 40% discount; however, payment of total value must be made before dispatch of publications is effected.
- Dispatch charges are calculated at 25% of cover prices.
- Present delivery time average is two weeks from date of receipt of firm order.

Price and discount policy for WHO/HQ publications

- WHO/HQ publications and subscriptions are priced in Swiss francs. Clients in developing countries are eligible for a special tariff which in all cases is 30% less than the Swiss francs regular prices.
- Sales agents receive a 40% discount for book orders and 20% for subscription orders. Credit limit is Swiss francs 1000.00.
- Bulk orders qualify the agents for a special higher discount, provided the dispatch of the whole order is done to the same consignee. In this case, a proforma invoice will be issued by WHO/HQ, and the order will be dispatched only upon receipt of payment. No return of books or periodicals will be accepted.
- Payment of invoices may be made in US dollars at the official rate of exchange at the date of payment.
- Present delivery time average is four weeks from date of receipt of orders.

A WHO/EMRO Publications Price List is available on request.

البلدان أعضاء اللجنة الإقليمية لشرق المتوسط في منظمة الصحة العالمية

الأردن أفغانستان الإمارات العربية المتحدة باكستان البحرين تونس
الجماهيرية العربية الليبية جمهورية إيران الإسلامية الجمهورية العربية السورية
الجمهورية اليمنية جيبوتي السودان الصومال العراق عمان فلسطين قطر
الكويت لبنان مصر المغرب المملكة العربية السعودية

Member States of the World Health Organization
Eastern Mediterranean Regional Committee

Afghanistan Bahrain Djibouti Egypt Islamic Republic of Iran
Iraq Jordan Kuwait Lebanon Libyan Arab Jamahiriya Morocco
Oman Pakistan Palestine Qatar Saudi Arabia Somalia Sudan
Syrian Arab Republic Tunisia United Arab Emirates Republic of Yemen

États Membres du Comité régional de la Méditerranée orientale
de l'Organisation mondiale de la Santé

Afghanistan Arabie saoudite Bahreïn Djibouti Égypte
Émirats arabes unis République islamique d'Iran Iraq
Jamahiriya arabe libyenne Jordanie Koweït Liban Maroc
Oman Pakistan Palestine Qatar République arabe syrienne Somalie
Soudan Tunisie République du Yémen

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

Subscription details

Individual copies: US$ 15.00
Annual subscription: US$ 60.00
There is a 50% discount for orders from developing countries
Prices include cost of dispatch

Contents