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المجلة الصحية لشرق المتوسط

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In order to protect people participating in health research and ensure their human rights are respected, ethical principles have been developed for the conduct of research involving humans, such as informed consent, confidentiality and protection of privacy. WHO provides leadership and guidance on ethics issues related to human health, including health research.

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المجلد الثاني والعشرون / عدد ١
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المجلة الصحية لشرق المتوسط

هى المجلة الرسمية التى تصدر عن المكتب الإقليمى لشرق المتوسط بمنظمة الصحة العالمية. وهى منبر لتقديم السياسات والمبادرات الجديدة فى الخدمات الصحية والترويج لها، ولتبادل الآراء والمفاهيم والمعطيات الوبائية ونتائج الأبحاث وغير ذلك من المعلومات، وخاصة ما يتعلق منها بإقليم شرق المتوسط. وهى 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 فى 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 SANTÉ DE LA MÉDITERRANÉE 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 ser-vices de santé ainsi qu'à l'échange d'idées, de concepts, de données épidémiologiques, de résultats de recherches et d'autres informations, se rapportant plus particulièrement à la Région de la Méditerranée orientale. Elle s'adresse à tous les professionnels de la santé, aux membres des instituts médicaux et autres instituts de formation médico-sanitaire, aux ONG, Centres collaborateurs de l'OMS et personnes concernés au sein et hors de la Région.

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Contents

المجلة الصحية لشرق المتوسط

EMHJ

Editorial

Ethics and health in WHO Regional Office for the Eastern Mediterranean

Ala Alwan[1]

The constitution of WHO states that, "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being". Ethics therefore underpin the work of WHO. Governments too have an ethical responsibility to protect and promote the health their peoples at the public health level through the provision of appropriate and adequate health and social services, as do health care professionals working at the individual and community level in primary health centres and hospitals in both the public and private sector.

Health research involving humans is essential to the advancement of health but to safeguard the participants, ethical principles have been laid down for its conduct, such as informed consent, confidentiality and protection of privacy and ethical clearance of research by a qualified and authorized ethics committee.

The scope of ethics within health, health care delivery and health advancement is diverse and varying. Developments and advancements in medicine and medical practice as well as the emergence of new diseases and re-emergence of old ones can raise important questions that require ethical consideration. The HIV/AIDS epidemic brought up issues of equitable access to HIV services and treatment, as well as testing and counselling. Outbreaks and emergencies have raised issues such as prioritization of access to health care resources when demand is increased and shortages may occur, responsibilities of healthcare workers in light of the risks to their own health and safety, and the balance between reducing disease spread by isolation and travel restrictions and protecting the individual right to free movement. During the recent Ebola outbreak in West Africa, several other ethical issues have been raised concerning the use of unregistered interventions, the equitable distribution of such interventions and data collection while providing optimal care with a scarcity of resources. Public health surveillance has raised concerns of informed consent and the provision of standards of care, while human organ and tissue transplantation requires consideration of issues like sources and allocation of organs.

Within its ethics mandate, WHO is required to provide leadership and guidance to Member States on a wide range of public health ethics issues and support them in handling bioethics issues arising in their own countries. WHO articulates ethical and evidence-based policy options, promotes ethics-based approaches to health protection and promotion, and supports capacity-building to address ethical issues in public health nationally, regionally and globally.

A vital aspect of health research, and an ethical obligation for researchers, is the reporting of research findings in order to provide data and evidence for knowledge translation which may advance health and inform and guide policy-makers. The *Eastern Mediterranean Health Journal* (EMHJ) has been contributing to the dissemination of health research for 21 years and has endeavoured to maintain high ethical standards for the research articles it publishes, following established international ethical standards and guidelines on the conduct and publication of health research. However, it is apparent that those submitting papers to EMHJ are not always aware of their ethical obligations. Therefore, in order to articulate EMHJ's position on the conduct and reporting of research, and with the support and guidance of the Editorial Board, EMHJ has developed the Guidelines on the Ethical Conduct and Publication of Health Research. These aim to provide health researchers with information on the ethical standards they are expected to conform to in their papers submitted for consideration for publication.

The WHO Regional Office for Eastern Mediterranean is committed to enhancing bioethics capability in countries of the Region. In that regard and to inform readers of this work, we are pleased to publish in this issue of EMHJ three pieces related to ethics and health in the Region: a report on the work of the Eastern Mediterranean Research Ethics Review Committee; an overview of ethics in health practice and research in the Region; and the EMHJ Guidelines on the Ethical Conduct and Publication of Health Research.

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Improved water and child health in Egypt: impact of interrupted water supply and storage of household water on the prevalence of diarrhoea

R. Roushdy [1] and M. Sieverding [2]

المياه المحسَّنة وصحة الأطفال في مصر: تأثير انقطاع إمدادات المياه وتخزين المياه في المنازل على انتشار الإسهال

رانية رشدي، مايا سيفردنج

الخلاصة: تقترب مصر من إتاحة الحصول على إمدادات مياه محسَّنة للجميع، ولكن التفاوت في جودة المياه المحسَّنة قد يكون له أثر صحي ملموس. ولقد استقصينا أثر مختلف تدابير الحصول على مياه محسَّنة على انتشار الإسهال بين الأطفال الذين تقل أعمارهم عن 5 سنوات. وباستخدام بيانات من المسح السكاني والصحي لمصر لعام 2008 وتقنيات المطابقة بين درجات الميل المحرزة، قارنّا بين أطفال في أسر لديها إمدادات مياه محسنة بحسب احتمالية انقطاعات في الإمدادات، وتخزين المياه في المنزل. فوجدنا أن الحصول على مياه محسنة لا تتعرض إلى انقطاعات قد أسفر عن انخفاض ملحوظ في انتشار الإسهال قدره 2.6 (نسبة الانخفاض في المناطق الريفية 4.7)، وأن الحصول على مياه محسنة لا تخزَّن قبل الاستخدام أدى إلى انخفاض بنسبة 3.5٪. هناك حاجة إلى إجراء مزيد من البحوث للوصول إلى فهم أفضل لطبيعة وأسباب انقطاع مياه المنازل في مصر، بغية التصدي لتحديات البنية التحتية المحتملة التي تؤدي إلى نتائج صحية أسوأ.

ABSTRACT Egypt is approaching universal access to improved water supply, but the variable quality of improved water may have a measureable health impact. We investigated the impact of different measures of improved water access on the prevalence of diarrhoea among children aged under 5 years. Using data from the 2008 Egypt Demographic and Health Survey and propensity score matching techniques we compared children in households with improved water supplies, with/without interruptions to supplies and with/without in-home storage of water. Access to improved water that was not subject to cuts resulted in a significant 2.6 percentage point reduction in the prevalence of diarrhoea (4.7% reduction in rural areas), and access to improved water that was not stored prior to use resulted in a 3.5% reduction. Further research is needed to better understand the nature and causes of piped water interruptions in Egypt, in order to address potential infrastructure challenges that are leading to poorer health outcomes.

Eau améliorée et santé de l'enfant en Égypte : impact de l'interruption de l'approvisionnement en eau et de la conservation de l'eau à usage domestique sur la prévalence de la diarrhée

RÉSUMÉ L'Égypte se rapproche de l'accès universel à l'approvisionnement en eau améliorée, cependant la qualité variable de l'eau améliorée peut avoir un impact sanitaire mesurable. Nous avons examiné l'impact de différentes mesures d'accès à l'eau améliorée sur la prévalence de la diarrhée chez des enfants de moins de cinq ans. A l'aide de données issues de l'Enquête démographie et sanitaire en Égypte de 2008, et de la méthode d'appariement par scores de propension, nous avons comparé des enfants vivant dans des foyers dotés d'un approvisionnement en eau améliorée, avec ou sans interruption d'approvisionnement et avec ou sans stockage de l'eau à domicile. L'accès à une eau améliorée qui n'avait pas fait l'objet de coupures entraînait une réduction importante de 2,6 points de pourcentage de la prévalence de la diarrhée (4,7 % de réduction dans les zones rurales), tandis que l'accès à une eau améliorée qui n'avait pas été stockée avant utilisation correspondait à une réduction de 3,5 points de pourcentage. Davantage de recherches sont nécessaires pour mieux comprendre la nature et les causes des coupures d'eau courante en Égypte, afin de lutter contre les problèmes d'infrastructure potentiels qui entraînent une dégradation des résultats sanitaires.

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Introduction

The Millennium Development Goal (MDG) of reducing by half the world's population that lives without sustainable access to safe drinking water has been met (*1*). However, as acknowledged by the WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (*2*), the current definition of improved water and means of measuring access are imperfect proxies for sustainable access, and leave many factors unexplored, such as water quality, continuity of supply and maintenance of facilities (*3–5*). As more countries, and regions within countries, approach universal access to improved water supply it is therefore increasingly important to re-evaluate what sustainable access to this basic service means. This issue has been part of the impetus for maintaining a dedicated water goal among the post-2015 Sustainable Development Goals (SDGs).

Egypt is one of the middle-income countries that has met the MDG water target, and in which coverage of an improved water supply according to the current JMP definition is nearly universal, at 99%, with 96% of households having water that is piped onto the premises (*1*). However, the quality of delivery continues to serve as a barrier to sustainable access at the sub-national level (*6,7*). This makes Egypt an ideal context in which to examine the effect of access to improved water—using alternative definitions to those of the JMP—on child health.

A major motivation for the provision of improved water supply is the high disease burden associated with the consumption of contaminated water, much of which is attributable to diarrheal disease (*8,9*). In Egypt, the limited literature on the topic has suggested that contamination of drinking water is a concern due to the poor quality of the pipes that connect households to water treatment facilities (*6,7*). Leaking pipes allow contaminated groundwater to enter the drinking supply, as evidenced by higher bacterial counts at the point of water usage than at treatment sites (*7*). This problem may be exacerbated by breaks in water pumping, as more groundwater enters the pipe system when it is not pressurized (*5,7*). Public officials have also blamed several diarrhoeal outbreaks in recent years on water that was contaminated due to poor pipe quality (*10,11*). These arguments emphasize the need for a more nuanced examination of the quality of improved services.

A large number of studies have investigated the impact of water supply on child health worldwide. Systematic reviews and meta-analyses (*3,12–14*), as well as cross-national studies (*15*), have found that improvements in water quality and increased water supply are effective in reducing morbidity due to diarrhoea. Individual and multi-country studies, however, have highlighted important differences in quality among types of water supply that are classified as improved (*4,16*). In Egypt, to the best of our knowledge, the limited research on the impact of water supply on child health has found that access to better quality water is associated with reductions in child mortality (*17,18*). Findings regarding the association with child diarrhoea have been more mixed (*19,20*). The results are also sensitive to the method of estimation (*18,20*), suggesting that the statistical approach adopted in the study, as well as the definition used for improved water supply, may affect measures of the impact of improved water supply on child health.

A problem that arises when attempting to quantify the effect of interventions aiming to improve water supply is that if we observe a household with improved drinking water, we will not be able to simultaneously observe the same household without access to improved services. This issue, which can be thought of as a missing data problem, biases the results of simple choice regressions and hazard models, since unobserved characteristics of households may be important determinants both of the household water source and the incidence of childhood diarrhoea (*18*). Propensity score matching (PSM) methods have been widely used in the impact evaluation literature on access to water supply and sanitation to correct for this self-selection or simultaneity problem (*21–24*). PSM matches subjects in the intervention (treated) group with subjects in the control (untreated) group based on the likelihood of being in treatment status as a function of observed characteristics (*25,26*). Throughout the paper we use the term "treated" to refer to the intervention group with higher-quality water supply, by various definitions, and not treated in the sense of water treatment practices. PSM techniques therefore have the advantage over regression and hazard models of allowing the analyst to isolate a control group that best approximates the characteristics of the intervention group in order to estimate treatment effects, even when using observational data (*26,27*). Matching techniques, however, do not control for selection based on unobserved characteristics. To reduce the possibility of selection bias when using matching methods, researchers often control for a wide range of locality and household characteristics that might be correlated with the treatment and the outcome variables (*26*). Following this literature, we use PSM methods to estimate the impact of improved water service quality on the prevalence of diarrhoea among children aged under 5 years in Egypt.

Methods

Study design and data source

Our analysis used data from the 2008 Egypt Demographic and Health Survey (EDHS), which successfully interviewed 18 968 households containing 10 581 children younger than 5 years old. The outcome of interest was diarrhoea prevalence, as measured by whether a child was reported by the mother to have experienced diarrhoea during the 2-week period preceding the survey. The primary analytical unit for this analysis was the 9992 children for whom data were available on diarrhoea occurrence in the past 2 weeks.

Definitions of improved water

Based on the WHO/UNICEF JMP definition for "improved" water (*1*), the 2008 EDHS defines improved sources of drinking water as water obtained from a piped source within the dwelling, a public tap, a tubewell, borehole or a protected well or spring (*28*). This definition will henceforth be referred to as the JMP definition. Access to improved water services according to the JMP definition is nearly universal in Egypt, at 98% of households in 2008. The JMP definition for improved water supply does not account for the quality of service delivery, yet a significant percentage of households in the EDHS experienced problems with service quality. According to the EDHS data, 29% of households with improved water supply experienced a cut in water availability during the 2 weeks prior to the survey, and 17% of households stored their water (authors' calculations).

We exploited these indicators of service delivery from the EDHS to create 2 alternative indicators for water quality among households that had an improved water supply according to the JMP definition. A household was defined as having: (*1*) "improved–uninterrupted" water supply if it had access to an improved source of drinking water with no interruption in water supply in the past 2 weeks, and (*2*) "improved–unstored" drinking water if it had access to an improved source of drinking water and did not store that water before use. Due to the small number of children living in households with an unimproved water supply according to the JMP definition (Table 1), these children were dropped from the analysis.

The definitions of improved–uninterrupted and improved–unstored water were not mutually exclusive; 55% of children had access to both types of water supply. We therefore also tested the impact of having both improved–uninterrupted and improved–unstored water by comparing children with improved–uninterrupted–unstored water with children in all other households with improved water; and with children in households with improved–interrupted–stored water. Finally, we tested the net effect of having uninterrupted water, controlling for storage practices, by comparing children in households with improved–uninterrupted–unstored water with children with improved–interrupted–unstored water.

Table 1 Prevalence of diarrhoea in the 2 weeks prior to the survey, by different definitions of improved water supply

Definition	No. of children	Prevalence of diarrhoea (%)[d]	*P*-value
JMP definition[a]			
Improved	9731	8.4	NS
Unimproved	261	6.9	
Total	9992	8.4	
Improved–uninterrupted definition[b]			
Improved–uninterrupted	5738	7.0	< 0.001
Improved-interrupted	3993	10.6	
Improved–unstored definition[c]			
Improved–unstored	7909	7.8	< 0.001[e]
Uninterrupted	5395	7.5	
Interrupted	2514	10.8	
Improved–stored	1822	11.2	
Uninterrupted	343	10.8	
Interrupted	1479	12.4	

[a]Water obtained from a piped source within the dwelling, a public tap, a tubewell, borehole or a protected well or spring; [b]Improved water supply with no interruption in water supply in the past 2 weeks; [c]Improved water supply and household does not store water before use.
[d]Calculations use Egypt Demographic and Health Survey sample weights.
[e]P-value for improved–unstored versus improved–stored.
JMP = WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation; NS = not significant.

Estimation techniques

Our primary estimation technique was one-to-one propensity score matching, in which each treated case was matched to the control case that had the closest propensity score (*27*). Throughout the paper, we defined treatment status as having access to improved water supply in the household of residence, but we used varying definitions of "improved", as explained above. For all analyses, we estimated the average treatment effect on the treated, which estimates the effect of the intervention—in our case access to improved water—on treated (intervention) units only (*26*). Standard errors of the estimates of average treatment effect on the treated were adjusted to account for the fact that the propensity score was estimated using a logistic regression model prior to the match, rather than known *a priori* (*27*).

To reduce the possibility of selection bias when using matching methods, we used a range of child, parental and household characteristics that might be correlated with both treatment status and the outcome variable to predict the propensity score (*26*). The likelihood of children being in treatment status, i.e. to be living in a household with improved water supply, was estimated using a core set of variables that consisted of wealth quintile (ordinal variable), region of residence, mother's and father's education in years, mother's age in years, child's age in months, dummy variables for dwelling type (apartment, house or other) and whether the household had livestock. These variables were selected based on their theoretical importance in predicting child diarrhoea or their identification in previous studies as risk factors for diarrhoea infection in Egypt (*29*). Additional covariates were needed to achieve balance in some of the PSM matching analyses. These primarily consisted of dummy variables for different combinations of region and wealth, as urban residence and higher wealth quintile were the variables on which selection into treatment status consistently occurred. All PSM analyses were run without replacement with a caliper of 0.03 (*27*) and standard errors were calculated using robust Abadie–Imbens standard errors (*30*).

To check the robustness of our results, for each analysis we compared the results produced by PSM with those produced by simple logistic regression and coarsened exact matching (CEM). CEM matches each treated case to all of the control cases with the same values on a range of coarsened covariates, approximating exact matching (*31*). For example, age in years is coarsened into age groups, and CEM then matches onto those groups. Compared with PSM, CEM tends to produce fewer matches but may improve balance (*23*). For consistency, we used the same set of covariates across all 3 methods—PSM, CEM and logistic regression—for each analysis.

Rural–urban differences

Based on the 2008 EDHS, 51.7% of households, containing 63.4% of the children aged under 5 years, resided in rural areas in Egypt, making this an important subpopulation for child health outcomes. Household-level connections to water systems are difficult to establish and maintain where populations are dispersed, and the rural water infrastructure in particular suffers from maintenance challenges in many low- and middle-income countries (*8*). In Egypt, many of the community-specific problems with pipe maintenance have been found in rural areas (*6,7*). We therefore hypothesized that the impact of having improved–uninterrupted water on child diarrhoea would be larger in rural areas, because poorer pipe maintenance in these areas may lead to greater risk of water contamination during breaks in pumping. To test this hypothesis, we conducted a separate analysis for the improved–uninterrupted treatment definition by residence.

Results

Effect of improved–uninterrupted and improved–unstored water access

Table 1 shows that 8.4% of children younger than 5 years of age were reported by their mothers to have experienced diarrhoea during the 2-week period preceding the survey. There was no significant difference in the percentage of children who experienced diarrhoea between those living in households with unimproved and improved water supply according to the JMP definition ($P = 0.20$).

In contrast, under both the improved–uninterrupted and improved–unstored definitions of water supply, children residing in households with poorer quality water supply (improved-interrupted or improved-stored, respectively) were significantly more likely to have suffered from diarrhoea ($P < 0.001$). Due to the small number of children living in households with an unimproved water supply according to the JMP definition (Table 1), adequate balance on key covariates could not be achieved and the PSM results were unreliable. We therefore present the multivariate results for the other definitions only.

PSM matching results for the improved–uninterrupted definition are shown in the first panel of Table 2, comparing children in households with improved water supplies that were uninterrupted (intervention) with those for whom water supplies was interrupted (control). PSM resulted in improved covariate balance across the treatment and control groups on nearly all covariates (Table 3). The results indicate that having access to improved water supplies that were uninterrupted resulted in a 2.6 percentage point decline (95% CI: –0.9% to –4.3%) in

Table 2 Estimates of the impact of different definitions of improved water supply on the prevalence of diarrhoea in children under 5 years old: comparison of propensity score matching (PSM), coarsened exact matching (CEM) and logistic regression analysis

Definition/analysis method	No. of treated	No. of controls	Estimate (% point change)[a]	SE of % point change	95% CI of % point change	*P*-value
Main definitions						
Improved–uninterrupted definition: Improved–uninterrupted vs improved–interrupted						
PSM	5634	3877	–0.026	0.009	–0.043 to –0.009	< 0.01
CEM	3356	2501	–0.019	0.006	–0.029 to –0.007	< 0.001
Logistic regression	5738	3993	–0.031	0.005	–0.042 to–0.021	< 0.001
Improved–unstored definition: Improved–unstored vs improved–stored						
PSM	7764	1779	–0.035	0.012	–0.059 to–0.012	< 0.01
CEM	3289	1259	–0.027	0.007	–0.040 to–0.013	< 0.001
Logistic regression	7909	1822	–0.030	0.006	–0.044 to–0.016	< 0.001
Combined effects analysis						
Combined effects analysis 1: Improved–uninterrupted–unstored vs all other improved						
PSM	5302	4195	–0.027	0.009	–0.043 to–0.010	< 0.01
CEM	3232	2654	–0.020	0.006	–0.030 to–0.008	< 0.001
Logistic regression	5395	4336	–0.032	0.005	–0.042 to–0.022	< 0.001
Combined effects analysis 2: Improved–uninterrupted–unstored vs improved–interrupted–stored						
PSM	5302	1409	–0.050	0.015	–0.079 to–0.022	< 0.001
CEM	1996	868	–0.030	0.008	–0.045 to–0.015	< 0.001
Logistic regression	5395	1479	–0.047	0.006	–0.064 to–0.029	< 0.001
Combined effects analysis 3: Improved–uninterrupted–unstored vs improved–interrupted–unstored						
PSM	5302	2443	–0.028	0.009	–0.046 to–0.010	< 0.01
CEM	2721	1574	–0.013	0.006	–0.025 to–0.001	< 0.05
Logistic regression	5395	2514	–0.028	0.005	–0.040 to–0.015	< 0.001
Rural-urban analysis						
Improved–uninterrupted vs improved–interrupted: children residing in rural households only						
PSM	3372	2684	–0.047	0.010	–0.068 to–0.027	< 0.001
CEM	2130	1818	–0.025	0.009	–0.043 to–0.007	< 0.01
Logistic regression	3442	2748	–0.036	0.006	–0.049 to–0.023	< 0.001
Improved–uninterrupted vs improved–interrupted: children residing in urban households only						
PSM	2260	1186	–0.017	0.014	–0.045 to 0.011	
CEM	1286	730	–0.008	0.011	–0.030 to 0.013	
Logistic regression	2296	1245	–0.022	0.009	–0.041 to–0.004	< 0.05

[a]*Estimates for the CEM and logit models are marginal effects*
SE = standard error; CI = confidence interval.

the prevalence of diarrhoea in children under 5 years (Table 2), somewhat smaller than the estimate produced by the unmatched logit (the full logit models for all analyses are presented in Appendix 1, which is available in the on line version on the EMHJ website). As expected, CEM resulted in a substantially smaller analytic sample, as there were more unmatched (off common support) cases that were deleted from the sample than with PSM. The CEM analysis produced only a 1.9 percentage point reduction in diarrhoea prevalence (95% CI: –0.7% to –2.9%), but the

result was still significant ($P < 0.001$). Access to improved water supplies that were unstored resulted in a 3.5 percentage point reduction (95% CI: –1.2% to –5.9%) in the prevalence of diarrhoea under PSM matching (Table 2; balance statistics in Table 4). The CEM and logit results again showed somewhat smaller percentage point reductions.

Combined effects analysis

Turning to the analyses of the combined effects of these 2 types of higher-quality improved water, the second panel of Table 2 compares children in households with the "best" improved water (i.e. uninterrupted and unstored) against children with all other forms of improved water, as well as against children with the "worst" improved water (i.e. interrupted and stored). For the first analysis, we obtained estimates of similar magnitude as the improved–uninterrupted definition, with a 2.7 percentage point reduction (95% CI: –1.0% to –4.3%) in diarrhoea prevalence under PSM (balance statistics in Table 5). However, in the second analysis, we obtained an estimate of a 5.0 percentage point reduction (95% CI: –2.2% to –7.9%) in diarrhoea prevalence. The CEM and logit estimates were also larger than in the earlier analyses. However, the balance statistics on several covariates was not optimal under this specification, likely due to the relatively small number of children in the control group (Table 6).

To control for potential effects of improper storage practices, we then investigated the net effect of having an uninterrupted water source among households that did not store water (Table 2). Among children with improved–unstored water, the net effect of having an uninterrupted water supply was a 2.8 percentage point reduction (95% CI: –1.0% to –4.6%) in diarrhoea prevalence compared with those with interrupted supplies (balance statistics in Table 7). The estimate under CEM, however, was smaller, indicating a 1.3 percentage point reduction (95% CI: –0.1% to –2.5%) ($P < 0.05$).

Rural–urban differences

Having an interrupted water supply was more common in rural areas than in urban ones; 46% of rural children compared with 32% of urban children lived in a household where the water had been cut off at least once in the past 2 weeks. The third panel of Table 2 shows that, as expected, rural areas accounted for a greater part of the effect seen with the improved–uninterrupted definition. Access to this type of water resulted in a 4.7 percentage point reduction (95% CI: –2.7% to –6.8%) in diarrhoea prevalence among children in rural areas under the PSM specification (balance statistics in Table 8) compared with only a 1.7 percentage point reduction for those in urban areas. This result was again robust to CEM, although with a smaller estimated reduction of 2.5 percentage points (95% CI: –0.7% to –4.3%). The estimate under the logistic regression model showed a 3.6 percentage point reduction. Among children in urban areas, the estimates for the impact of improved–uninterrupted water, while negative, were not significant under either PSM or CEM (balance statistics in Table 9).

Discussion

The results of this study support the growing body of evidence that there is a high degree of variability in the quality of improved water, including piped water, in low- and middle-income countries (*4,16*), and that these variations have measurable health impacts (*5,16*). We found that having access to an improved water supply that was not subject to cut-offs reduced the prevalence of diarrhoea in children under age 5 years in Egypt, as did access to improved water that was not stored prior to use. These results were robust both to the matching method used, and to different forms of overlap between improved–uninterrupted and improved–unstored water. These overall results were driven by treatment effects in rural areas, where access to an improved water supply that was uninterrupted led to substantial reductions in the prevalence of diarrhoea in under-5s. In contrast, no treatment effects were found in urban areas. This confirms our hypothesis that the effects of an improved–uninterrupted water supply would be greater in rural areas, where access to this type of water is also less common. Although we are not able to assess the quality of water at the source, these findings are consistent with arguments that the poor quality of pipes, potentially in combination with pauses in water pumping, is leading to water contamination.

We also found that treatment effects for children with the highest quality water as compared to those with the lowest quality were particularly large, suggesting that there is a compounding effect between poor quality water delivery and improper water storage practices. This agrees with previous studies that have found that improper water storage practices are a source of contamination even for water that may be clean at the source, and can lead to negative health impacts (*32,33*). However, given that a substantial percentage of households in Egypt do experience water cuts with some regularity, and there is an association between cuts and water storage, it is unrealistic to propose that in-home water storage be abandoned. Thus, in the absence of more continuous water supplies, interventions to promote proper water storage and water treatment practices would be expected to have a positive impact on child health (*5*). Water purification at home is currently very uncommon in Egypt, making this an area with substantial

Table 3 Balance statistics for the effect of the improved–uninterrupted definition of improved water supplies on the prevalence of diarrhoea in children, using propensity score matching (PSM) analysis

Variable	Unmatched sample					PSM matched sample				
	Mean treated	Mean control	% bias	*t*-value	*P*-value	Mean treated	Mean control	% bias	*t*-value	*P*-value
Region										
Urban Lower Egypt	0.091	0.076	5.4	2.62	0.009	0.092	0.092	0.2	0.1	0.922
Rural Lower Egypt	0.291	0.259	7.3	3.55	< 0.001	0.291	0.297	–1.3	–0.68	0.495
Urban Upper Egypt	0.133	0.105	8.6	4.14	< 0.001	0.133	0.138	–1.5	–0.77	0.441
Rural Upper Egypt	0.303	0.400	–20.4	–9.96	< 0.001	0.302	0.299	0.5	0.27	0.789
Frontier governorates	0.022	0.089	–29.7	–15.26	< 0.001	0.021	0.021	0.1	0.07	0.947
Wealth quintile										
Wealth quintile 2	0.191	0.209	–4.7	–2.27	0.023	0.191	0.190	0.2	0.12	0.905
Wealth quintile 3	0.198	0.196	0.5	0.24	0.808	0.199	0.199	–0.1	–0.05	0.962
Wealth quintile 4	0.227	0.162	16.3	7.76	< 0.001	0.226	0.246	–4.9	–2.4	0.017
Wealth quintile 5	0.235	0.160	18.8	8.93	< 0.001	0.235	0.227	1.9	0.96	0.336
Dwelling type										
House	0.415	0.524	–22.0	–10.70	< 0.001	0.412	0.395	3.4	1.84	0.065
Apartment	0.566	0.458	21.7	10.55	< 0.001	0.569	0.585	–3.1	–1.66	0.097
Parents' education										
Father's education	9.295	8.201	20.4	9.93	< 0.001	9.307	9.372	–1.2	–0.66	0.510
Mother's education	8.182	6.507	30.0	14.62	< 0.001	8.199	8.272	–1.3	–0.71	0.478
Age										
Mother's age (years)	28.491	28.472	0.3	0.16	0.872	28.494	28.372	2.1	1.12	0.261
Child's age (months)	28.212	28.116	0.6	0.27	0.788	28.205	27.729	2.7	1.48	0.140
Livestock										
Yes	0.242	0.395	–33.4	–16.43	< 0.001	0.241	0.244	–0.6	–0.33	0.742
Combined categories										
Upper Egypt rural poor	0.198	0.280	–19.2	–9.42	< 0.001	0.202	0.187	3.6	2.02	0.043

Table 4 Balance statistics for the effect of the improved–unstored definition of improved water supplies on the prevalence of diarrhoea in children, using propensity score matching (PSM) analysis

Variable	Unmatched sample					PSM matched sample				
	Mean treated	Mean control	% bias	*t*-value	*P*-value	Mean treated	Mean control	% bias	*t*-value	*P*-value
Region										
Urban Lower Egypt	0.095	0.042	21.2	7.38	< 0.001	0.094	0.105	1.3	–2.31	0.021
Rural Lower Egypt	0.288	0.235	12.0	4.54	< 0.001	0.287	0.283	1.0	0.62	0.533
Urban Upper Egypt	0.128	0.091	12.0	4.43	< 0.001	0.128	0.124	1.4	0.85	0.397
Rural Upper Egypt	0.325	0.417	–19.0	–7.45	< 0.001	0.326	0.322	0.8	0.48	0.631
Frontier governorates	0.030	0.132	–38.0	–18.48	< 0.001	0.030	0.030	0.0	0.00	1.000
Wealth quintile										
Wealth quintile 2	0.194	0.218	–6.0	–2.30	0.021	0.195	0.189	1.3	0.86	0.392
Wealth quintile 3	0.201	0.182	5.0	1.89	0.058	0.202	0.203	–0.4	–0.24	0.810
Wealth quintile 4	0.209	0.160	12.7	4.69	< 0.001	0.209	0.200	2.3	1.35	0.176
Wealth quintile 5	0.217	0.148	18.0	6.56	< 0.001	0.216	0.223	–1.8	–1.03	0.304
Dwelling type										
House	0.439	0.552	–22.8	–8.79	< 0.001	0.438	0.440	–0.5	–0.29	0.771
Apartment	0.542	0.433	21.9	8.43	< 0.001	0.544	0.539	1.0	0.60	0.551
Education										
Father's education	9.034	8.035	18.5	7.18	< 0.001	9.022	8.977	0.8	0.53	0.598
Mother's education	7.772	6.289	26.6	10.21	< 0.001	7.761	7.844	–1.5	–0.93	0.355
Age										
Mother's age (years)	28.509	28.371	2.3	0.90	0.369	28.499	28.591	–1.5	–0.96	0.336
Child's age (months)	28.152	28.262	–0.6	–0.24	0.807	28.157	27.656	2.9	1.79	0.074
Livestock										
Yes	0.278	0.421	–30.4	–12.09	< 0.001	0.278	0.279	–0.3	–0.20	0.844
Combined categories										
Upper Egypt rural poor	0.216	0.300	–19.3	–7.71	< 0.001	0.220	0.219	0.4	0.23	0.816
Lower Egypt rural poor	0.088	0.112	–7.8	–3.12	0.002	0.090	0.099	–3.1	–1.98	0.048

Table 5 Balance statistics for the effect of the improved–uninterrupted–unstored versus all other definitions of improved water supplies on the prevalence of diarrhoea in children, using propensity score matching (PSM) analysis

Variable	Unmatched sample					PSM matched sample				
	Mean treated	Mean control	% bias	*t*-value	*P*-value	Mean treated	Mean control	% bias	*t*-value	*P*-value
Region										
Urban Lower Egypt	0.094	0.073	7.4	3.63	< 0.001	0.095	0.095	0.1	0.03	0.974
Rural Lower Egypt	0.293	0.259	7.8	3.80	< 0.001	0.293	0.289	0.7	0.36	0.716
Urban Upper Egypt	0.133	0.108	7.7	3.76	< 0.001	0.133	0.139	–1.8	–0.88	0.380
Rural Upper Egypt	0.293	0.404	–23.4	–11.53	< 0.001	0.293	0.291	0.3	0.15	0.881
Frontier governorates	0.021	0.085	–28.9	–14.63	< 0.001	0.020	0.021	–0.3	–0.21	0.836
Wealth quintile										
Wealth quintile 2	0.190	0.208	–4.5	–2.20	0.028	0.191	0.183	2.0	1.07	0.284
Wealth quintile 3	0.197	0.198	–0.3	–0.14	0.888	0.197	0.197	0.1	0.07	0.942
Wealth quintile 4	0.228	0.166	15.6	7.54	< 0.001	0.228	0.246	–4.6	–2.19	0.028
Wealth quintile 5	0.241	0.158	20.9	10.07	< 0.001	0.241	0.236	1.3	0.62	0.538
Dwelling type										
House	0.407	0.525	–23.7	–11.64	< 0.001	0.405	0.405	0.1	0.04	0.968
Apartment	0.574	0.458	23.3	11.44	< 0.001	0.576	0.577	–0.3	–0.16	0.875
Parents' education										
Father's education	9.347	8.224	21.0	10.30	< 0.001	9.353	9.272	1.5	0.79	0.431
Mother's education	8.254	6.550	30.6	15.04	< 0.001	8.272	8.255	0.3	0.16	0.876
Age										
Mother's age (years)	28.494	28.470	0.4	0.20	0.838	28.500	28.594	–1.6	–0.82	0.413
Child's age (months)	28.202	28.137	0.4	0.18	0.854	28.198	27.975	1.3	0.67	0.506
Livestock										
Yes	0.228	0.401	–38.0	–18.79	< 0.001	0.228	0.230	–0.6	–0.32	0.746

Table 6 Balance statistics for the effect of the improved–uninterrupted–unstored versus improved–interrupted–stored definitions of improved water supplies on the prevalence of diarrhoea in children, using propensity score matching (PSM) analysis

Variable	Unmatched sample					PSM matched sample				
	Mean treated	Mean control	% bias	*t*-value	*P*-value	Mean treated	Mean control	% bias	*t*-value	*P*-value
Region										
Urban Lower Egypt	0.094	0.041	21.2	6.57	< 0.001	0.092	0.083	3.6	1.62	0.105
Rural Lower Egypt	0.293	0.229	14.6	4.87	< 0.001	0.290	0.282	1.8	0.91	0.364
Urban Upper Egypt	0.133	0.080	17.0	5.47	< 0.001	0.135	0.148	–4.4	–1.99	0.047
Rural Upper Egypt	0.293	0.408	–24.3	–8.47	< 0.001	0.296	0.300	–0.9	–0.49	0.623
Frontier governorates	0.021	0.155	–48.7	–21.73	< 0.001	0.020	0.020	0.0	0.00	1.000
Wealth quintile										
Wealth quintile 2	0.190	0.223	–8.1	–2.77	0.006	0.193	0.176	4.1	2.19	0.029
Wealth quintile 3	0.197	0.173	6.3	2.09	0.037	0.199	0.204	–1.4	–0.71	0.480
Wealth quintile 4	0.228	0.149	20.1	6.51	< 0.001	0.221	0.254	–8.7	–4.06	< 0.001
Wealth quintile 5	0.241	0.151	22.7	7.32	< 0.001	0.243	0.215	7.1	3.44	0.001
Dwelling type										
House	0.407	0.556	–30.1	–10.29	< 0.001	0.405	0.398	1.4	0.74	0.461
Apartment	0.574	0.429	29.2	9.95	< 0.001	0.577	0.586	–1.7	–0.89	0.373
Parents' education										
Father's education	9.347	7.929	26.2	9.07	< 0.001	9.294	9.332	–0.7	–0.37	0.709
Mother's education	8.254	6.114	38.8	13.27	< 0.001	8.206	8.162	0.8	0.41	0.681
Age										
Mother's age (years)	28.494	28.354	2.4	0.82	0.414	28.461	28.390	1.2	0.62	0.536
Child's age (months)	28.202	28.235	–0.2	–0.07	0.947	28.179	27.847	1.9	0.98	0.325
Livestock										
Yes	0.228	0.412	–40.2	–14.39	< 0.001	0.230	0.224	1.3	0.75	0.456
Combined categories										
Lower Egypt rural poor	0.082	0.117	–11.6	–4.15	< 0.001	0.084	0.083	0.4	0.25	0.805
Rural poor	0.275	0.453	–37.6	–13.25	< 0.001	0.283	0.273	2.1	1.11	0.266

Table 7 Balance statistics for the effect of improved–uninterrupted–unstored versus improved–interrupted–unstored definitions of improved water supplies on the prevalence of diarrhoea in children, using propensity score matching (PSM) analysis

Variable	Unmatched sample					PSM matched sample				
	Mean treated	Mean control	% bias	*t*-value	*P*-value	Mean treated	Mean control	% bias	*t*-value	*P*-value
Region										
Urban Lower Egypt	0.094	0.097	−0.8	−0.35	0.725	0.095	0.088	2.4	1.28	0.201
Rural Lower Egypt	0.293	0.276	3.9	1.61	0.108	0.293	0.304	−2.4	−1.23	0.218
Urban Upper Egypt	0.133	0.120	3.9	1.61	0.108	0.133	0.140	−1.9	−0.93	0.351
Rural Upper Egypt	0.293	0.395	−21.5	−9.02	< 0.001	0.293	0.290	0.6	0.34	0.732
Frontier governorates	0.021	0.050	−15.9	−7.14	< 0.001	0.020	0.017	1.6	1.15	0.249
Wealth quintile										
Wealth quintile 2	0.190	0.201	−2.8	−1.16	0.248	0.191	0.203	−2.9	−1.51	0.130
Wealth quintile 3	0.197	0.210	−3.3	−1.36	0.175	0.197	0.201	−1.0	−0.51	0.610
Wealth quintile 4	0.228	0.170	14.5	5.85	< 0.001	0.228	0.228	−0.2	−0.12	0.908
Wealth quintile 5	0.241	0.165	18.9	7.57	< 0.001	0.241	0.231	2.6	1.26	0.208
Dwelling type										
House	0.407	0.505	−19.8	−8.21	< 0.001	0.405	0.407	−0.3	−0.16	0.874
Apartment	0.574	0.476	19.7	8.18	< 0.001	0.576	0.577	−0.3	−0.16	0.875
Parents' education										
Father's education	9.347	8.362	18.4	7.68	< 0.001	9.353	9.312	0.8	0.40	0.689
Mother's education	8.254	6.739	27.1	11.30	< 0.001	8.272	8.303	−0.6	−0.29	0.770
Age										
Mother's age (years)	28.494	28.541	−0.8	−0.33	0.742	28.500	28.466	0.6	0.29	0.769
Child's age (months)	28.202	28.046	0.9	0.37	0.710	28.198	27.989	1.2	0.62	0.533
Livestock										
Yes	0.228	0.386	−34.8	−14.84	< 0.001	0.228	0.237	−2.1	−1.15	0.250

Table 8 Balance statistics for the effect of the improved–uninterrupted definition of improved water supplies on the prevalence of diarrhoea in children, using propensity score matching (PSM) analysis: children in rural households only

Variable	Unmatched sample					PSM matched sample				
	Mean treated	Mean control	% bias	*t*-value	*P*–value	Mean treated	Mean control	% bias	*t*-value	*P*–value
Region										
Rural Lower Egypt	0.486	0.376	22.3	8.71	< 0.001	0.485	0.489	−0.8	−0.32	0.751
Rural Upper Egypt	0.505	0.581	−15.3	−5.99	< 0.001	0.506	0.502	0.8	0.32	0.751
Frontier governorates	0.010	0.043	−21.1	−8.56	< 0.001	0.010	0.010	0.0	0.00	1.000
Wealth quintile										
Wealth quintile 2	0.258	0.253	1.2	0.48	0.631	0.260	0.260	−0.1	−0.03	0.978
Wealth quintile 3	0.228	0.215	3.2	1.22	0.222	0.228	0.197	7.4	3.07	0.002
Wealth quintile 4	0.196	0.126	19.3	7.39	< 0.001	0.194	0.212	−4.9	−1.82	0.069
Wealth quintile 5	0.096	0.057	14.9	5.70	< 0.001	0.097	0.101	−1.8	−0.65	0.514
Dwelling type										
House	0.580	0.644	−13.2	−5.15	< 0.001	0.576	0.563	2.5	1.01	0.313
Apartment	0.400	0.335	13.6	5.29	< 0.001	0.405	0.418	−2.8	−1.14	0.254
Parents' education										
Father's education	8.456	7.417	19.4	7.60	< 0.001	8.465	8.443	0.4	0.16	0.869
Mother's education	6.974	5.336	30.2	11.81	< 0.001	6.967	6.908	1.1	0.44	0.660
Age										
Mother's age (years)	27.892	28.197	−5.1	−2.00	0.046	27.877	27.831	0.8	0.32	0.749
Child's age (months)	28.275	28.583	−1.8	−0.70	0.486	28.243	27.754	2.8	1.15	0.250
Livestock										
Yes	0.363	0.519	−31.9	−12.49	< 0.001	0.363	0.359	0.8	0.33	0.741
Combined categories										
Lower Egypt rural poor	0.138	0.156	−5.2	−2.03	0.042	0.140	0.149	−2.5	−1.04	0.299

Table 9 Balance statistics for the effect of the improved-uninterrupted definition of improved water supplies on the prevalence of diarrhoea in children, using propensity score matching (PSM) analysis: children in urban households only

Variable	Unmatched sample					PSM matched sample				
	Mean treated	Mean control	% bias	*t*-value	*P*-value	Mean treated	Mean control	% bias	*t*-value	*P*-value
Region										
Urban governorates	0.401	0.230	37.3	10.37	< 0.001	0.400	0.372	6.1	1.93	0.054
Urban Lower Egypt	0.228	0.244	–3.8	–1.08	0.279	0.230	0.239	–2.1	–0.70	0.483
Urban Upper Egypt	0.332	0.337	–1.0	–0.28	0.780	0.332	0.351	–4.0	–1.35	0.178
Wealth quintile										
Wealth quintile 2	0.090	0.113	–.77	–2.20	0.028	0.090	0.085	1.9	0.68	0.494
Wealth quintile 3	0.155	0.156	–0.4	–0.11	0.916	0.155	0.165	–2.8	–0.93	0.351
Wealth quintile 4	0.272	0.243	6.5	1.83	0.067	0.271	0.279	–1.8	–0.60	0.549
Wealth quintile 5	0.441	0.389	10.5	2.94	0.003	0.440	0.432	1.6	0.54	0.589
Dwelling type										
House	0.168	0.259	–22.5	–6.56	< 0.001	0.167	0.164	0.8	0.28	0.779
Apartment	0.815	0.731	20.3	5.88	< 0.001	0.817	0.814	0.6	0.23	0.818
Parents' education										
Father's education	10.553	9.928	12.3	3.52	< 0.001	10.538	10.365	3.4	1.17	0.242
Mother's education	9.998	9.087	17.5	5.01	< 0.001	10.004	10.050	–0.9	–0.31	0.755
Age										
Mother's age (years)	29.391	29.078	5.4	1.54	0.123	29.392	29.342	0.9	0.29	0.770
Child's age (months)	28.118	27.086	6.0	1.70	0.088	28.116	28.114	0.0	0.00	0.997

potential for impact while longer-term investments in the continuity of water delivery are undertaken.

On the other hand, our findings suggest that supply interruptions are driving the health impacts seen from the variations in water quality in this study. In other words, the direct health benefits of a continuous water supply may be greater than the benefits achieved by reducing the likelihood that households will store their water. On a broader level, these findings also point to the importance of considering multiple dimensions of water quality in definitions of safe and sustainable water access. Although universal access to safe drinking water has been proposed as one of the SDG goals, the indicators to measure progress against this goal are still under discussion. Proposals include indicators for "safely managed" water, mentioning factors such as sufficient water supply and specific forms of contamination. The results of this study argue for including and ensuring the means to adequately measure a target indicator that captures sufficiency and consistency of water supply in particular.

A main limitation of this study was the lack of more detailed measures of the quality of water service delivery in the EDHS. Unfortunately, an analysis of the frequency, duration and causes of piped water interruptions in Egypt was not possible using the EDHS data, nor, to our knowledge, are such indicators available in alternative data sources. We were also unable to compare water quality at the source with water quality at point-of-use among households with piped water, which is needed in order to develop recommendations for investments in the water delivery system in Egypt. Although hygiene practices and access to sanitation facilities may also affect diarrhoea prevalence among children, we were not able to address these factors in this analysis. Access to improved sanitation according to the JMP definition is also

near universal in Egypt, and we were unable to identify a robust alternative definition of sanitation access using the measures available in the EDHS. The EDHS also does not contain measures for hygiene practices such as hand-washing.

Another limitation of this study is that it was based on observational data; there may therefore be unobserved factors related to both water supply and child diarrhoea for which matching methods do not control. However, the fact that robustness checks using CEM showed highly consistent results with PSM suggests that, within the limitations of matching methods generally, our results are robust to the matching specification used.

Our findings therefore call for further investigation of the dimensions of improved water quality in rural and urban areas. Such studies are needed in order to better understand what investments in the water delivery infrastructure, and what changes in water handling practices, have the potential to reduce the negative health impacts of poorer quality piped water.

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Relative inequalities in geographic distribution of health care resources in Kermanshah province, Islamic Republic of Iran

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عدم المساواة النسبية في التوزيع الجغرافي لموارد الرعاية الصحية في محافظة كرمنشاه بجمهورية إيران الإسلامية

ستار رضائي، علي كاظمي كرياني، راضية فلاح، بهزاد كرمي متين

الخلاصة: لقد هدفت هذه الدراسة إلى تقييم التفاوت القائم في التوزيع الجغرافي للموارد البشرية والمادية في القطاع الصحي في محافظة كرمنشاه بجمهورية إيران الإسلامية. ففي دراسة استعادية مقطعية استخدمت بيانات من مركز الإحصاء في إيران لحساب مقاييس التفاوت (مُعامل جيني ومَنسب التباين) على مدى السنوات 2005-2011. فلوحظ أن أعلى مُعامل جيني للموارد البشرية بالنسبة للصيادلة كان في عام 2005 (0.75) وأدنى مُعامل للمسعفين كان في عامي 2010 و 2011 (0.10). وكانت أعلى مَناسب للتباين للصيادلة كذلك في عام 2005 (29٪) وللمسعفين في عام 2011 (3٪). وبالنسبة للموارد المادية كان أعلى وأدنى مُعامل جيني لمراكز التأهيل في عام 2010 (0.59) ولمساكن الصحة في عام 2011 (0.12) على التوالي. وبصفة عامة، فلقد لوحظ أن التفاوت في توزيع موارد الرعاية الصحية أقل في نهاية فترة الدراسة، على الرغم من أنه كانت هناك إمكانية لتوزيع الصيادلة والاختصاصيين ومساكن الصحة والأسرَّة بطريقة أكثر إنصافاً.

ABSTRACT This study aimed to evaluate inequalities in the geographical distribution of human and physical resources in the health sector of Kermanshah province, Islamic Republic of Iran. In a retrospective, cross-sectional study, data from the Statistical Centre of Iran were used to calculate inequality measures (Gini coefficient and index of dissimilarity) over the years 2005–11. The highest Gini coefficient for human resources was observed for pharmacists in 2005 (0.75) and the lowest for paramedics in 2010 and 2011 (0.10). The highest indices of dissimilarity were also for pharmacists in 2005 (29%) and paramedics in 2011 (3%). For physical resources, the highest and lowest Gini coefficients were for rehabilitation centres in 2010 (0.59) and health houses in 2011 (0.12) respectively. Generally, inequalities in the distribution of health care resources were lower at the end of the study period, although there was potential for more equitable distribution of pharmacists, specialists, health houses and beds.

Inégalités relatives dans la répartition géographique des ressources en soins de santé dans la province de Kermânchâh (République islamique d'Iran)

RÉSUMÉ La présente étude visait à évaluer les inégalités dans la répartition géographique des ressources humaines et physiques du secteur de la santé de la province de Kermânchâh (République islamique d'Iran). Dans une étude rétrospective transversale, des données du centre iranien des statistiques ont été exploitées pour calculer des mesures d'inégalité (le coefficient de Gini et l'indice de dissimilitude) entre 2005 et 2011. Le coefficient de Gini le plus élevé pour les ressources humaines a été observé chez les pharmaciens en 2005 (0,75) et le plus faible chez les personnels paramédicaux en 2010 et 2011 (0,10). Les indices de dissimilitude les plus élevés concernaient aussi les pharmaciens en 2005 (29 %) et les personnels paramédicaux en 2011 (3 %). Pour les ressources physiques, les coefficients de Gini les plus élevés et les plus faibles concernaient les centres de réadaptation en 2010 (0,59) et les maisons de santé en 2011 (0,12), respectivement. De manière générale, les inégalités dans la répartition des ressources en soins de santé étaient plus faibles à la fin de la période de l'étude, même s'il existait un potentiel pour une répartition plus équitable des pharmaciens, des spécialistes, des maisons de santé et des lits.

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Introduction

Unequal geographical distribution of health care resources has been a persistent policy concern throughout the world (*1–6*). It is not only a challenge to policy-makers, researchers and planners in the health sector but is also a major barrier to the successful performance of health systems (*1,7,8*). While there is a positive relationship between the geographical availability of health care resources and the health status of populations, increasing health care resources alone does not necessarily lead to improved health outcomes. People regardless of their race, sex and geographical region should be guaranteed fair access to health care services (*9,10*).

Previous studies have mainly focused either on inequality in the distribution of health workers or of health care resources (*8,11–16*). However, sound decisions are dependent on timely and accurate information concerning the distribution all needed health care resources. In the Islamic Republic of Iran, studies conducted over the country as a whole and in Kermanshah province in particular have reported a high rate of unemployment, low income among a significant proportion of the population and low access to health care resources. These conditions may contribute to inequality in the distribution of health care resources (*17–20*).

Little evidence is available concerning inequality in health care resource distribution in Kermanshah province. Therefore, the aim of this study was to determine whether there were inequalities in the human and physical health care resources distributed across the province during the period 2005 to 2011 and whether was there a time trend in resource distribution. The findings are expected to contribute to evidence-based resource allocation in the province.

Methods

Context and geographical units of analysis

Kermanshah province in the west of the Islamic Republic of Iran consists of 14 counties and is bordered by Hamadan, Kurdistan, Lorestan and Ilam provinces in the east, north, south and south of the country respectively and by Iraq in the west. The total population of the province in the year 2014 was estimated to be around 2 million.

Study design and population

We used a case-study design to describe the distribution of human and physical resources in the province. The data were obtained from the Statistical Centre of Iran (*17*). The data from each county was summed to represent the resource distribution in the province, and the unit of analysis was the entire province. In addition, the data on distribution of human resources (the number of specialists, general medical practitioners, pharmacists, dentists and paramedics per 1 000 000 population) and physical resources (the number of health houses, beds, pharmacy, radiology centres, rehabilitation centres and laboratory facilities per 1 000 000 population) over the years 2005 to 2011 were used to calculate inequality measures for the province.

Inequality measures and data analysis

There are many indicators to measure inequality in the geographic distribution in health variables, such as the Lorenz curve, Gini coefficient, decile ratio, index of dissimilarity, Atkinson index and Robin Hood index (*4,21*). We used the Gini coefficient and the index of dissimilarity which are both commonly used in analysing inequality in the distribution of health care resources (*10,22,23*).

The values of the Gini coefficient vary from 0 (perfect equality) to 1 (perfect inequality). This index can be derived from the Lorenz curve (Figure 1) using the following formula:

$$\text{Gini coefficient} = A/A + B$$

Where A = area between the Lorenz curve and the 45° line, whole area under the 45° line.

In the Lorenz curve, the cumulative percentage of the health care resource variables on the y-axis and the cumulative percentage of population on the x-axis are shown. The current study used Brown's formula to calculate the Gini coefficient as follows (*24*):

$$\text{Gini coefficient} = 1 - \sum_{i=0}^{k-1} (Y_{i+1}+Y_i)(X_{i+1}-X_i)$$

Where: *Yi* = cumulative percentage of health variable in the ith county, *Xi* = cumulative percentage of the population (ranked by variables) in the ith county, *K* = total number of counties.

The index of dissimilarity indicates the percentage of all health variables that are redistributed across counties to achieve a situation of perfect equality. The value of the index varies between 0 (perfect equality) and 100 (perfect inequality) and is calculated using the following formula (*25*):

$$\text{Index of dissimilarity} = \frac{1}{2} \sum_{i=1}^{n} |x_{ip} - x_{ih}|$$

Where: X_{ip} = ith county's population share, X_{ih} = ith county's health variable share, *n* = total number of counties.

The time trend in inequality of health care resources was examined by estimating 11 regression models, one for each resource. The dependent variable was the Gini coefficient for the resource and the independent variable was the year as follows:

$$Y = \beta_0 + \beta_i x + \varepsilon_i$$

Where *Y* = Gini coefficient for ith health variable; *x* = year.

The robust standard error was applied for possible heteroscedasticity over time inferences. Also, the β

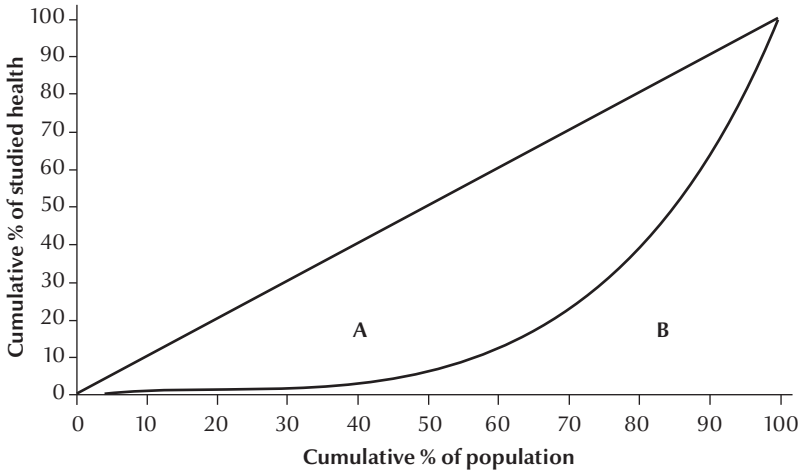

Figure 1 Lorenz curve for derivation of the Gini coefficient

coefficient was used to capture the direction and magnitude of the trend in the Gini for each health variable (3). Negative β implies that the Gini coefficient declined over time and the distribution of health variable became more equal.

The data analysis was carried out using *Stata*, version 12, and *DASP*, version 2.3, and the findings were considered statistically significant at *P*-value < 0.05.

Results

This study assessed 14 counties in Kermanshah province for inequalities in the distribution of human and physical resources in the health sector.

Human and physical health resources per 1 000 000 population

In general there was an increase in the allocated human and physical resources between 2005 and 2011. For example, the number of general practitioners increased from 195 per 1 000 000 population to 229 per 1 000 000 between 2005 and 2011, while hospital beds increased from 1141 to 1575 per 1 000 000 population over the same period (Table 1).

Gini coefficient and index of dissimilarity for distribution of human and physical health care resources

Table 2 shows the Gini coefficients and indices of dissimilarity for the distribution of human health care resources in Kermanshah province over the years 2005–2011. These demonstrate the presence of inequalities in the health human resources. The highest Gini coefficient was observed for pharmacists in 2005 (0.75) and the lowest was for paramedics in 2010 and 2011 (0.10). Similarly, analysis by index of dissimilarity showed that in 2005 the highest and lowest index of dissimilarity were for pharmacists (29%) and for general practitioners (12%) respectively, while in 2011 the height and lowest index of dissimilarity were for dentists (19%) and for paramedics (3%) respectively.

Generally, a reduction in the inequalities was observed between the baseline and the end of the study. For instance, the Gini coefficient for all types of specialists reduced from 0.39 in 2005 to 0.26 in 2011. Similarly, the Gini coefficient for dentists fell from 0.39 in 2005 to 0.23 in 2010 and 0.32 in 2011.

Table 3 shows the Gini coefficients and indices of dissimilarity for physical health care resources. The highest Gini coefficient was for rehabilitation centres in 2010 (0.59) and the lowest was for health houses in 2011 (0.12). Similarly, the highest index of dissimilarity was for rehabilitation centres in 2010 (36%) and the lowest was for laboratories in 2007 (5%).

Time trends in Gini coefficient for distribution of human and physical health care resources

The time trends in human and physical resources based on Gini coefficients in Kermanshah province over the years 2005–2011 are presented in Figures 2 and 3 respectively.

Although irregularities were seen, between 2006 and 2011 the inequality for the distribution of pharmacists showed a decreasing trend, whereas the inequality for general practitioners was almost constant at a Gini coefficient of about 0.2 and in paramedics it was almost constant at a Gini coefficient of about 0.1.

Among the physical resources, the distribution of health houses, pharmacies and rehabilitation centres remained almost constant between 2006 and 2011 at different levels of Gini coefficient.

Regression analysis

Regression analysis indicated that among the human resources there was a statistically significant reduction in inequality in the distribution of pharmacists ($P = 0.02$) (Table 4). Among the physical resources, there was a statistically significant reduction in inequality in the distribution of health houses ($P = 0.01$) and of pharmacies ($P = 0.004$). However, the reduction in inequality for rehabilitation centres was borderline in significance ($P = 0.06$).

Discussion

One of the main objectives of health policy-makers is ensuring fair and equitable distribution of health services. According to the Iranian statistical yearbook,

Table 1 Allocated human and physical health care resources per 1 000 000 population in Kermanshah province over the years 2005–2011

Health resource	No. per 1 000 000 population						
	2005	2006	2007	2008	2009	2010	2011
Human resources							
Specialists	127	117	134	144	143	154	219
General practitioners	195	176	193	213	221	231	229
Pharmacists	13	10	14	14	15	19	21
Dentists	29	33	34	39	41	47	43
Paramedics	1093	2858	3083	3122	3205	3343	3373
Physical resources							
Health houses	352	353	353	353	351	347	340
Hospital beds	1141	1279	1302	1566	1574	1582	1575
Laboratories	58	51	61	61	65	66	65
Rehabilitation centres	26	29	29	30	31	32	32
Radiology centres	27	23	29	30	30	36	31
Pharmacies	89	94	101	102	97	99	101

the number of general practitioners, pharmacies, health houses and beds were 14 901, 8484, 17 649 and 103 365 per 1 00 000 population respectively in Islamic Republic of Iran in 2011, of which Kermanshah province had 2.9% of the general practitioners, 2.3% of pharmacies, 3.7% of health houses and 2.9% of beds. According to the 2011 census, 2.5% of the country's population were in Kermanshah province in 2011. In 2011 on average, there were 233 specialists per 1 000 000 population in the whole country compared with 219 per 1 000 000 in Kermanshah province. The number of pharmacies in 2011 was 120 per 1 000 000 population in the whole country and 101.3 per 1 000 000 in Kermanshah.

This study has shown inequalities in the distribution of human and physical resources in the province. For human resources the Gini coefficients for specialists, general practitioners, dentists, pharmacists and paramedics were found to closely relate to the reports of other previous studies (*22,26,27*). However, the Gini coefficient for dentists in this study in 2011 was higher than that was reported from Japan (0.255) (*28*) and lower than the report from previous study across all provinces in Islamic Republic of Iran (0.39) (*26*). This difference may be due to the inclusion of only one province in our study while the others represented entire nations. Also, the previous Iranian study included all dentists practising in the public and private sectors and this will add to the difference in Gini coefficient between the current study and the previous one. The Gini coefficient for general practitioners in our study (0.18) is somewhat higher than the Gini coefficient of 0.14 for the distribution of physicians reported from a study in Turkey. The Gini coefficient reported from Turkey represented all physicians, including specialists,

Table 2 Gini coefficient and index of dissimilarity for inequality in the distribution of human resources in Kermanshah province over the years 2005–2011

Year	Specialists		General practitioners		Dentists		Pharmacists		Paramedics	
	Gini (SE)	ID %	Gini (SE)	ID %	Gini (SE)	ID %	Gini (SE)	ID %)	Gini (SE)	ID %
2005	0.39 (0.09)	17	0.22 (0.02)	12	0.39 (0.09)	21	0.75 (0.07)	29	0.30 (0.07)	12
2006	0.38 (0.10)	6	0.17 (0.07)	5	0.24 (0.05)	20	0.73 (0.11)	11	0.12 (0.03)	3
2007	0.34 (0.10)	6	0.16 (0.03)	5	0.23 (0.04)	8	0.62 (0.12)	10	0.12 (0.02)	4
2008	0.40 (0.09)	16	0.17 (0.02)	10	0.21 (0.03)	14	0.68 (0.10)	27	0.11 (0.02)	4
2009	0.31 (0.10)	6	0.16 (0.03)	12	0.24 (0.06)	18	0.56 (0.10)	21	0.11 (0.03)	4
2010	0.40 (0.10)	16	0.17 (0.03)	13	0.23 (0.05)	19	0.63 (0.11)	25	0.10 (0.02)	4
2011	0.26 (0.06)	12	0.18 (0.03)	14	0.32 (0.07)	19	0.40 (0.09)	17	0.10 (0.02)	3

Gini = Gini coefficient; ID = index of dissimilarity; SE = standard error.

Table 3 Gini coefficient and index of dissimilarity for inequality in the distribution of physical resources in Kermanshah province over the years 2005–2011

Year	Health houses		Hospital beds		Pharmacies		Laboratories		Rehabilitation centres		Radiology centres	
	Gini (SE)	ID %	Gini (SE)	ID %	Gini (SE)	ID %	Gini (SE)	ID %	Gini (SE)	ID %	Gini (SE)	ID %
2005	0.19 (0.04)	29	0.47 (0.09)	28	0.28 (0.07)	15	0.29 (0.07)	12	0.43 (0.09)	28	0.47 (0.09)	22
2006	0.15 (0.03)	13	0.45 (0.09)	10	0.21 (0.05)	5	0.22 (0.05)	6	0.51 (0.08)	10	0.35 (0.08)	9
2007	0.15 (0.03)	13	0.45 (0.09)	10	0.17 (0.03)	6	0.20 (0.03)	5	0.54 (0.10)	9	0.22 (0.03)	8
2008	0.14 (0.03)	30	0.46 (0.10)	24	0.18 (0.03)	7	0.21 (0.05)	13	0.48 (0.10)	29	0.20 (0.03)	16
2009	0.13 (0.02)	30	0.46 (0.09)	23	0.18 (0.06)	10	0.18 (0.04)	6	0.52 (0.11)	30	0.47 (0.09)	25
2010	0.13 (0.04)	31	0.44 (0.10)	24	0.21 (0.05)	12	0.18 (0.05)	8	0.59 (0.12)	36	0.22 (0.04)	19
2011	0.12 (0.01)	30	0.40 (0.10)	24	0.19 (0.04)	11	0.18 (0.04)	8	0.44 (0.09)	18	0.23 (0.04)	27

Gini = Gini coefficient; ID = index of dissimilarity; SE = standard error

however, and this implies lower inequality than in our study (*27*).

In this study, the distribution of resources was also analysed using the index of dissimilarity. For human resources the index of dissimilarity for dentists was 19%, which implies that 19% of the currently available dentists in the province could be redistributed from the over-served counties to the relatively under-served areas across the province to reach an equitable distribution. The index of dissimilarity for dentists in the current study is lower than that reported for dentists (30.5%) in the previous Iranian study (*26*). As mentioned above, that study considered all dentists, both private and public, and this could be a likely reason for this difference.

In our study time-trend analysis showed inequalities in the distribution of all human and physical resources decreased from baseline in the year 2005 to 2011. Although the findings showed a reduction in the inequality in the distribution of health resources, regression analysis showed that the reductions were statistically significant only pharmacists, health houses and pharmacies. The reasons could be related to the emphasis given to the development of primary health care in areas where the public have unmet health care services (*29*).

Although inequalities still exist, the improvement in the distribution of the health care resources over the 7-year period of our study may imply that Iranian health sector policy-makers have paid attention to improving the allocation of resources across the country. Besides, the increase in the number of specialists, general medical practitioners and pharmacists between the years 2005 and 2011 may indicate that the government

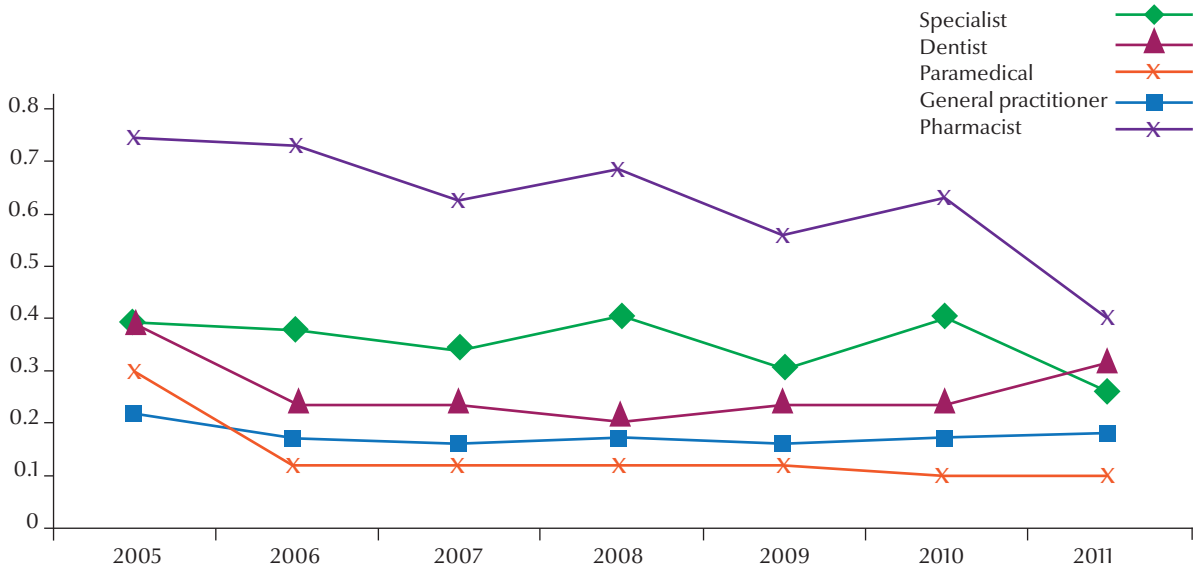

Figure 2 Trends in the Gini coefficient for the distribution of human resources in Kermanshah province, 2005–2011

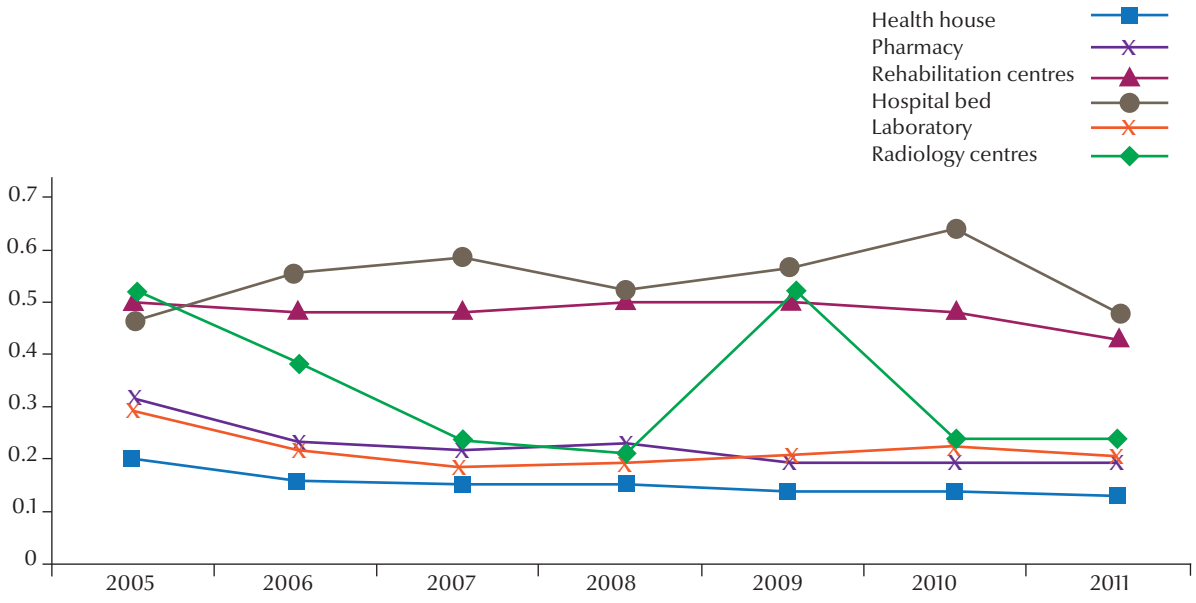

Figure 3 Trends in the Gini coefficient for the distribution of physical resources in Kermanshah province, 2005–2011

has paid more attention to the production of these human resources. The increase in the percentage of these distributed resources was higher than the population growth, which showed only a 4% increase between the beginning and end of the study period. A government regulation which allows new graduate general practitioners, dentists, pharmacists and other health professionals to work in remote areas seems to have contributed to the reduction in inequality in the distribution of human resources for health.

A previous study also reported that improvement in roads and transportation systems and incentives and promotion opportunities to health workers has contributed to reducing inequalities in the distribution of resources for health (*22*). Other reasons could have due to improvement in the equity of distribution of health care resources. However, this study focused only on the distribution of public health resources across the province. The private sector is usually known to practise in areas where it can generate profit from the delivery of services. It has been reported that in Islamic Republic of Iran about 80% of dentists are working in the private sector in urban areas (*30*).

This study focused on analysis of inequality in the distribution of human and physical resources. The fact that the data were credible and representative of the province helps us to confidently characterize the magnitude of inequality in the distribution of human and physical resources in Kermanshah and to suggest possible solutions. However, this analysis did not include the opinion of the people in the province concerning the distribution of the resources analysed. Hence, obtaining additional information from the direct beneficiaries of

Table 4 Regression analysis of time trends of inequality in the distribution of human and physical health resources in Kermanshah province over the years 2005–2011

Health resource	β-coefficient	*t*-statistic	*P*-value (robust SE)
Human resources			
Specialists	−0.013	−1.45	0.2
General practitioners	−0.004	−0.89	0.4
Pharmacists	−0.04	−3.36	0.02
Paramedics	−0.02	−1.69	0.15
Dentists	−0.007	−0.047	0.6
Physical resources			
Health houses	−0.009	−3.56	0.01
Hospital beds	+0.006	0.43	0.68
Pharmacies	− 0.015	−2.85	0.004
Laboratories	− 0.009	−1.29	0.25
Rehabilitation centres	− 0.007	−2.33	0.06
Radiology centres	−0.02	−1.81	0.13

SE = standard error.

the services and health care managers in the area could consolidate the findings. In addition, the study was limited to the distribution of health care resources in Kermanshah province, and therefore the findings cannot be generalized to other provinces in the Islamic Republic of Iran.

Conclusions

The results show that inequalities in the distribution of health care resources between the years 2005 and 2011 have decreased, although there was still a potential for more equitable distribution of some resources, such as pharmacists, specialists, health houses and beds, which could be done by the redistribution of the already available resources or by increasing the total resources.

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Meals served to hypertensive and cardiac inpatients in Jordan: comparison with WHO and NIH dietary guidelines

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الوجبات التي تقدم في المستشفيات لمرضى ارتفاع ضغط الدم ومرضى القلب في الأردن: مقارنة مع الدلائل الإرشادية الغذائية لمنظمة الصحة العالمية والمعاهد الصحية الوطنية

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الخلاصة: لقد هدفت هذه الدراسة إلى تقييم الالتزام في الوجبات اليومية التي تقدم لمرضى ارتفاع ضغط الدم ومرضى القلب المنومين في المستشفيات الأردنية بالدلائل الإرشادية لمنظمة الصحة العالمية وبخطط النظام الغذائي الواردة في التغييرات العلاجية لنمط الحياة وفي النهج الغذائي الهادف إلى وقف ارتفاع ضغط الدم. ولقد أجري تحليل لقوائم الطعام الدورية الأسبوعية التي أخذت من أقسام خدمات الطعام في المستشفيات الكبرى في الأردن (ع = 16)، وذلك باستخدام برنامج معالج الطعام إيشا ESHA للحصول على بيانات عن محتواها من المغذيات كبيرة المقدار والمغذيات زهيدة المقدار وعن مجموعات الأغذية الممثّلة فيها. فأظهرت النتائج أن كميات العديد من المغذيات الواردة في القوائم المقدمة ليست ملائمة، إلى جانب عدم الالتزام – عموماً – بخطط النظام الغذائي الواردة في النهج الغذائي الهادف إلى وقف ارتفاع ضغط الدم وفي التغييرات العلاجية لنمط الحياة وبالدلائل الإرشادية لمنظمة الصحة العالمية. فكان محتوى الوجبات من الصوديوم أعلى من الموصى به، إلى جانب انخفاض محتواها من البوتاسيوم. وكانت كمية الأحماض الدهنية – في الغالب – خارج المجالات الموصى بها. فالوجبات التي تقدم لمرضى القلب في مستشفيات الأردن بحاجة إلى مراجعة كي تلبي الدلائل الإرشادية التي وضعت خصيصاً لتناسب الظروف الصحية لهؤلاء المرضى.

ABSTRACT This study aimed to evaluate the compliance of daily meals served to hypertensive and cardiac inpatients in Jordan according to WHO guidelines and the Therapeutic Lifestyle Changes (TLC) and Dietary Approach to Stop Hypertension (DASH) diets plans. Weekly cycle menus from the food service department of major hospitals in Jordan (n = 16) were analysed using ESHA *Food Processor* software to obtain data about macro- and micronutrient contents and food groups represented. The results showed inappropriate amounts of several nutrients in the menus provided, along with a general noncompliance with the DASH, TLC and WHO guidelines. Meals had higher than recommended sodium content coupled with low potassium content. Fatty acid profiles were often outside the recommended ranges. Meals provided to cardiac inpatients in Jordan need to be revised to meet the guidelines specified for the health conditions of these patients.

Repas servis aux patients hospitalisés atteints d'hypertension et de cardiopathie en Jordanie : comparaison avec les recommendations alimentaires de l'Organisation mondiale de la santé et de l'Institut national de santé

RÉSUMÉ La présente étude visait à évaluer dans quelle mesure les repas quotidiens servis aux patients hospitalisés atteints d'hypertension ou de cardiopathie en Jordanie respectaient les recommendations de l'Organisation mondiale de la Santé (OMS) et les régimes alimentaires *Therapeutic Lifestyle Changes* (TLC) et *Dietary Approach to Stop Hypertension* (DASH). Les cycles hebdomadaires de menus du service de restauration des grands hôpitaux en Jordanie (n = 16) ont été analysés à l'aide du logiciel ESHA *Food Processor* pour obtenir des données sur la composition en macronutriments et en micronutriments ainsi que sur les groupes d'aliments représentés. Les résultats ont révélé des quantités inadaptées de plusieurs nutriments dans les menus servis, ainsi qu'un non-respect général des recommandations DASH, TLC et de l'OMS. Les repas avaient une composition en sodium trop élevée et un taux de potassium trop faible par rapport aux recommandations. Les profils des acides gras étaient souvent hors des plages recommandées. Les repas fournis aux patients hospitalisés atteints de cardiopathie en Jordanie doivent être revus pour répondre aux recommandations visant leurs pathologies.

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Introduction

Cardiovascular disease (CVD) is the number one cause of death worldwide (*1*). The World Health Organization (WHO) estimated that deaths from cardiovascular diseases and diabetes contribute to about 53% of all mortalities in Jordan (*2*). Hypertension is a major risk factor for CVD, affecting approximately 1 billion people globally and claiming the lives of more than 9 million annually (*2*). Hypertension is defined as a systolic blood pressure ≥ 140 mmHg and/or a diastolic blood pressure ≥ 90 mmHg (*3*). In Jordan, hypertension affects about 32% of the adult population over age 25 years (*4*). Of those affected, only 56% are aware they have hypertension, 63% are being treated and only 39% are adequately controlled (*4*).

Diet is a major modifiable risk factor that underlies many chronic diseases (*5*). Two dietary strategies recommended by the United States National Institutes of Health—Therapeutic Lifestyle Changes (TLC) for lowering cholesterol and Dietary Approaches to Stop Hypertension (DASH) (*6,7*)—have been shown to reduce the risks of cardiovascular disease, high blood pressure and other related conditions. The World Health Organization (WHO) and the Food and Agriculture Organization have also set out guidelines in the *Population nutrient intake goals for preventing diet-related chronic diseases* (*8*).

Patients suffering from CVD and/or hypertension may experience long durations of hospital stay, with an average of 4.6 days for heart disease in general and 6.1 days for cerebrovascular disease (*9*). Nutritional status in most cases worsens during hospital stays, which further increases the risk of disease complications (*10*). Therefore hospital meals must be planned carefully, not only to meet the nutritional needs of patients but also to improve their future health status (*10*). Previous studies have found diets offered to hospitalized patients to be inadequate in macronutrient and micronutrients (*11,12*). For example, in Jordan, Hourani et al. looked at the adequacy of meals offered to patients with diabetes and found them to be lower in total carbohydrates and fibre, and higher in cholesterol and total fats, as compared with the guidelines set by the American Diabetes Association (*12*).

The aim of the current study was to investigate and evaluate the compliance of daily meals served to inpatients suffering from hypertension and/or CVD in comparison with the DASH and TLC diet guidelines (*13–15*) and the diet and nutrition recommendations of WHO (*8*). The rationale for carrying out this study lies in the importance of evaluating meals provided for inpatients suffering from hypertension and/or CVD against specified guidelines in order to improve patients' health and prognoses and reduce hospital stays, to promote models of ideal meals to be prepared after hospital discharge and to identify areas for improvements in hospital meals. Meals served to hypertensive and cardiac patients have not previously been evaluated in Jordan. The results of this study will therefore be useful for hospital administrators and health authorities wishing to improve patients' dietary intakes during their hospital stay.

Methods

This research was conducted in June 2012 and the study protocol was approved by the institutional review board at Jordan University of Science and Technology.

Sampling

Food service departments in major hospitals in Jordan were approached and asked to participate in the study. Out of 35 hospitals approached, only 16 hospitals agreed to participate. Hospital size varied from small to large, with the number of beds ranging from less than 100 to more than 300 beds.

Data collection

Food service departments were asked to provide their weekly menu served for hypertensive and cardiac patients; these are regularly referred to as "low salt" menus. All types of meals (breakfast, lunch, dinner) and snacks were included and all daily possible combinations were considered for analysis and evaluation.

The nutrient content of each food item was analysed using the *Food Processor* software, version 10.6.3 (ESHA Research; http://www.esha.com/products/food-processor/). Cultural items that were not available in the ESHA database were added manually using available cultural-specific food composition tables and tools (*15–18*). The criteria for evaluation of the diets included data about food groups, total energy, macronutrients, saturated fat, dietary cholesterol, simple and refined sugars, and mineral content.

Intakes/day for each nutrient and each food group were obtained by calculating the average of 7 days intakes (from the weekly menus). The degree to which average daily menus content of the hospitals met the relevant nutrition recommendation for patients with hypertension and CVD was evaluated against WHO, DASH and TLC guidelines (*8,13,14*), which were considered as the gold standards for comparisons of nutrient requirements in a cardiovascular context.

Statistical analysis

The data were analysed using *SPSS* software, version 17.0. Descriptive analysis was performed to obtain frequencies, means and standard deviations (SD). Student *t*-test was performed to analyse the differences between the nutrient and food group contents of the hospital meals and the gold standard guidelines. A P-value < 0.05 was considered the cut-off level for statistical significance.

Results

Nutrient contributions to total energy according to WHO guidelines

Table 1 shows the average daily nutrient and macronutrient contribution to total energy content in meals served in the 16 Jordanian hospitals and compares these with the recommended nutrient contents of the different guidelines for preventing diet-related chronic diseases.

The mean protein content of hospital meals (19.0%) was significantly higher than the WHO guidelines (10–15%), the mean sodium content (2831 mg) was significantly higher than recommended (< 2000 mg) and the potassium content (2411 mg) was significantly lower than the guideline (3150 mg) (all $P \leq 0.5$) (Table 1). No significant differences between the actual meal contents and the WHO guidelines were observed for calorie content, carbohydrates, total fats, saturated fats, cholesterol and trans-unsaturated fatty acids (trans fats) (Table 1).

Table 2 shows the number and percentage of hospitals whose meals complied with the nutrient recommendations of the 3 guidelines. This analysis confirmed that none of the hospitals met the protein guidelines of WHO, and only 37.5% met the sodium and potassium recommendations.

Nutrient contributions to total energy according to the DASH diet

Compared with the DASH diet, it was found that on average the hospital meals provided significantly higher amounts of saturated fats (12.1% versus 6%), dietary cholesterol (343 mg versus < 200 mg) and sodium (2831 mg versus 2300 mg) and lower amounts of dietary fibre (25.5 g versus 30 g), calcium (899 mg versus 1250 mg) and potassium (2411 mg versus 4700 mg) than those recommended ($P \leq 0.5$) (Table 1).

Nearly 44% of the hospitals met the sodium content guidelines of the DASH diet, 25.0% met the calcium guidelines, 18.8% met the fibre guidelines, 6.3% met guidelines on saturated fats and dietary cholesterol and 0% met the potassium recommendations (Table 2).

The average content of the meals were also analysed by food groups and compared with the TLC and DASH diets (Table 3). WHO recommendations were not defined for food groups in a similar way as our reported data and hence comparison was not applicable. It was found that daily meals offered in hospitals provided significantly fewer servings of vegetables (3.26), fruits (1.09) and milk (1.29) as compared with the DASH recommendations (4–5, 4–5 and 2–3 respectively) ($P \leq 0.5$).

Table 1 Average daily nutrient and macronutrient contribution to total energy content of meals served to hypertensive and cardiac patients in a sample of Jordanian hospitals (n = 16): comparison with recommendations of various guidelines for preventing diet-related chronic diseases

Nutrient (units)	Recommended nutrient content according to:			Actual daily nutrient content of meals in hospitals Mean (SD)
	DASH	TLC	WHO	
Calories (kcal)	2000	2000	Not specified	2062 (529)
Protein (%)	18	≈ 15	10–15	19.0 (2.0)[b,c]
Carbohydrates (%)	55	50–60	55–75	53.3 (5.3)
Sugar (%)	Not specified	Not specified	10	14.3 (22.8)
Fat (%)	27	25–35	15–30	27.7 (4.7)
Monounsaturated fatty acids (%)	Not specified	Up to 20	By difference	10.6 (2.1)
Polyunsaturated fatty acids (%)	Not specified	Up to 10	6–10	5.00 (0.79)
Saturated fatty acids (%)	6	< 7	< 10	12.1 (2.12)[a,b]
Trans fats (%)	Minimum	Minimum	< 1	0.19 (0.16)
Fibre (g)	30	20–30	From food	25.5 (7.2)[a]
Soluble fibre (g)	Not specified	10–25	Not specified	1.21 (0.85)[b]
Cholesterol (mg)	< 200	150	< 300	343 (118)[a,b]
Calcium (mg)	1250	Not specified	Not specified	899 (263)[a]
Potassium (mg)	4700	Not specified	3150	2411 (472)[a,c]
Sodium (mg)	2300	Not specified	< 2000	2831 (942)[a,c]

[a]P ≤ 0.05 versus DASH (1-sample t-test); [b]P ≤ 0.05 versus TLC (1-sample t-test); [c]P ≤ 0.05 versus WHO (1-sample t-test).
TLC = Therapeutic Lifestyle Changes diet plan; DASH = Dietary Approaches to Stop Hypertension diet plan; WHO = World Health Organization population nutrient intake goals for preventing diet-related chronic diseases (8).
SD = standard deviation.

Table 2 Percentage of Jordanian hospitals (*n* = 16) whose daily meals served to hypertensive and cardiac patients were compliant with the nutrient content recommendations of various guidelines for preventing diet-related chronic diseases

Nutrient	Hospitals compliant with recommended nutrient content according to:					
	DASH		TLC		WHO	
	No.	%	No.	%	No.	%
Calories	6	37.5	6	37.5	–	–
Protein	4	25.0	0	0.0	0	0.0
Carbohydrates	5	31.3	7	43.8	7	43.8
Sugar	–	–	–		1	6.3
Fat	4	25.0	11	68.8	18.8	93.8
Monounsaturated fatty acid	–	–	16	100.0	–	–
Polyunsaturated fatty acids	–	–	16	100.0	9	56.3
Saturated fatty acids	1	6.3	3	18.8	13	81.2
Trans fats	–	–	–	–	16	100.0
Fibre	3	18.8	12	75.0	–	–
Soluble fibre	–	–	0	0.0	–	–
Cholesterol	1	6.3	4	25.0	8	50.5
Calcium	4	25.0	–	–	–	–
Potassium	0	0.0	–	–	6	37.5
Sodium	7	43.8	–	–	6	37.5

DASH = Dietary Approaches to Stop Hypertension diet plan; TLC = Therapeutic Lifestyle Changes diet plan; WHO = World Health Organization population nutrient intake goals for preventing diet-related chronic diseases (8).
A dash (–) indicates data not applicable, i.e. no guideline specified.

Nutrient contributions to total energy according to the TLC diet

Compared with the TLC diet, the hospital meals on average had a significantly higher than recommended content of protein (19.0% versus ≈ 15%), saturated fatty acids (12.1% versus < 7%) and dietary cholesterol (343 mg versus 150 mg). The soluble fibre content was much lower than recommended by the TLC diet (1.21 g versus 10–25 g) ($P \leq 0.5$) (Table 1).

Only one-quarter (25.0%) of the hospitals studied met the dietary cholesterol recommendations; 18.8% met the saturated fatty acids recommendations and 0% met the soluble fibre and protein recommendations (Table 2).

With regard to food groups, our study showed that the daily servings of vegetables (3.26), fruit (1.09) and milk (1.29) were significantly lower than those recommended by TLC (5, 4 and 2–3 respectively), whereas meat content was higher (6.17 versus < 5 servings) ($P \leq 0.5$) (Table 3).

Table 3 Food groups content of daily meals served to hypertensive and cardiac patients in Jordanian hospitals (*n* = 16): comparison with recommendations of various guidelines for preventing diet-related chronic diseases

Food group	Recommended content according to:		Actual daily food group content of meals in hospitals (servings)
	DASH (servings)	TLC (servings)	
Grains and cereals	6–8	7	8.52
Vegetables	4–5	5	3.26[a,b]
Fruit	4–5	4	1.09[a,b]
Milk	2–3	2–3	1.29[a,b]
Meat	< 6	< 5	6.17[b]

[a] $P \leq 0.05$ versus DASH (1-sample t-test); [b] $P \leq 0.05$ versus TLC (1-sample t-test).
DASH = Dietary Approaches to Stop Hypertension diet plan; TLC = Therapeutic Lifestyle Changes diet plan; World Health Organization recommendations do not define food groups in a similar way as our reported data, hence comparisons were not applicable.

Discussion

The dietary factors that are most strongly implicated in hypertension include weight management and adequate dietary sodium and potassium intakes (7). To a lesser extent other factors also influence blood pressure and these include intake of saturated fats, trans fats, calcium and magnesium (7). Our study analysed the content of the primary dietary factors for cardiac patients, i.e. sodium and potassium, but also looked at all other factors associated with elevated blood pressure as presented by the DASH diet.

Our study showed that the sodium content of meals served to hypertensive and cardiac patients in our sample of Jordanian hospitals was high compared with the recommended level and the potassium level was low. Previous research has shown that sodium and potassium levels are of utmost importance for maintaining healthy blood pressure (*19*,*20*). Appel et al. suggested that increased potassium intakes have a stronger role in lowering blood pressure when combined with a high sodium diet; therefore increasing potassium, by increasing servings of fruits and vegetables, could consist of the first realistically achievable step toward meeting at least part of the guidelines (*21*).

Monitoring the types and amounts of dietary fat consumed by patients suffering from hypertension is a fundamental goal towards reducing the mortality and morbidity associated with hypertension (*22*). Saturated and trans fatty acids are the principal dietary determinants of plasma low-density-lipoprotein (LDL) cholesterol. Decreasing the level of LDL cholesterol may be achieved by an increase in the intake of energy derived from monounsaturated fatty acids and polyunsaturated fatty acids, which are recommended to be up to 20% and 10% respectively. We found a meal content of monounsaturated fatty acids near 10% in our sampled hospitals and of polyunsaturated fatty acids about 5%. The amounts presented in Jordanian hospital menus were extremely low and combined with a high content of saturated fats (about 12% versus < 7% recommended menu content). A dietary cholesterol intake of < 200 mg daily is also recommended by the DASH guidelines and this too was violated by the actual average meal content of dietary cholesterol in our study hospitals of 343 mg per day.

Other dietary components including fibre and calcium have been shown to have an impact on the management of elevated blood pressure. It has been reported that an average increase of about 14 g of fibre per day may decrease systolic blood pressure and diastolic blood pressure by 1.6 and 2.0 mmHg respectively. Again, the menus analysed by our study contained insufficient amounts of fibre in comparison with the recommendations set by DASH. As for calcium, we also found inadequate intakes (about 900 mg compared with 1250 mg set by DASH), and although the evidence is inconclusive with regard to the role of calcium in the management of hypertension, it is essential to note that calcium metabolism is influenced by elevations in serum sodium and may play a role in the blood pressure response to salt in the diet (*23*).

Our results showed that there was no emphasis on fruit in the hospital menus and, whereas vegetables seemed to be offered more frequently, insufficient fruit servings were provided. A previous study showed that high consumption of fruits and vegetables was associated with a significantly lower risk for hypertension (*24*).

Hospitals should have an obligation to cater therapeutic meals that are planned to achieve targets set by guidelines as a tool to help control blood pressure. Some governmental institutions across the world have set clear guidelines for hospital meals and menus. For instance the Scottish government has established nutrient specifications for hospital meals, recommending a sodium intake below 2400 mg per day (*25*). Similarly, New York City Food Standards have explicitly requested that hospital menus achieve the nutrition goals set by the *Dietary guidelines for Americans 2010*, specifying a sodium content of 2300 mg for those aged less than 51 years and 1500 mg of sodium for those 51 years or older and/or suffering from hypertension (*26*). WHO also recommends that sodium consumption is kept below 2000 mg/day (*8*).

Clearly, the hospitals assessed in this study failed to meet the recommendations and furthermore they failed to do so in the so-called "low salt" diet, raising greater concerns about the sodium content of the "regular" diet menus.

Similar to our findings, a Brazilian study by Moreira et al. reported inadequate content of iron, zinc, copper, manganese and selenium in hospital meals (*11*). Additionally Hourani et al. looked at the adequacy of meals offered to patients with diabetes in Jordanian hospitals and found them to be lower in total carbohydrates and fibre, and higher in cholesterol and total fats, as compared with the guidelines set by the American Diabetes Association (*12*). Hospital meals offered to patients with chronic diseases should be considered as excellent educational tools to help patients implement lifestyle changes after discharge. Therefore the adequacy of the meals offered in the hospital may also influence the knowledge and eating habits of the patients after leaving the hospital, as well as that of their family members.

The results of this study may be limited due to the use of the ESHA *Food Processor* software as a tool to assess the nutrient content of the meals. Some researchers have questioned the validity of *Food Processor* in estimating the mineral content of foods. Sullivan et al. compared the phosphorus content of poultry in comparison to the content listed by *Food Processor* and found a significantly higher content in the analysed samples (*27*). Future studies should consider analysing the content of hospital meals.

In conclusion, our findings showed that Jordanian hospitals failed to meet some of the dietary recommendations set by WHO and the National Institutes of Health in their DASH and TLC guidelines. The findings of this study imply that the low-salt diet offered by this group of hospitals is providing an adversely high level of sodium and a deficient potassium

content. An intensive re-evaluation of meals offered to hypertensive and cardiac inpatients in Jordanian hospitals is recommended. An easy start would be increasing servings of fruits and vegetables and considering greater provision of culturally acceptable vegetarian meals.

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Prevalence of oro-dental anomalies among schoolchildren in Sana'a city, Yemen

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انتشار العيوب الخِلقية الفموية–السنية بين أطفال المدارس في مدينة صنعاء باليمن

محمد باسلامة، قصي بارودي

الخلاصة: يحتاج الأطباء الممارسون وواضعو السياسات إلى معلومات عن الحدوث النسبي للعيوب الخِلقية بين الأطفال في منطقتهم. ولقد استقصت هذه الدراسة مدى انتشار مختلف العيوب الخِلقية الفموية بين تلاميذ المدارس في مدينة صنعاء باليمن. فُحِصت عينة ضمت ألفاً من تلاميذ المدارس العامة والخاصة تتراوح أعمارهم بين 4 و 12 سنة من قبل نفس الفاحص باستخدام خوافض لسان وحيدة الاستعمال. فكان الانتشار الكلي للعيوب الخِلقية الفموية ٪15.1، وكانت أكثر شيوعاً لدى الذكور (نسبة الذكور:الإناث 1:3.2) الذين تتراوح أعمارهم بين 7 و 12 سنة. وكانت العيوب الخِلقية السنية المرتبطة بالأنسجة الصلبة الأكثر انتشاراً مثل: نقص تنسج الأسنان (٪2.8)، يليه نقص التكلس (٪2.6)، ثم صغر الأسنان (٪0.5)، فضخامة الأسنان (٪0.4)، ونقص الأسنان (٪0.4)، فالأسنان الزائدة (٪0.3)، ومناقلة الأسنان (٪0.3)، فالتحام الأسنان (٪0.2) فالتضاعف (٪0.2). وكانت العيوب الخِلقية في الأنسجة الرخوة الأكثر انتشاراً مثل: اللسان المشقق (٪4)، يليه التصاق اللسان (٪1.8)، فاللسان الجغرافي (٪0.9)، فضخامة اللسان (٪0.4)، فاللسان الأشعر (٪0.3). يجب اتخاذ التدابير المناسبة في وقت مبكر لتلطيف الآثار السلبية لهذه العيوب الخِلقية وتخفيف تكاليف معالجتها لاحقاً.

ABSTRACT Practitioners and policy-makers need information about the relative frequency of dental anomalies among children in their region. This study investigated the prevalence of different oral anomalies among schoolchildren in Sana'a city, Yemen. A sample of 1000 private and public schoolchildren aged 4–12 years were examined by the same examiner using disposable tongue blades. The total prevalence of oral anomalies was 15.1%, most commonly in boys (male:female ratio 3.2:1) aged 7–12 years. The most prevalent dental anomaly related to hard tissues was tooth hypoplasia (2.8%), followed by hypocalcification (2.6%), then microdontia (0.5%), macrodontia (0.4%), hypodontia (0.4%), supernumerary teeth (0.3%), tooth transposition (0.3%), dental fusion (0.2%) and gemination (0.2%). The most prevalent soft tissues anomaly was fissured tongue (4.0%), followed by ankyloglossia (1.8%), geographic tongue (0.9%), macroglossia (0.4%) and hairy tongue (0.3%). Appropriate measures need to be taken early to mitigate the negative impact and later costs of treatment of anomalies.

Prévalence des anomalies bucco-dentaires chez des écoliers de la ville de Sanaa (Yémen)

RÉSUMÉ Les praticiens et les décideurs politiques ont besoin d'informations sur la fréquence relative des anomalies dentaires chez les enfants de leur région. La présente étude a évalué la prévalence de différentes anomalies bucco-dentaires chez des écoliers de la ville de Sanaa (Yémen). Dans un échantillon, 1000 enfants âgés de quatre à douze ans fréquentant des écoles publiques et privées ont été examinés par le même praticien à l'aide d'abaisse-langue à usage unique. La prévalence totale des anomalies bucco-dentaires était de 15,1 %, le plus souvent chez les garçons (rapport garçon : fille 3,2 : 1) âgés de sept à douze ans. L'anomalie dentaire la plus répandue liée aux tissus durs était l'hypoplasie dentaire (2,8 %), suivie de l'hypocalcification (2,6 %), puis de la microdontie (0,5 %), la macrodontie (0,4 %), l'hypodontie (0,4 %), les dents surnuméraires (0,3 %), la transposition dentaire (0,3 %), la fusion dentaire (0,2 %) et la gémination dentaire (0,2 %). Les anomalies des tissus mous les plus prévalentes étaient une langue fissurée (4,0 %), suivies d'une ankyloglossie (1,8 %), d'une langue géographique (0,9 %), d'une macroglossie (0,4 %) et d'une langue pileuse (0,3 %). Il est nécessaire de prendre des mesures précoces appropriées pour limiter l'impact négatif puis le coût ultérieur du traitement de ces anomalies.

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Introduction

Dental anomalies are abnormalities of form, function or position of the teeth, bones and tissues of the jaw and mouth. They may affect both primary and permanent dentition, jaw articulation and the emotional development of a child (*1*). Dental anomalies not only cause aesthetic problems but also can lead to dental problems such as functional disorders, dental caries, pulp disease, malocclusions and in particular masticatory problems for infants and children. If untreated, these may persist throughout life leading to physical growth disorder (*1*).

There are more than 500 anomalies caused by simple genetic factors and perhaps an equal number of others derived from multifactorial causes or chromosome aberrations where there are orofacial alterations (*2*). Dental anomalies can be evidence of systemic disease and may have more than one cause (3). After evaluating the patient's symptoms, pain, health risks, family history, aesthetic considerations, treatment costs, and insurance coverage, the dentist needs to decide whether to treat or simply monitor the condition. Treatment is intended to eliminate or diminish the defect, manage pain, and alleviate the patient's concerns. In most cases, surgery can correct the deformity, and psychological services are often included as part of the treatment along with speech and hearing services (*1*). Although many orofacial anomalies are currently managed, rather than treated, the rapid advances of science, such as the ability to identify mutated genes, promise future cures and treatment modalities that will eliminate or reduce the number of defects currently seen (*4*).

Many epidemiological surveys have been conducted in different parts of the world to determine the prevalence of various types of dental anomalies. For example, Cho et al. and Ezoddini et al. found a high prevalence of supernumerary premolars and dilacerations in Chinese and Iranian children (*5,6*). These earlier results have shown that there are regional and ethno-racial variations in the prevalence of dental and soft tissue anomalies. It is therefore important for practitioners to know the relative frequency of anomalies among children in their region in order to counsel patients who seek treatment (*1*). Furthermore, since dental anomalies such as missing teeth, supernumerary teeth and gemination problems are important etiological factors of malocclusion, it is essential to detect these anomalies in the primary and mixed dentition stages, as they can give rise later to serious complications including malocclusion. The aims of study therefore were to investigate the prevalence of different oral anomalies among schoolchildren in Sana'a city, Yemen, and to determine the age and sex distribution of these anomalies.

Methods

Study design and setting

This cross-sectional study was carried out in 2010 in different areas of Sana'a city. Before conducting the survey, information about the study was sent and written approval was obtained for the conduct of the study from the dean of medical science at the University of Science and Technology, Sana'a, the general manager of education and culture of each district in Sana'a city and the managers of schools in each district in Sana'a city. The parents of schoolchildren were also given information and asked to give permission for their children to participate in the research.

Sampling

This study was conducted on 1000 students (500 boys and 500 girls) out of the total school enrolment in Sana'a city of 122 500. As socioeconomic level was a factor in this study, it was conducted on children from both private and public schools, selected randomly from 6 different areas of Sana'a city according to a recent geographical map of the city. Using cluster sampling techniques 500 children (aged 4–6 years) were selected from 4 private preschools and 500 children (aged 7–8 years) from 5 public primary schools, out of 833 schools from the 6 districts of education in the city. Students who were aged 4–12 years and showed good cooperation during examination were recruited for the study.

Data collection

Before the examinations started, the examiner gave information to the students about the teeth and oral cavity and normal structure. Mouth examinations were carried out throughout the study by a single examiner (the principal investigator) wearing gloves and gauze mask. Each child was examined under natural light with a disposable plane mouth mirror, with a tongue blade to retract the cheek. The sole objective was to detect dental anomalies related to soft and hard tissues.

A data collection chart was designed for recording the necessary information for each child, including personal data such as name, age, sex and birth date.

The diagnosis of oral anomalies was made according to the clinical criteria described by Shafer et al. in 2000 (*7*).

Statistical analysis

Data analysis was carried out using the chi-squared test. Statistical analyses were considered significant at $P < 0.05$.

Results

We found dental anomalies in 151 of the 1000 children examined, giving an overall prevalence of oral anomalies of 15.1% (23.0% in boys and 7.2% in girls) (Table 1). The prevalence of oral anomalies was significantly higher among boys (115/500 cases 23.0%) than girls (36/500 cases; 7.2%) (male to female ratio 3.2:1) ($P < 0.05$).

Hard tissue anomalies

The most prevalent anomaly related to dental hard tissues was tooth hypoplasia in (28 cases; 2.8%), followed by hypocalcification (26 cases; 2.6%), then microdontia (5 cases; 0.5%), macrodontia (4 cases; 0.4%), hypodontia (4 cases; 0.4%), supernumerary teeth (3 cases; 0.3%), tooth transposition (3 cases; 0.3%), dental fusion (2 cases; 0.2%) and gemination (2 cases; 0.2%). (Figure 1).

The cases of dental fusion and tooth gemination were found only in boys (Figure 1). Microdontia was detected in 3 boys and 2 girls; this anomaly affected only the anterior region. More boys than girls had macrodontia (3 boys and 1 girl). Dental hypoplasia, occurring mostly in the upper jaw, affected 20 teeth in boys and 8 teeth in girls. Tooth hypocalcification was observed in 22 boys and 4 girls; all cases were seen in the upper jaw only. Dental transposition occurred in 1 boy and 2 girls. Tooth transposition usually involved the maxillary canine–lateral incisor. Hypodontia was seen in 2 boys and 2 girls; the maxillary lateral incisors were the most frequently absent teeth in both sexes. There were no congenitally missing primary teeth. Oligodontia (congenital absence of 6 or more teeth) was seen in only 1 case. Supernumerary primary teeth were also found only in boys and occurred mostly in the anterior region as mesiodens.

Soft tissue anomalies

Fissured tongue was the most prevalent anomaly of oral soft tissues (40 cases; 4.0%), followed by ankyloglossia (18 cases; 1.8%), geographic tongue (9 cases; 0.9%), macroglossia (4 cases; 0.4%) and hairy tongue (3 cases; 0.3%) (Figure 2).

More of the cases of ankyloglossia were found in boys (13 cases) than girls (5 cases) (Figure 2). The same was true for geographic tongue (7 boys and 2 girls) and fissured tongue (30 boys and 10 girls). Hairy tongue and macroglossia occurred only in boys.

Discussion

Study of the most common dental anomalies is important for accurate and effective treatment planning. These anomalies cause a variety of clinical problems and therefore early diagnosis should be made to avoid future problems and to plan comprehensive management.

There was a gender difference in the prevalence of all anomalies in the present study, with a higher prevalence in boys: 23.0% of boys and 7.2% of girls. The reason for this difference might be related to ethnic and racial factors. Dental anomalies are caused by inherited genetic defects. Environmental and pathological factors may also be the cause (*8*). In relation to Yemen's children several environmental factors such as chronic dry mouth, vitamin deficiency and oral use of certain drugs may be responsible for some of the anomalies (*9*). Our finding was in agreement with Aljawfi's report of tongue anomalies among Yemeni children in 2013 (*9*). It also agrees with a study

Table 1 Prevalence of dental anomalies in the sample of schoolchildren in Sana'a, Yemen

Anomaly	Boys (*n* = 500)		Girls (*n* = 500)		Total (*n* = 1000)	
	No.	%	No.	%	No.	%
Hard tissue anomalies						
Enamel hypoplasia	20	4.0	8	1.6	28	2.8
Hypocalcification	22	4.4	4	0.8	26	2.6
Microdontia	3	0.6	2	0.4	5	0.5
Macrodontia	3	0.6	1	0.2	4	0.4
Hypodontia	2	0.4	2	0.4	4	0.4
Supernumerary teeth	3	0.6	0	0.0	3	0.3
Dental transposition	1	0.2	2	0.4	3	0.3
Dental fusion	2	0.4	0	0.0	2	0.2
Gemination	2	0.4	0	0.0	2	0.2
Soft tissue anomalies						
Fissure tongue	30	6.0	10	2.0	40	4.0
Ankyloglossia	13	2.6	5	1.0	18	1.8
Geographic tongue	7	1.4	2	0.4	9	0.9
Macroglossia	4	0.8	0	0.0	4	0.4
Hairy tongue	3	0.6	0	0.0	3	0.3
Total	115	23.0	36	7.2	151	15.1

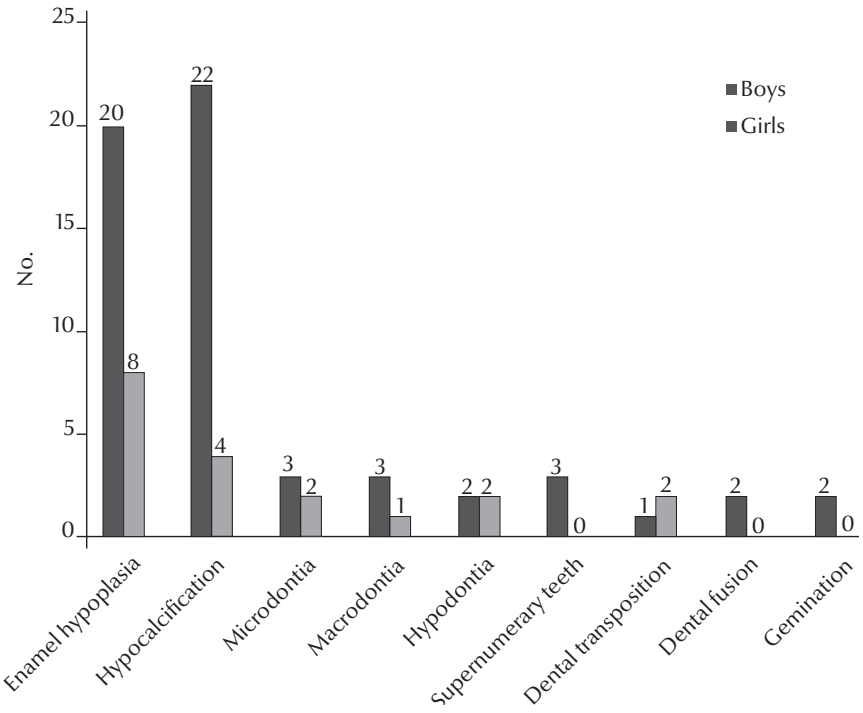

Figure 1 Prevalence (number of cases) of hard tissue anomalies among the sample of boys (*n* = 500) and girls (*n* = 500) in Sana'a, Yemen

of dental anomalies in neighbouring Saudi Arabia (*1*) and elsewhere in the world, from New Zealand (*10*). The results disagree, however, with a study in Australia, which reported that dental anomalies occurred more frequently in girls than boys. This lack of agreement can be attributed to their small sample size and the much higher ratio of girls to boys (65:46) in their study sample (*11*).

The prevalence of dental fusion of this study was 0.2%. This is in agreement with findings from the New Zealand study (0.4%) (*10*) but is much lower than in studies from Saudi Arabia or in Brazil, which found the prevalence of dental fusion to be 1.3% and 3.7% respectively (*1, 12*). This might be attributed to the large numbers of examiners (5 trained examiners) in those studies as against the use of a sole examiner in our study. Dental fusion in the present study was found in boys only, whereas the study in New Zealand found fusion in 4 boys and 2 girls (*10*). This can be attributed to genetic predisposition and racial differences, which have also been reported as contributing factors, or it may be due to trauma during crown formation of 2 adjacent teeth before calcification (*10*).

The prevalence of dental gemination in our study sample was 0.2%, which is similar to the findings of studies in New Zealand (0.4%) (*10*) and Sweden (0.3%) (*13*). Our finding of dental gemination only in boys might be explained by the greater involvement of Yemeni boys in sports-related activities compared with girls, thus exposing them to higher risk of accidents and orofacial trauma.

Supernumerary teeth were observed in 0.3% of our subjects. This figure is close to the findings of another study in Yemen by Balkees and Garib (0.2%) (*14*), and also to data from the United Kingdom (0.8%) (*15*) and a study of 1260 Brazilian children (0.3%) (*12*), but significantly less than what was found in Sweden (1.9%) (*13*) and a smaller study of 172 Brazilian children (2.3%) (*2*). Supernumerary teeth occur frequently in the permanent dentition, more so in the anterior region as mesiodens than in other parts of the arches (*13*). This can be related to hypergenesis of the epithelial cord and hereditary and developmental defects such as cleft lip and palate. It may also be an autosomal dominant trait, with splitting of the permanent tooth germ.

The present results found hypodontia in 0.4% of the study sample, which is similar to results from Brazil (0.6%) (*12*), but is considerably lower than findings from Sweden (7.4%) (*13*). The difference may be due to the size of the Swedish study sample. Hypodontia can be caused by mechanical trauma to the jaw during tooth formation, or due to infection (*16*).

The prevalence of tooth transposition in the present study (0.3%) fell within the range reported in a study carried out in India (0.4%) (*17*). The present study showed a higher incidence of tooth transposition among girls, in agreement with an earlier report from Israel (*18*). One study reported that transpositions were more commonly observed in males (*17*) while the study in Israel reported the opposite (*18*). We found that transpositions were more common in the maxilla than in the mandible. We also found that most transpositions occurred in the maxillary canine–lateral incisor. This can be related to hereditary or genetic factors or to migration during tooth formation. Trauma to deciduous teeth has also been suggested as a causative factor.

The prevalence of microdontia in the present study was 0.5%, which falls within the prevalence range reported by studies in Brazil (0.3%) (*12*) and Japan (0.7%) (*19*). Microdontia were seen only in the anterior region of both maxillary and mandibular arches, as found in the Brazilian study (*12*). This may be due to hereditary factors. Similarly, the prevalence of macrodontia in our study was 0.4%. This is in agreement with the finding of 0.2% from Sweden (*13*). Macrodontia of a single tooth is rare (*20*).

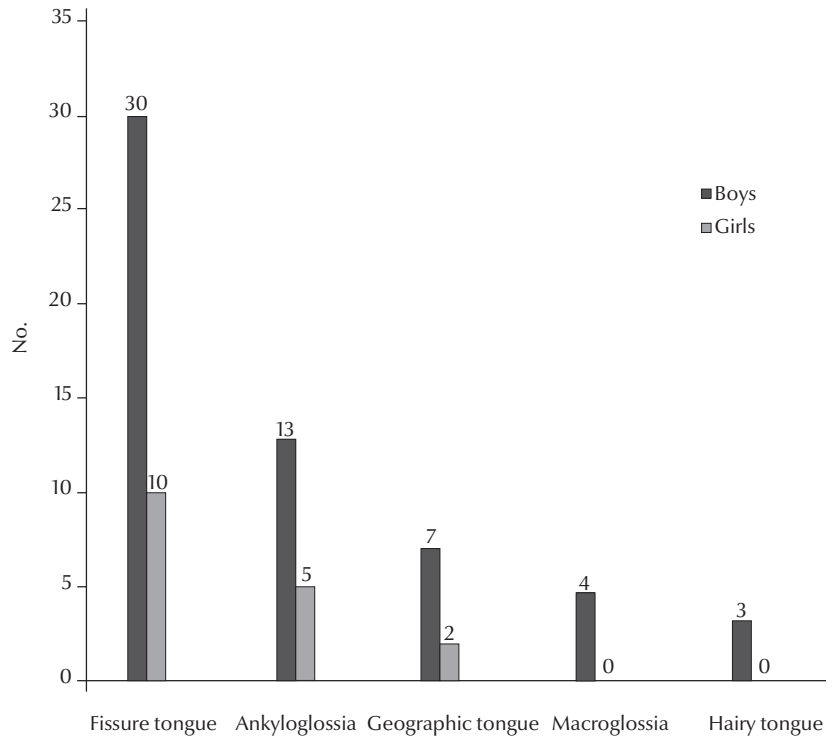

Figure 2 Prevalence (number of cases) of soft tissue anomalies among the sample of boys (*n* = 500) and girls (*n* = 500) in Sana'a, Yemen

Enamel hypoplasia was the most prevalent dental anomaly in this study at 2.8%, which is higher than the figure of 1.5% reported in Japanese children (*2*), but lower than 3.5% found among Brazilians (*21*). Enamel hypoplasia can be attributed to local infections or systemic disturbances during childhood illnesses. Of our 28 cases, there were 2 children with enamel hypoplasia in the lower arch. The other cases had hypoplasia that affected the upper anterior teeth. These findings were in agreement with those of authors in South Africa (*22*) and Islamic Republic of Iran (*23*), who found hypoplasia more commonly in the upper arch than in the lower. This can be attributed to mechanical trauma or hereditary factors, as suggested in a study of Mexican children (*24*).

The prevalence of hypocalcification in our study population was 2.6%, much lower than 23.96% found among Iranian children (*23*) and the range of 10–19% mentioned by Kellerhoff and Lussi in their review article (*25*).

The prevalence of ankyloglossia in this study was 1.8%. This figure is relatively low compared with reports from other populations in the world. For example, in a study of 1540 Iranian 7–17-year-old children the prevalence of ankyloglossia was 5% (*3*).

The present survey showed that 0.9% of children had geographic tongue. The reported frequency of geographic tongue in children varies widely in the literature. Our finding is lower than the figures of 2.5% among institutionalized orphans in Yemen (*26*) and 6.8% in Jordanian dental outpatients (*27*). However, a study of 2–17-year-old American children reported a similar figure of 1.05% (*28*).

The prevalence of fissured tongue in this study was 4.0%. The rate differs from the reports from Jordan (11.4%) (*27*) and the Islamic Republic of Iran (11.8%) (*3*). The difference may be due to congenital anomalies or environmental factors such as chronic dry mouth or chronic trauma and vitamin deficiency.

Hairy tongue was observed in 0.3% of our subjects, compared with 0.8% reported by Aljawfi in Sana'a, Yemen in 2013 (*9*) and 0.8% among Iranian children (*3*). However, it is less than the rate of 3.4% among Jordanian children (*27*). The difference in prevalence can be attributed to several predisposing factors such as oral use of certain drugs, chronic dry mouth or chronic trauma and vitamin deficiency.

The present survey showed that 0.4% of boys had macroglossia, compared with none of the girls, perhaps due to overdevelopment of the musculature.

There were some limitations to the study. We only sampled children in schools, so children who were not attending school (probably the poorest children) were not included. Also, we only sampled children in Sana'a so the results cannot be generalized to all Yemeni children. Large-scale population-based studies would be required to further refine our understanding of the genetics and hereditary of these anomalies. Nevertheless, the study has provided baseline data on the prevalence of oro-dental anomalies in schoolchildren in Sana'a. It is vital that assessment be carried out periodically to identify these anomalies early in life so that appropriate measures are taken early to mitigate their negative impact and costs of treatment in adult life.

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Prévalence et facteurs associés au tabagisme parmi les étudiants de la ville de Sousse (Tunisie)

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انتشارُ التدخين بين الطلاب في مدينة سوسة بتونس والعواملُ المرتبطة بذلك

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الخلاصة: في إطار مكافحة استهلاك التبغ بين الشباب أجرينا دراسة وصفية مقطعية في عام 2013 لتقدير معدل انتشار التدخين بين الطلاب في سوسة وتحديد العوامل المرتبطة بذلك. فتم استخدام استبيان لعينة ممثِّلة مكوَّنة من 556 طالباً في 5 مؤسسات أكاديمية في سوسة اختيروا بطريقة عشوائية. وكانت أعمار المشاركين بين 17 و 35 عاماً. فكان انتشار استهلاك التبغ في الأشهر الـ 12 السابقة للبحث ٪22.1، وكان الاستهلاك خلال الـ 3 أشهر الماضية ٪65.3. وكان متوسط عمر البدء في التدخين 17 عاماً. وكان انتشار التدخين أعلى بكثير لدى الذكور ($P < 0.001$) ولدى مَن تجاوزت أعمارهم الـ 25 عاماً ($P = 0.002$). وكان استهلاك التبغ لدى تلاميذ مؤسستين أعلى من أقرانهم في المؤسسات الأخرى ($P = 0.027$). إن ارتفاع معدل انتشار التدخين الذي وُجد لدى الطلاب يعني أن اتخاذ تدابير وقائية أمر ضروري. وهذا يتطلب تنمية احترام الذات، وتقييم برامج التدخل التي تنفَّذ قبل تدخين السيجارة الأولى.

RÉSUMÉ Dans le cadre de la lutte contre le tabac auprès des jeunes, une étude descriptive transversale a été menée en 2013 afin d'estimer la prévalence du tabagisme et d'identifier les facteurs qui lui sont associés parmi les étudiants de la ville de Sousse. Un questionnaire a été administré auprès d'un échantillon représentatif de 556 étudiants inscrits dans cinq établissements universitaires à Sousse tirés au hasard. L'âge des répondants variait entre 17 et 35 ans. La prévalence de la consommation de tabac durant les 12 derniers mois était de 22,1 % et la consommation durant les trois derniers mois était de 65,3 %. L'âge moyen de début de consommation tabagique était de 17 ans. La prévalence tabagique augmente significativement avec le sexe masculin (p<0,001) et l'âge supérieur à 25 ans (p =0,002). Les étudiants de deux institutions universitaires consommaient plus de tabac que leurs collègues des autres facultés (p=0,027). La forte prévalence du tabagisme chez les étudiants fait de la prévention une mesure indispensable qui passe essentiellement par le renforcement de l'estime de soi et l'évaluation des programmes d'intervention mis en oeuvre avant la consommation de la première cigarette.

Prevalence of and factors associated with smoking among students in Sousse, Tunisia

ABSTRACT Within the framework of the fight against tobacco among young people, we conducted a descriptive cross-sectional study in 2013 to estimate the prevalence of smoking and to identify associated factors among students in Sousse. A questionnaire was administered to a representative sample of 556 students in 5 academic institutions in Sousse randomly drawn. The age of the participants was between 17 and 35 years. The prevalence of tobacco consumption in the past 12 months was 22.1% and consumption during the past 3 months was 65.3%. The average age of starting smoking was 17 years. Smoking prevalence was significantly higher for males ($P <$ 0.001) and those aged over 25 years ($P = 0.002$). Students from 2 of the institutions were using more tobacco than their colleagues in the other institutions ($P = 0.027$). The high prevalence of smoking found among the students means that prevention measures are essential; this requires increasing self-esteem and evaluating intervention programmes implemented before smoking the first cigarette.

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Introduction

L'accroissement des conduites addictives constitue aujourd'hui un problème majeur de santé, notamment chez les étudiants (*1,2*). En effet, la transition que représente le passage du lycée à l'université est à l'origine de nombreux changements, et de l'apparition ou parfois l'aggravation des consommations de substances psychoactives (*3*). Parmi ces substances, on note le tabac qui représente un des produits addictifs les plus consommés chez les étudiants (*3,4*).

Dans ce sens, de nombreuses études épidémiologiques ont permis de mesurer l'ampleur du tabagisme chez les jeunes générations (*4*). Selon l'Organisation mondiale de la Santé, 1,1 milliard sont fumeurs, soit le tiers de la population mondiale âgée de 15 ans et plus (*5*). En France, et d'après les données de l'Observatoire français des drogues et des toxicomanies (OFDT), 36,2 % des étudiants français s'avèrent être des fumeurs réguliers (*2*). C'est la prévalence tabagique la plus importante de toutes les tranches d'âge de la vie (*2*). Ainsi, le tabac tue chaque année plus de cinq millions de personnes et constitue un facteur de risque majeur pour de nombreuses pathologies (*6*). Son usage quotidien dès le jeune âge constitue la première cause de mortalité prématurée (*7*).

Dans les pays en développement, le nombre de jeunes adultes commençant à fumer s'est multiplié et la consommation de tabac par habitant a augmenté (*8*). Malgré une discrète tendance à la baisse constatée depuis une trentaine d'années, la situation ne semble pas être meilleure en Tunisie (*9*). En effet, on peut retenir que chez les célibataires de 18 à 29 ans, 30 % consomment du tabac (*10*). Au vu de la prévalence élevée du tabagisme, en particulier chez les jeunes, qui fument autant que la population générale (*9*), les mesures de lutte antitabac menées depuis quelques années doivent s'intensifier contre ce fléau (*11*). Auparavant, nous avons jugé utile d'estimer la prévalence de la consommation de nicotine durant les 12 derniers mois et d'explorer les facteurs qui y sont associés auprès des étudiants de cinq facultés de la région de Sousse en vue d'orienter notre intervention.

Méthodologie

Type d'étude et population étudiée

Il s'agit d'une étude descriptive transversale menée durant l'année universitaire 2012-2013 auprès d'un échantillon d'étudiants inscrits dans cinq établissements universitaires du gouvernorat de Sousse :

- Institut Supérieur des Sciences Appliquées et de Technologie de Sousse (ISSAT)
- Faculté de Médecine de Sousse (FMS)
- Faculté de Droit de Sousse (FDS)
- Institut Supérieur de Finances et de Fiscalité de Sousse (ISFFS)
- Institut Supérieur de Musique de Sousse (ISMS).

Dans le présent travail, n'ont été inclus que les étudiants présents les jours de passage dans l'établissement et ayant accepté de participer à notre étude.

Échantillonnage

Une liste des établissements universitaires du gouvernorat de Sousse a été retirée auprès du rectorat. Ces derniers ont été regroupés par spécialité (littérature, économie, sciences médicales, sciences technologiques, sciences des arts), puis un établissement par spécialité a été tiré au sort. Nous avons procédé à plusieurs visites dans les établissements afin de remettre le questionnaire. Au sein de chaque établissement, nous nous sommes déplacés dans les différentes salles de cours, de travaux dirigés, les bibliothèques et les amphithéâtres et nous avons demandé aux étudiants de remplir le questionnaire de façon anonyme et confidentielle en leur expliquant le cadre de cette étude. Les questionnaires étaient récupérés sur le champ.

Notre étude a concerné au total 574 étudiants quelle que soit l'année d'étude, en instance de thèse de doctorat ou inscrits dans un master de recherche.

Collecte des données

L'enquête a été entamée après avoir eu une autorisation du président de l'université de Sousse. L'étude a été effectuée à l'aide d'un auto-questionnaire, administré par un seul enquêteur préalablement formé.

Les données portaient sur les éléments suivants :

- caractéristiques socio-démographiques : sexe, âge, établissement universitaire, niveau d'étude, redoublement, origine géographique, niveau socio-économique, mode de vie, état civil de l'étudiant, état civil des parents.
- Le niveau socio-économique est évalué selon la catégorie socio-professionnelle du père. La classification adoptée est inspirée de la classification du ministère de l'Éducation nationale, de l'Enseignement supérieur et de la Recherche (France) des professions et catégories socio-professionnelles (*12*):
  - *Favorisée A* : chefs d'entreprise de dix salariés ou plus, cadres et professions intellectuelles supérieures, instituteurs, professeurs des écoles.
  - *Favorisée B* : professions intermédiaires.
  - *Moyenne* : agriculteurs exploitants, artisans et commerçants, employés.
  - *Défavorisée* : ouvriers, retraités, inactifs (chômeurs n'ayant jamais

travaillé, personnes sans activité professionnelle).

- Les catégories « favorisée A » et « favorisée B » ont été regroupées en une seule catégorie « favorisée ».
- Consommation tabagique : consommation moyenne durant les 12 derniers mois (c'est la variable d'intérêt de la présente étude), consommation actuelle (ceux qui ont fumé tous les jours ou presque durant les trente derniers jours), âge de début de la consommation, fréquence de consommation de tabac et présence d'une éventuelle dépendance.
- Concernant la fréquence de la consommation tabagique, la classification de l'Institut de la statistique du Québec (*13*) qui classe les fumeurs en quatre catégories a été adoptée :
  - les *fumeurs quotidiens* sont des étudiants qui ont fumé au moins 100 cigarettes au cours de leur vie et qui ont fumé des cigarettes tous les jours au cours des trente jours précédant l'enquête ;
  - les *fumeurs occasionnels* sont des étudiants qui ont fumé au moins 100 cigarettes au cours de leur vie et qui ont fumé moins que tous les jours au cours des trente jours précédant l'enquête ;
  - les *fumeurs débutants* sont des étudiants qui ont fumé entre 1 et 99 cigarettes au cours de leur vie et qui ont fumé au cours des trente jours précédant l'enquête ;
  - les *anciens fumeurs* sont des étudiants qui ont fumé 100 cigarettes au cours de leur vie mais qui n'ont pas fumé au cours des trente jours précédant l'enquête.
- Par ailleurs, le risque de dépendance nicotinique a été déterminé par le test de Fagerström abrégé (*14*). Ce test est composé de deux questions ; chacune est côtée de zéro à trois points. Un score de dépendance sera calculé par la suite et on obtient trois catégories de dépendance :
  - *absence de dépendance* à la nicotine si le score est inférieur ou égal à un ;
  - *dépendance modérée* à la nicotine si le score est supérieur ou égal à deux et inférieur ou égal à trois ;
  - *forte dépendance* à la nicotine si le score est supérieur ou égal à quatre et inférieur ou égal à six.

Afin d'étudier les facteurs associés à l'usage de tabac, nous nous sommes basés sur les facteurs ayant prouvé leur lien avec le tabagisme dans certains articles, à savoir, sexe, famille monoparentale ou séparée *versus* parents en couple, conditions économiques, milieu de vie, tabagisme dans la famille (parents fumeurs) et redoublement ou échec scolaire (*8,15-17*).

Analyse des données

L'analyse statistique a été effectuée en utilisant le logiciel SPSS 18.0. Afin d'étudier la part de certains facteurs associés au tabagisme, le test du χ^2 a été utilisé lorsque les conditions de validité le permettaient pour les variables qualitatives. Le seuil de significativité (p) était fixé à 0,05.

Résultats

Caractéristiques de la population étudiée

Parmi les 574 étudiants recrutés dans cette étude, 556 ont répondu convenablement au questionnaire qui leur a été distribué (soit un taux de 96,9%) avec un *sex ratio* de 0,93. L'âge moyen des participants était de 21,8 ans (écart type [ET] 2,2) (n = 556). La répartition des étudiants selon le sexe, l'âge moyen et l'établissement universitaire est résumée dans le tableau 1.

Plus de la moitié des étudiants (55,2 % ; n = 307) était inscrite en première et deuxième année, 30,8% des étudiants (n = 171) étaient inscrits en troisième et quatrième année et 14 % (n = 78) avaient un niveau d'études supérieur à cinq ans. Seulement 9,6 % (n = 53) étaient des redoublants.

Concernant l'origine géographique et le niveau socio-économique, plus des trois quarts des étudiants vivaient en milieu urbain (78,5 % ; n = 434) et 40,2% (n = 202) appartenaient à la classe économique favorisée. La majorité des participants étaient célibataires (75,6 % ; n = 418) et

Tableau 1 Répartition des étudiants selon le sexe, l'âge moyen et l'établissement universitaire

Etablissement universitaire	Total		Féminins		Masculins		Age moyen (ET) (ans)
	Nbre	%	Nbre	%	Nbre	%	
FMS	121	21,8	73	60,3	48	39,7	22,3 (2,2)
FDS	143	25,7	96	67,1	47	32,9	22,87 (2,6)
ISFS	58	10,4	39	67,2	19	32,8	20,64 (1,4)
ISSAT	209	37,6	73	34,1	136	65,1	21,15 (1,5)
IMS	25	4,5	7	28	18	72	22 (2,5)
Total	556	100	288	51,8	268	48,2	21,8 (2,2)

FMS : Faculté de Médecine de Sousse ; FDS : Faculté de Droit de Sousse ; ISFFS : Institut Supérieur de Finances et de Fiscalité de Sousse ; ISSAT : Institut Supérieur des Sciences Appliquées et de Technologie de Sousse ; ISMS : Institut Supérieur de Musique de Sousse.
ET = écart type.

vivaient avec les deux parents (73,6 % ; n = 408) (Tableau 2). Concernant l'état civil des parents des participants, 96,1 % (n = 514) des pères et 94,1 % (n = 513) des mères étaient mariés.

Consommation tabagique

Prévalence de la consommation tabagique

La prévalence globale de consommation de cigarettes pendant les 12 derniers mois était de 22,1 %, intervalle de confiance à 95% ($IC_{95\,\%}$) :18,9-25,7 (n = 123). La prévalence tabagique chez les étudiants de sexe masculin durant les 12 derniers mois était de 41 % (n = 110) et celle chez le sexe féminin était de 4,5 % (n = 13) (Tableau 2). Par ailleurs, la consommation actuelle (lors des 30 derniers jours) est de 13,8 % (n = 77) par rapport à la totalité de notre échantillon. Cette consommation représente 65,3 % ($IC_{95\,\%}$: 55,9-73,7) parmi les fumeurs durant les 12 derniers mois (77/118). L'âge moyen de début du tabagisme était de 17,2 (ET 2,9) ans.

Fréquence de la consommation tabagique

Parmi les fumeurs, un étudiant sur deux (48,6 % ; n = 53) avait une consommation quotidienne. Environ un étudiant sur cinq (18,3 % ; n = 20) avait une consommation occasion-nelle ; 26,6 % (n = 29) étaient des fumeurs débutants et 6,4 % (n = 7) étaient des anciens fumeurs. La fréquence de la consommation tabagique ne différait pas significativement en fonction du sexe.

Dépendance à la nicotine (n = 104)

La prévalence de la dépendance tabagique était forte chez 33,9 % (n = 39) des cas et faible chez 14,8 % (n = 17) des étudiants dépendants. Cinquante-neuf (51,3 %) étaient non dépendants au tabac.

Facteurs associés au tabagisme

La prévalence du tabagisme augmente significativement avec le sexe masculin ($p < 10^{-3}$) et l'âge des étudiants supérieur à 25 ans (p = 0,002) (Tableau 2). Selon les établissements universitaires, la prévalence tabagique était significativement différente (p = 0,027), en faveur de l'Institut Supérieur de Musique (40 % ; n = 10) (Tableau 2).

Discussion

Le tabagisme constitue un problème de santé publique (*18*). Les adolescents et les jeunes sont la principale cible : de ce fait, des actions de prévention s'avèrent nécessaires pour préserver la santé des jeunes et éviter les maladies liées au tabagisme. Afin d'avoir une idée sur le tabagisme en milieu universitaire et de planifier une éventuelle intervention de prévention, nous avons mené une étude chez les étudiants au niveau de cinq établissements universitaires. Par ailleurs, pour des raisons d'accessibilité aux étudiants de différents niveaux d'études au sein des établissements universitaires, nous avons opté pour un échantillonnage de convenance.

La prévalence de la consommation tabagique trouvée dans notre étude (22,1 %) était nettement inférieure à celle de la population générale tunisienne qui a été estimée en 2008 par l'Association tunisienne de Lutte contre le cancer (ATCC) à 36 % (*9*). Les études faites en 2004 (Harrabi et al.) et 2011 (Khefacha *et al.*) à Sousse ont montré des prévalences respectives chez les étudiants de 19 % et de 32,6 % (*19,20*). D'autres études à l'échelle nationale ont trouvé des résultats différents. Ainsi, l'étude conduite par Soltani *et al.* en 1997 à Monastir [18] révélait une prévalence du tabagisme chez les étudiants de 33 % contre 10 % pour l'étude de Fakhfakh *et al.* faite en 2003 à Tunis (*11*).

À l'échelle internationale, Chakroun *et al.*, Fernandez et al., Kracmarova et al. et De Andrade et al. ont rapporté des prévalences respectives de 35,4 %, 29,3 %, 28,0 % et 27,8 % (*4,21-23*) (Tableau 3). Cette différence de résultats pouvait être expliquée par le fait que nous comparons des groupes d'étudiants de structures différentes en utilisant des instruments de mesure différents et un mode d'échantillonnage différent. Ainsi, d'après ces études et bien d'autres menées dans le monde, la consommation tabagique chez les étudiants reste élevée malgré les campagnes antitabac qui ont été mises en place. Ceci nous amène à réfléchir sur les stratégies adoptées actuellement et leur efficacité.

L'analyse selon le sexe montre que la prévalence tabagique augmente avec le sexe masculin. La même constatation a été faite dans les autres études tunisiennes (*9,11*) et étrangères, notamment musulmanes et arabes (*9,24*). En effet, l'étude menée en Arabie saoudite auprès de 400 étudiants en 2014 a montré que la prévalence chez les étudiants était de 27,6 % contre 2,4 % chez les étudiantes (*6*). Cette différence entre les deux sexes envers le tabac peut être expliquée par des considérations d'ordre socio-culturel et religieux. En fait, les sociétés arabes considèrent le tabagisme féminin comme un tabou dévalorisant l'image de la fille, mais cette image est en train de changer ces dernières années en faveur du modèle occidental (*25*). Par ailleurs, cet écart se réduit dans les pays occidentaux où les femmes fument autant que les hommes. En effet, les femmes sont des victimes soumises à l'image séduisante, libérée et dynamique véhiculée par les campagnes publicitaires et les magazines de mode (*26*). Cette image pourrait expliquer la forte prévalence du tabagisme féminin où la cigarette fait partie des attributs symboliques de l'émancipation, de la féminité et du plaisir (*26*).

L'âge moyen d'initiation au tabac est de 17,25 ans (ET 2,9) dans notre travail. Il est légèrement en dessous de

Tableau 2 Répartition de la prévalence du tabagisme pendant les 12 derniers mois selon les caractéristiques socio-démographiques et académiques des étudiants

Caractéristique	Fumeurs		Non-fumeurs		Total	*p*
	Nbre	%	Nbre	%	No.	
Genre						
Masculin	110	41,0	158	59,0	268	< 0,001
Féminin	13	4,5	275	95,5	288	
Tranche d'âge (ans)						
17-25	108	20,7	414	79,3	522	0,002
> 25	14	43,8	18	56,3	32	
Niveau socio-économique						
Favorisé	43	21,3	159	78,7	202	0,922
Moyen	31	20,4	121	79,6	152	
Défavorisé	33	22,3	115	77,7	148	
Origine						
Rurale	31	26,1	88	73,9	119	0,236
Urbaine	91	21,0	343	79,0	434	
Etat civil						-
Célibataire	98	23,4	320	76,6	418	
Marié	4	19,0	17	81,0	21	
Divorcé	0	0	1	100,0	1	
En couple	21	18,6	92	81,4	113	
Mode de vie						0,775
Avec les parents*	101	22,4	349	77,6	450	
Hors foyer parental	30	21,2	82	78,8	104	
Redoublement						0,063
Nouveau	22	21,0	396	79,0	501	
Redoublant	17	32,1	36	67,9	53	
Niveau d'étude						0,975
1ère et 2ème année	69	22,5	238	77,5	307	
3ème et 4ème année	37	21,6	134	78,4	171	
5ème année et plus	17	21,8	61	78,2	78	
Etablissement universitaire						0,027
FMS	24	19,8	97	80,2	121	
FDS	22	15,4	121	84,6	143	
ISSAT	55	26,3	154	73,7	209	
ISFS	12	20,7	46	79,3	58	
ISMS	10	40,0	15	60,0	25	

[a]Avec les parents : soit avec les deux parents, soit avec l'un des deux parents, ou avec un membre de la famille.
Tous les totaux ne sont pas égaux à 556 en raison des valeurs manquantes.
FMS : Faculté de Médecine de Sousse ; FDS : Faculté de Droit de Sousse ; ISSAT : Institut Supérieur des Sciences Appliquées et de Technologie de Sousse ; ISFFS : Institut Supérieur de Finances et de Fiscalité de Sousse ; SIMS : Institut Supérieur de Musique de Sousse.

l'âge de début retrouvé dans de nombreuses études tunisiennes (19-20 ans) (*8,9*). En Europe, l'étude multicentrique menée auprès de 2249 étudiants en 2009 a montré que l'âge moyen de début de la consommation de tabac était entre 11 et 15 ans (*7*). Au niveau de cette dernière étude, le tabagisme a débuté à l'adolescence, avant l'entrée dans la vie universitaire. Ceci semble lié à un malaise personnel et psychologique, en principe transitoire (*27*). Il ressort ainsi que les programmes de prévention se basant, entre autres, sur l'éducation sanitaire doivent avoir comme cible principale les jeunes adolescents (*11*).

Dans notre étude, la prévalence tabagique était plus élevée dans la tranche d'âge de plus de 25 ans (43,8 %). Par contre, en France,

Tableau 3 Prévalence du tabagisme chez les étudiants dans le monde

Auteurs	Population	Effectifs	Année	Pays	Prévalence fumeurs (%)
Soltani MS et al (*14*)	Faculté de Médecine (Monastir)	501	2000	Tunisie	33,0
Harrabi I et al (*15*)	Faculté de médecine (Sousse)	230	2004	Tunisie	19,2
Fakhfakh R et al (*11*)	Ecole supérieure des sciences et des techniques de la santé (Tunis)	1288	2010	Tunisie	10,0
Khefacha AS et al (*16*)	Institut Supérieur des sciences infirmières (Sousse)	150	2011	Tunisie	32,6
Maatouk F et al (*9*)	Faculté de Médecine dentaire (Monastir)	1123	2013	Tunisie	14,2
Manoudi F et al (*20*)	Université Caddi Ayyad de Marrakech	418	2010	Maroc	24,6
Chakroun N et al (*4*)	Université de bordeaux II	1517	2005	France	35,4
Fernandez GD (*19*)	Ecole des sciences de la santé (University of Léon)	265	2006	Espagne	29,3
De Andrade AG et al. (21)	Vingt-sept Facultés au Brésil	12 721	2009	Brésil	27,8
Kracmarova L et al (*18*)	Université centrale d'Italie	345	2011	Italie	28,0
Jradi H et al (*32*)	Trois Facultés de médecine (King Saud Bin Abdul-Aziz University, King Abdul-Aziz University and Jazan University)	212	2014	Arabie saoudite	19,4
Présente étude	Cinq établissements universitaires (Sousse)	556	2014	Sousse	22,1

d'après les données de l'Observatoire français des drogues et des toxicomanies (OFDT), la tranche d'âge 18-25 ans est celle où la fréquence du tabagisme est maximale (36,2 %) (*2*). Cette fréquence diminue régulièrement dans les tranches d'âge supérieures (*2*). La différence de prévalence de cette tranche d'âge pourrait être expliquée par l'initiation tardive au tabac et l'indépendance financière des jeunes qui se concrétise à un âge tardif.

Selon l'établissement d'enseignement supérieur, la Faculté de Médecine de Sousse se classe en quatrième position avec 19,8%. Dans le même sens, Moaouad *et al.* dans une étude comparative chez une population d'étudiants libanais a trouvé que la prévalence de la dépendance à la nicotine était significativement inférieure chez les étudiants en médecine par rapport à leurs homologues d'autres facultés (*28*). Certainement, le tabagisme constitue un problème sérieux pour tout étudiant quelle que soit sa discipline académique, mais cette gravité nous semble prendre davantage d'importance lorsqu'il s'agit d'un futur médecin vu l'image négative qu'il va véhiculer, non seulement à ses patients, mais à toute la population en général (importance du rôle modèle) (*29*). Par ailleurs, plusieurs études ont montré un taux plus élevé d'abus de substances psychoactives (tabac, alcool, marijuana) chez les médecins comparés à la même tranche d'âge de la population générale en rapport avec le stress de la profession médicale (*29,30*).

Dans notre étude, 18,3 % des étudiants consommaient du tabac de façon occasionnelle. Ce mode de consommation tabagique (occasionnelle), selon plusieurs études, se rencontre plus fréquemment chez les jeunes adultes (*31,32*) qui chercheraient à partager cette consommation dans un cadre festif ou de convivialité (*33*). Ainsi, les fumeurs occasionnels utilisent le tabac comme un signe d'engagement social, mais aussi pour atténuer les émotions négatives (*33*). En outre, ces derniers ne se considèrent pas comme de vrais fumeurs et sont plus confiants quant à leur capacité d'arrêter de fumer (*34*), ce qui a comme conséquence une faible demande d'aide pour le sevrage tabagique et de faibles tentatives d'arrêt. Donc les actions de prévention doivent essentiellement toucher cette catégorie de fumeurs. En effet, bien que ces fumeurs consomment moins de cigarettes et aient moins de dépendance nicotinique (*35*), plusieurs études ont montré la progression de ces consommateurs vers des habitudes tabagiques plus enracinées en développant une dépendance nicotinique à long terme (*31*). Ce type de consommation tabagique doit être pris en considération dans les programmes de lutte antitabac afin d'inciter ces consommateurs au sevrage et de prévenir l'escalade.

Conclusion

Ainsi, au regard des résultats de cette étude, la prévention du tabagisme dans nos milieux universitaires est jugée prioritaire à plusieurs titres vu la forte prévalence de la consommation de cette substance parmi les étudiants (22,1 %), la lourde morbidité

et la mortalité qui y sont liées et son potentiel introductif, selon la théorie de l'escalade, vers d'autres produits comme le cannabis et l'alcool.

Les stratégies de lutte contre le tabac ont consisté presque exclusivement jusqu'ici en une information sur les risques liés à l'usage du tabac. La majorité des actions de prévention étaient ponctuelles à l'occasion de la célébration de journées nationales, maghrébines et mondiales, dont certaines sont spécifiques au milieu universitaire. Dans ce cadre, nous prévoyons d'instaurer un programme de prévention tabagique en collaboration avec le service de médecine universitaire de la Direction régionale de santé de base de Sousse. Ce programme a pour objectif non seulement d'améliorer les connaissances des étudiants sur les méfaits du tabac sur leur santé mais aussi, et surtout, de mettre en exergue la manipulation qu'exerce l'industrie du tabac, de favoriser l'estime de soi des étudiants, de créer des activités physiques (tournois sportifs) et intellectuelles (clubs de jeu d'échecs) en milieu universitaire. Ces actions s'étendront de façon régulière sur une période minimale de six mois, sinon plus, afin de provoquer une prise de conscience et engendrer un changement d'attitudes sur une période de 12 à 18 mois (*36*).

Par ailleurs, en Tunisie, bien qu'on dispose depuis plus d'une dizaine d'années de mesures législatives relatives à l'interdiction de fumer dans les lieux publics, l'application de cette loi reste toutefois à vérifier ; son application en milieu universitaire afin de bénéficier d'une université sans tabac fait partie de notre mission.

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Paediatric continuing medical education needs and preferences of UNRWA physicians in Jordan

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احتياجات أطباء الأونروا في الأردن وما يفضلونه بخصوص التعليم الطبي المستمر في مجال طب الأطفال

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الخلاصة: إن معظم الأطباء الذين يعملون في برنامج صحة الرضع والأطفال التابع لوكالة الأمم المتحدة لغوث وتشغيل اللاجئين (الأونروا) في الأردن هم ممارسون عامون لم يدرَّبوا بعد التخرج على طب الأطفال. وعلاوة على ذلك فإن القدرة على تقديم تعليم طبي مستمر مباشر – في الأماكن شحيحة الموارد أو في المناطق النائية – غالباً ما تكون محدودة. فقد أُرسل لجميع الأطباء الـ 92 الذين يمارسون العمل في عيادات الأونروا في الأردن استبيان لاستقصاء الموارد المتاحة والمصادر الحالية للتعليم الطبي المستمر، واستكشاف ما يفضلونه من أنماط التعليم الطبي المستمر، والوقوف على الموضوعات ذات الاهتمام في مجال الرعاية الطبية للأطفال. فذكر ٪80 من المجيبين الـ 89 أنهم حضروا محاضرات طبية مباشرة للتعليم الطبي المستمر، كما ذكر ٪70 أنهم حضروا اجتماعات للتعليم الطبي المستمر. وعلى الرغم من أن معظم الأطباء تتوافر لديهم إمكانية الوصول إلى الإنترنت فإن ٪52.8 منهم فقط كان مهتماً بدورات شبكة الإنترنت للحصول على التعليم الطبي المستمر. وكانت هناك علاقة ذات دلالة إحصائية بين سنة التخرج من كلية الطب وبين تفضيل التعليم الطبي المستمر عن طريق شبكة الإنترنت. إن الآثار المترتبة على المشاركة في التعليم الطبي المستمر ومواضيع التعليم الطبي المستمر في مجال طب الأطفال هي قيد المناقشة.

ABSTRACT Most physicians who work in the United Nations Relief and Works Agency (UNRWA) infant and child health programme in Jordan are general practitioners with no postgraduate training in paediatrics. Furthermore, in resource-poor or remote settings, the ability to deliver live continuing medical education (CME) is often limited. A questionnaire exploring the resources available for accessing CME, preferences for types of CME, current sources of CME and topics of interest in the field of paediatric care was sent to all 92 physicians practising in UNRWA clinics in Jordan. Of the 89 respondents 80% had attended live medical lectures for CME and 70% CME meetings. Despite most physicians having access to the Internet only 52.8% were interested in Internet-based courses for accessing CME. There was a statistically significant relationship between year of graduation from medical school and preference for Internet-based CME. Implications for CME participation and paediatric CME topics are discussed.

Besoins et préférences en matière de formation médicale continue en pédiatrie des médecins exerçant en Jordanie de l'Office de secours et de travaux des Nations Unies pour les réfugiés de Palestine dans le Proche-Orient

RÉSUMÉ La plupart des médecins qui travaillent pour le programme de santé du nourisson et de l'enfant en Jordanie à l'Office de secours et de travaux des Nations Unis pour les réfugiés de Palestine dans le Proche-Orient (UNRWA) sont des médecins généralistes sans spécialisation en pédiatrie. Par ailleurs, dans un contexte de ressources limitées ou dans des zones isolées, la capacité à dispenser une formation médicale continue (FMC) est souvent limitée. Un questionnaire étudiant les ressources disponibles qui permettent d'accéder à la formation médicale continue, les types de formation préférés, les sources actuelles de formation médicale continue et les sujets d'intérêt dans le domaine des soins pédiatriques a été envoyé à l'ensemble des 92 médecins exerçant dans des cliniques de l'UNRWA en Jordanie. Sur un total de 89 répondants, 80 % avaient assisté en personne à des conférences médicales dans le cadre de la formation médicale continue et 70 % à des réunions de formation médicale continue. Si la plupart des médecins avaient accès à l'Internet, seuls 52,8 % étaient intéressés par des cours en ligne permettant d'accéder à la formation médicale continue. Il existait une relation statistiquement significative entre l'année de fin d'études en faculté de médecine et la préférence pour une formation médicale continue sur l'Internet. Les implications pour une participation à la formation médicale continue et les sujets de formation médicale continue en pédiatrie sont en cours de discussion.

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Introduction

Continuing medical education (CME) allows physicians to keep up with advances in medical knowledge that affect patient care. Evidence indicates that CME can be effective in improving knowledge, attitudes, skills and behaviours (*1*). While Internet-based learning has been found to be associated with large positive effects on knowledge compared with no intervention, a meta-analysis of 81 trials has suggested that CME interventions that result in measureable improvements in patient outcomes are those that provide a combination of didactic and interactive elements (*2*).

The health programme of the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) delivers primary health care services to over 3 million Palestinian refugees in the Gaza Strip, the West Bank, Jordan, Syrian Arab Republic and Lebanon (3). Through their infant and child health programme, UNRWA provides care for children across all phases of the life cycle, with specific interventions that meet the health needs of newborns, infants and school-age children. Both preventive and curative care is provided, with a special emphasis on prevention. In Jordan, UNRWA clinics are located in both refugee camps and in the community, at various locations throughout the country (Table 1).

Physicians working in resource-limited countries or remote areas often have limited access to CME venues. This has an impact on their ability to access advances in medical knowledge and skills. Internet-based CME activities offer a potential solution to this problem (*4*). Particularly in resource-poor or remote settings, the ability to deliver live CME is often limited. This makes Internet-based delivery of courses and information a potentially attractive method by which information and education might be disseminated.

Most physicians who work in the UNRWA infant and child health programme are general practitioners with no postgraduate training in paediatrics. CME on paediatric topics has been identified by both physicians and the UNRWA leadership as being very important in maintaining and improving the quality and efficiency of health care in the UNRWA clinics in Jordan. Since little is known about the CME needs of UNRWA physicians, we wanted to explore their current practices and format preferences for CME, with an emphasis on paediatric topics.

Methods

A questionnaire was developed for this survey by a team comprised of a board-certified academic paediatrician, a board-certified academic family physician and physician leaders in the UNRWA health department headquarters in Amman, Jordan. The questionnaire was also reviewed by the Center for Continuing Education at the University of Nebraska medical centre in Omaha, United States of America. It explored preferences, practices and access to CME as well as content needs in paediatrics. The questionnaire was reviewed and approved by the ethics committee at the UNRWA headquarters.

The paper questionnaire was sent in February 2014 to the UNRWA physicians who staff the 23 primary health care centres in the 6 regions in Jordan. The questions explored the following themes: the preferred format for CME; current sources of CME; resources available to allow participation in online and other types of CME; and preferred paediatric topics for CME.

Counts and percentages were used to describe all variables. Fisher exact test was used to determine associations between questions. A P-value < 0.05 was considered statistically significant.

Results

Of the 92 physicians, 89 completed and returned the questionnaire (96% response rate); 72 (80.9%) respondents were male and 15 (16.8%) were female (2 did not report their sex). The majority of physicians in the sample (50.6%) reported having graduated from medical school before 1996.

Preferred method of CME

In the question about preferred methods of CME 69.7% of the respondents were very interested in medical conferences as a method for obtaining CME. The next most preferred methods

Table 1 Locations of United Nations Relief and Works Agency for Palestine Refugees in the Near East primary care clinics in Jordan

Clinics within refugee camps	Clinics outside refugee camps
Amman new camp	Tybeh
Irbid	Aqaba
Jerash	Waggas
Husn	North Shoneh
Talbieh	Mashare
Suf	Kraymeh
Baqaa	Amman town health centre
South Baqaa	Zarqa town
Jabal Hussain	Amir Hasan Quarter
Zarqa camp	Awajan
Marka	Nuzha
Msheirfeh	

Table 2 Preferred methods of accessing continuing medical education (CME) among physicians at United Nations Relief and Works Agency clinics in Jordan (*n* = 89)

Method of accessing CME	Very interested		Somewhat/not interested	
	No.	%	No.	%
Medical conferences	62	69.7	27	30.3
Brief courses	58	65.2	31	34.8
Local lectures and case presentation	52	58.4	37	41.6
Internet-based courses and modules	47	52.8	42	47.2
Medical databases	34	38.2	55	61.8
Webinars	16	18.0	73	82.0
Medical journals	0	0.0	89	100.0
Websites	0	0.0	89	100.0
Other	10	11.2	79	88.8

were brief courses (65.2%) and local lectures and case presentations (58.4%). Although just over half of respondents (52.8%) were interested in Internet modules, other modes of electronic delivery were less preferred (webinars 18.0%, Internet databases 38.2%). None of the physicians reported an interest in accessing medical journals online or medical websites (Table 2).

Current CME participation

When asked about their current participation in CME 85.4% of physicians said they participated in medical lectures and 70.8% participated in brief courses. Participation in Internet-based CME was significantly lower, with 49.4% accessing CME through medical websites and only 31.5% using taking Internet-based courses and modules. One-fifth of respondents (20.2%) reported accessing medical databases such as PubMed. Only 5.6% participated in webinars (Table 3).

Access to CME

Although all UNRWA clinics in Jordan have an Internet connection, only 79.9% of the physicians surveyed reported that they had reliable access to the Internet, 37.0% reported having access to medical databases and 35.9% had access to online medical journals.

Paediatric topic preferences

Physicians indicated that the paediatric topics they were most interested in were respiratory infections (76.4%), followed by asthma (71.9%), examination of the newborn (70.8%), fever in infants (70.8%), immunization updates (70.8%) and gastrointestinal infections (69.7%). Subjects that were of least interest included oral health (31.5%), injury prevention (42.7%) and behavioural problems (48.3%) (Table 4).

Preferences by year of graduation

Further analysis of the data revealed that there was greater preference for online CME among those physicians who had graduated more recently from medical school: 91.3% among those who graduated between 2005 and 2012 versus 88.9% among those graduating before 1996 ($P = 0.03$) (Table 5).

Table 3 Current types of continuing medical education (CME) participation among physicians at United Nations Relief and Works Agency clinics in Jordan (*n* = 89)

Type of CME	Participated		Did not participate	
	No.	%	No.	%
Local lectures	76	85.4	13	14.6
Brief courses	63	70.8	26	29.2
Medical websites	44	49.4	45	50.6
Medical conferences	33	37.1	56	62.9
Internet based courses and modules	28	31.5	60	67.4
Medical journals	27	30.3	62	69.7
Medical databases	18	20.2	71	79.8
Webinars	5	5.6	84	94.4
Other	5	5.6	84	94.4
No participation	88	98.9	1	1.1

Table 4 Paediatric continuing medical education topics of interest among physicians at United Nations Relief and Works Agency clinics in Jordan (*n* = 89)

Topic	Very interested		Somewhat/not interested	
	No.	%	No.	%
Respiratory infections	68	76.4	21	23.6
Asthma	64	71.9	25	28.1
Newborn examination	63	70.8	26	29.2
Fever in small infant	63	70.8	26	29.2
Immunization update	63	70.8	26	29.2
Gastrointestinal infections	62	69.7	27	30.3
Failure to thrive	56	62.9	33	37.1
Micronutrient deficiencies	55	61.8	34	38.2
Physician professional development	55	61.8	34	38.2
Urinary tract infection	53	59.6	36	40.4
Late preterm infants	46	51.7	43	48.3
Behavioural and emotional problems	43	48.3	46	51.7
Injury prevention	38	42.7	51	57.3
Oral health	28	31.5	61	68.5
Other	5	5.6	84	94.4

Discussion

Our data indicated that while most UNRWA physicians practising in Jordan reported that they had reliable access to the Internet, only 31.5% of the physician sample participated in Internet-based courses and modules, and similar numbers reported accessing online medical journals. The respondents reported a strong preference for live interactive courses and lectures when participating in CME. Although all UNRWA clinics in Jordan are connected to the Internet, 20.2% of the physicians reported that they did not have a reliable access to the Internet. This may be due to local issues or difficulties on the part of the physicians trying to access this resource.

In addition, the number of years since medical school graduation was significantly associated with lower interest in Internet-based CME delivery. Data from other regions regarding the relationship between physician age and Internet use for CME are scarce and conflicting (*5–7*). It is possible that among older physicians, less familiarity with computers and the Internet is a barrier to participation. Other possibilities might be that older physicians place a greater value on other aspects of group CME. These include the opportunity for a respite from practice or to experience personal interactions with teachers, colleagues and other professionals (*8*). Older physicians may also have a different understanding of the role played by the social environment in consolidating new knowledge (*9*). Research indicates that even in countries where Internet access is nearly universal, the traditional live CME format continues to be preferred by many physicians, although it is unclear whether physician's age is a factor in this preference (*10,11*).

Paediatric topics reported to be of greatest interest included commonly seen paediatric conditions such as immunizations and asthma. Oral health, injury prevention and behavioural problems were of less interest. Previous

Table 5 Preference for Internet-based continuing medical education (CME) as a function of year of medical school graduation among physicians at United Nations Relief and Works Agency clinics in Jordan

Graduation year	Interest in Internet-based CME				*P*-value
	Somewhat/not interested		Very interested		
	No.	%	No.	%	
2005–2012	2	8.7	21	91.3	0.0316
1997–2004	3	15.0	17	85.0	
1996 and before	5	11.1	40	88.9	

research has suggested that physicians practising in the region may not have received much training in some of these topics (*12*). Additionally, they may consider some of these conditions to be outside of their sphere of responsibility (*13*). Therefore, CME on these important topics would be expected to improve the scope and quality of health care provided in these UNRWA primary care clinics.

Although the response rate to our survey was high, the questions on the survey did not explore preferences and barriers to physician CME preferences in depth. Further work should focus on detailing these barriers and assessing the effectiveness of different types of CME delivery on patient outcomes in the UNRWA setting.

A cost-effective health care system depends on a well-trained medical workforce. Continuing medical education is also an important means of coordinating and standardizing practices among a group of physicians across a medical system. These findings highlight the importance of understanding which specific types of CME activities are the most compelling to the target audience, and which are most likely to lead to measureable positive changes in clinical practice. Aligning modalities and subjects to take advantage of preferences, needs and resources available will allow the health organization to maximize cost–effectiveness of the CME provided, while allowing patients to benefit fully from new advances in medical care.

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Report

Compiling comprehensive national health statistics in a fragmented health information system: lessons learned from Lebanon

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تجميع إحصائيات صحية وطنية شاملة في نظام معلومات صحية مجزأ: دروس مستفادة من لبنان

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الخلاصة: نظراً للتحول الصحي السريع التي تواجهه البلاد ولوجود قطاع خاص شديد الهيمنة أصبح الحصول على إحصاءات صحية موثوقة مسألة ذات أولوية بالنسبة للبنان. ويستعرض هذا البحث عملية تجميع ونشر الإحصائيات الصحية الوطنية من العديد من الشركاء في القطاع العام والخاص وغير الحكومي في البلاد. إن الدروس المستفادة من إعداد طبعتين من "تقرير الإحصائيات الصحية الوطنية في لبنان" تتيح التعرف على نقاط القوة وكذلك بعض التحديات التي يواجهها نظام المعلومات الصحية الراهن في لبنان. فهذه التجربة تؤكد الحاجة إلى إقامة شراكة وثيقة بين جميع الأطراف المعنية، وإلى وجود نظام إدارة كفء، وموارد بشرية كافية، ونظم وإجراءات محددة مسبقاً. ومن شأن هذه العملية أن تستفيد من وجود موقع إلكتروني تفاعلي لتبادل البيانات والمعلومات بين الأطراف المعنية والجمهور. كما أن وجود دلائل إرشادية واضحة ذات تعريفات محددة ونماذج موحدة من شأنه أن يسهل جمع البيانات وتحليلها.

ABSTRACT In view of the rapid health transition faced by the country and a highly dominant private sector, the issue of obtaining reliable health statistics is becoming a priority for Lebanon. This paper reviews the process of compiling and disseminating national health statistics from the multitude of public, private and nongovernmental partners in the country. The lessons learned from preparing two editions of the *National health statistics report in Lebanon* allow identification of some challenges and strengths of the current health information system in Lebanon. The experience emphasizes the need for a close partnership with all stakeholders, an efficient management system, adequate human resources and predefined systems and procedures. The process would benefit from having an interactive website for exchange of data and information among stakeholders and the public. The existence of clear guidelines with consistent definitions and standardized forms would also facilitate the collection and analysis of data.

Compilation de statistiques sanitaires nationales et exhaustives dans un système d'information sanitaire fragmenté : les enseignements tirés de l'expérience du Liban

RÉSUMÉ Face à la transition sanitaire rapide dans le pays et à un secteur privé fortement dominant, l'obtention de statistiques de santé fiables devient une priorité au Liban. Le présent article analyse le processus de compilation et de diffusion des statistiques de santé nationales fournies par une multitude de partenaires publics, privés et non gouvernementaux dans le pays. Les enseignements tirés de la préparation de deux éditions du rapport sur les statistiques sanitaires nationales au Liban ont permis d'identifier certaines forces et faiblesses du système d'information sanitaire actuel dans le pays. L'expérience souligne la nécessité d'un partenariat étroit entre les parties prenantes, d'un système de gestion efficace, de ressources humaines adéquates ainsi que de systèmes et de procédures prédéfinis. La création d'un site Internet interactif pour l'échange de données et d'informations entre les parties prenantes et le public constituerait un avantage pour le processus. En outre, l'existence de recommandations claires, de définitions cohérentes et de formulaires normalisés faciliterait également le recueil et l'analyse des données.

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Introduction

Statistics are essential in any process of evidence-based and informed policies and decisions (*1*). It is often mentioned that Lebanon lacks the accurate and relevant health statistics that are necessary for strategic decision-making. However, significant efforts to improve the health information system have been made by the Lebanese Ministry of Public Health (MoPH) over the past few years (*2,3*). These include periodic birth statistics reports, annual health bulletins on selected indicators as well as reports on services and vertical programmes delivered through the primary health care network supported by the MoPH. In addition, a geographical information system for health was introduced, but updated erratically, and several departments were computerized to allow easier access to health data such as billing, drug dispensing and other data. Moreover, an effort to unify databases between different public funders, such as the National Social Security Fund and the MoPH, was also achieved to ensure transparency and accuracy of information (*2,4*). In an attempt to improve reporting on communicable diseases and hospital-based mortality and morbidity, the Epidemiological Surveillance Unit at the MoPH has greatly expanded its sources of data by including hospitals, primary health care centres and public schools. However, compliance with reporting requirements is suboptimal.

Health statistics in Lebanon are also generated from other sources. The Central Administration of Statistics which is mandated to produce national data and statistics including those related to health suffers from both a heavy bureaucracy and understaffing and underfunding, which limit its capacity to fulfil its mission. In addition, there is an abundance of small-scale health studies, generally limited to specific population groups and geographical areas. These studies are usually not reproducible, not representative and often incomplete, thus limiting the generalization of the results. Moreover, a significant number of indicators and variables are estimates or extrapolations. In general, health information from both the public and private sectors is fragmented and difficult to access.

In the health care field, valid and reliable information contributes to improving the quality of any intervention in the health sector, whether at the level of policy, planning, service delivery or impact assessment. Given the multitude of public, private and nongovernmental partners in health, the issue of obtaining reliable health statistics is becoming a priority for Lebanon, especially in view of the rapid health transition faced by the country and the highly dominant private health care sector.

The deficiencies in the health information systems, as described above, highlighted the importance of having an exhaustive national health statistics document that could be used as a reference by all concerned actors. This led to the publication of the first edition of the *National health statistics report in Lebanon* in 2004, which was subsequently updated and enriched in 2012. Each of these editions was a 3-year endeavour, published by the Institute of Health Management and Social Protection at the Saint-Joseph University of Beirut (IGSPS-USJ) in collaboration with the Italian Development Cooperation and the MoPH for the first edition (*5*) and the MoPH and the Lebanon country office of the World Health Organization (WHO) for the second edition (*6*).

This article describes the experience of compiling and disseminating health information from multiple sources and draws on lessons learned through the challenges encountered and the opportunities observed. It is too early to make a formal evaluation of the process, which should be done by evaluators external to the process, and so the main intent behind this article is to summarize and share the experience.

Method for compiling health information data

The first edition of the *National health statistics report in Lebanon* was a non-exhaustive compilation of existing health data. No similar project had been previously undertaken in the country. The objective was to provide a document that could on the one hand support decision-makers and planners and on the other hand offer the public reliable information and an overview of the Lebanese health sector. The report presented the available health data, the main health problems of the population and identified the public and private sources of health statistics in the country. The ultimate goal of this first edition was to be a first step towards the development of a health information system.

Two main reasons justified the publishing of a second edition. First, there was the positive feedback received from several users of the first edition, mentioning the importance and helpfulness of such a report in their daily work. Second, was the interest shown by the MoPH and the WHO to produce an updated edition to enhance the quality and comprehensiveness of the previous report.

The second edition of the report presented the range and types of data available as well as their evolution and trends over time. It was structured in such a way as to provide information on all the components of a health system. It described the health situation of the country in relation to the Millennium Development Goals and facilitated comparisons at both the national and international levels. Moreover, this edition highlighted the existing gaps in the Lebanese health information system and emphasized the main issues to be developed.

A team consisting of a physician, a health administration professional (project manager), a representative from the

MoPH and two management trainees was responsible for the first edition.

The first step was the elaboration of a list of private and public institutions in the health sector. Contacts with various institutions, either by phone or through direct visits, were made by the IGSPS-USJ team, under the auspices of the MoPH. Health statistics pertaining to resources, services and results were requested as well as annual activity reports. Statistics were selected, taking into account mainly the relevance of the data, their nature, reliability, completeness and periodicity. The data were collected using a standard format that defined the origin, context, objectives, data collection method, periodicity of the data and field of interest. Tables were then developed and descriptive comments written. Information was collected from 22 private and public sources, including ministries, professional orders and syndicates, universities, nongovernmental organizations and international organizations.

Before publication, two audits were done, one by the team, to check compliancy of the data in terms of content, analysis and relevance. In its final form, the document included 22 chapters covering the 22 sources of health data identified.

For the second edition, the team responsible for the report included the same project manager, a biostatistician, two Master's students in management, reviewers and a secretary. The development of the second edition began by building on the experience from the first report and analysing the recommendations and suggestions received from the stakeholders and users of the first edition. A formal proposal with a new presentation scheme was elaborated and submitted to the IGSPS-USJ research committee and WHO Lebanon country office for funding.

After updating the list of people and institutions to approach, data were collected from over 100 private and public sources, including ministries, universities, nongovernmental organizations and international organizations, and from publications, including surveys, reports, statistical bulletins and utilization reports.

Formal letters were sent to introduce the project and request access to data and information related to health. Follow-up was done through various means such as phone calls, emails and faxes. This phase was the longest and most time-consuming. The gathering of information was done simultaneously for all data pertaining to one topic. A data retrieval form was developed and sent to key individuals within the chosen organizations. These forms were then collected, and data from different sources was compiled and unified whenever possible.

Table 1 Methods and structure of the first and second edition of the *National health statistics report in Lebanon*

	First edition	Second edition
Methods	• Developing a list of institutions/sources of health statistics • Establishing contacts with institutions/ sources • Collecting existing data on health • Selecting the data • Presentation of data by institution • Elaborating the tables • Writing the comments • Validation of final documents	• Updating the list of institutions/sources of health statistics • Establishing contacts with institutions/ sources • Collecting existing data on health • Selecting the data • Standardization of data and definitions • Presentation of data by topics • Elaborating the tables • Writing the comments • Scientific and technical validation of final documents
Number of chapters	22	5
Scope of chapters	Compilation of information	Compilation of data and integration of information
Duration of data collection	2 years	2 years
Duration of drafting/ editing	1 year	1 year
Nature of chapters	Descriptive	Descriptive and analytical
Team	• Physician • Health administration professional • Ministry of Public Health representative • Two management trainees	• Project manager • Biostatistician • Two data collection agents, reviewers • Secretary
Data sources	22 private and governmental sources	More than 100 private and governmental sources
Funding	Italian Development Cooperation	Saint-Joseph University of Beirut World Health Organization

Primary data for each chapter were compiled in tables and graphs in order to facilitate understanding and utilization. Secondary data that seemed useful were added in the text. The main concern was to ensure the validity, reliability and compatibility of the data, while minimizing the risk of misinterpretation. Graphs were used to identify possible trends over time.

The editing consisted of describing each theme first within its general context and then more specifically within the Lebanese one. This was followed by an interpretation of all the tables and graphs. A technical and scientific review by WHO was obtained for all the tables and graphs, as well as the chapter content. Approval of the MoPH was also received for the overall document.

The second edition document consisted of five main sections:

- Chapter 1 focused on the description of the method used.
- Chapter 2 presented Lebanon in terms of geographical location and sociodemographic structure and described the evolution of its health system, the Millennium Development Goals for Lebanon as well as the public health regulations for Lebanon.
- Chapter 3, which was the core component of the document, focused on health population indicators, such as mortality, morbidity, risk behaviours, health status of different subgroups of the population and indicators of the health system dealing with infrastructure, human resources, national health programmes, funding and pharmaceuticals.
- Chapter 4 discussed three determinants of health: poverty, employment and environment.
- Chapter 5 gave a brief overview of the national and international partners working in the health sector.

Table 1 compares and contrasts the two editions.

Lessons learned

These experiences have emphasized the strengths and weaknesses of the current Lebanese health statistics system. The national health statistics reports confirm that health statistics in Lebanon exist, that they are exhaustive for certain topics, that they are generated by researchers and competent authorities and that they are available through several sources. The findings based on both reports are summarized in the SWOT (strengths, weaknesses, opportunities and threats) analysis in Figure 1.

A rapid assessment of the state of health statistics in Lebanon shows that even though health statistics exist at the national level they are still limited, incomplete, scattered and difficult to access. In fact, sometimes they are even contradictory and therefore hinder a comprehensive and in-depth view of the Lebanese health sector. Work in this sector, though abundant, is still difficult and riddled with red tape. Government organizations, nongovernmental organizations and private researchers are not always eager to share their data and benefit from each other's experiences. Perhaps one of the hardest tasks in this compilation was obtaining the data itself and then finding it in a usable or compatible form. Very often, and especially with public institutions, the whole process had to be done several times, either because the person initially contacted was no longer in his/her position or

STRENGTHS	WEAKNESSES
• Availability of data • Abundance of data in certain fields • Presence of qualified human resources	• Limited national data • Incomplete data • Contradictory data • Scattered data • Absence of common denominators • Difficulty of access • Lack of dissemination
OPPORTUNITIES	**THREATS**
• Awareness of the importance of health statistics • Existence of a will for improvement • High demand for quality data • Concern for transparency	• Lack of funds • Turnover of human resources • Limited coordination and cooperation • Absence of a solid national information system

Figure 1 SWOT (strengths, weaknesses, opportunities and threats) analysis of health data in Lebanon

because the administrative procedure was interrupted and had to be restarted from the beginning. In addition, most of the data were received in a raw format and varied in their presentation, definitions and/or categories. It was very clear that there was no collaboration among data generators to unify definitions and baseline figures. In fact, for the most part, there was a lack of common denominators resulting in non-standardized definitions and operationalization of indicators. Consequently, a meticulous validation task was necessary in order to standardize the data and to allow for its exploitation and comparison.

Moreover, it was noted that little effort had been put into the standardization and computerization of health information generated by multiple sources. The Internet, although widely used for advertising and social media in Lebanon, has not been exploited to facilitate data retrieval and sharing of health information. As it is, the data obtained could not be manipulated to get more information than that for which it was intended. There was also a problem in terms of the timeliness of the data available. If health information is to be useful, it requires regular updating, maintenance and tracking.

Nevertheless, the relevant stakeholders appeared to be aware of the importance of statistics and the necessity of ensuring the transparency of the results. This was revealed through the growing demand for reliable and valid data in the Lebanese context characterized by limited and restricted funds as well as a poorly coordinated information system. Even though challenging and time-consuming, this task was made easier by the following two factors which counter-balanced the difficulties encountered and ensured the success of the endeavour: the support of the MoPH and of the WHO throughout the process, which was a guarantee of the credibility and quality of the work; and the collaboration among MoPH, WHO and IGSPS-USJ, which greatly facilitated stakeholders' compliance. In addition, the will of all the contributors to share the information greatly enriched the final product. Finally, the availability of funding made the compiling and publication of the report a reality.

Both the reports have provided national benchmarks for the health of the population and have contributed to the dissemination of the available data. Moreover, they have also served to identify the existing gaps and areas to be strengthened. The reports highlight several tracks that could be exploited to develop a national health information system as well as potential obstacles that should be minimized to ensure success.

The experiences with each report have emphasized the need for a close partnership with all stakeholders, an efficient management system, adequate human resources and predefined systems and procedures. The process would benefit from having an interactive website with the dual purpose of exchanging data and information through an intranet system and of disseminating information to and receiving feedback from the public. The existence of clear guidelines with consistent definitions and standardized forms would also facilitate the collection and analysis of data.

The following recommendations can be drawn from these experiences:

- generation of data on a national level, especially in areas where information is scarce or unavailable, such as topics related to mental health, marginalized populations, risk factors and human resources;
- creation of an official body to standardize and validate data generated by different sources;
- strengthening of the existing health statistics system as a basis for a future national health information system; and
- development of adequate mechanisms to disseminate the information and render it accessible to all users and stakeholders.

Conclusion

The *National health statistics report in Lebanon* is an important step forward towards increasing multisectorial and multidisciplinary collaboration and coordination among the various parties involved in the health sector. It is also a means to ensure transparency, greater reliability and sound decision-making. Such a publication demonstrates that, contrary to common belief, relevant health statistics are available in Lebanon. However, merely compiling these statistics is no longer sufficient; it is time to utilize them within a broader health strategy. This can only occur if there is a formal involvement and a continuous input to process by all stakeholders in the health sector. Above all, there should be a commitment by all partners to sustain and improve this effort.

While the dream of collecting in one volume the majority of health information available in Lebanon has now been realized, the process should not stop here. Our aim over the coming years is to enrich this tool with additional valuable and accurate health information and to offer a more holistic overview of the health sector in Lebanon. In fact, the experience of publishing these two editions of health statistics should be considered in the short term as the basis for the institutionalization of the national health information system, which would also pave the road in the long term for a more ambitious project the establishment of a national health observatory whose role would be not only to collect information but also to undertake research within the complex health context of this country.

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Case report

Multidrug-resistant disseminated tuberculosis in a 9-month-old infant

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Introduction

Multidrug-resistant tuberculosis (MDR) is an emerging problem in the world. It is a disease caused by strains of *Mycobacterium tuberculosis* that are resistant to at least isoniazid and rifampicin, the 2 most powerful first-line anti-tuberculosis drugs (*1–3*). The World Health Organization (WHO) in 2013 reported that an estimated 12 million people worldwide had tuberculosis, with about 630 000 (5.3%) of these people having MDR tuberculosis (*1*).

MDR tuberculosis can affect people from all age groups. Children usually acquire primary drug-resistant tuberculosis from adults with MDR tuberculosis. However, because of the paucibacillary nature of childhood tuberculosis, a microbiological diagnosis is made in only 20–40% of cases. Drug susceptibility testing is only possible following bacteriological confirmation. Therefore, MDR tuberculosis in children is often undetected. Moreover, little is known about the clinical profile, treatment and prognosis of MDR tuberculosis in children (*2,4–7*). Here we report the clinical picture and treatment of an infant with disseminated MDR tuberculosis.

Case report

A 9-month-old girl was admitted to our department of paediatric infectious diseases in Samsun, Turkey with complaints of swelling on the right side of her neck and a draining lesion on her right forearm over the previous 2 months. Swelling on the left side of her neck in the previous month was also observed. The patient had not recovered despite previous antibiotic therapies. She also had poor appetite and failure to gain weight. When the patient's history was further probed, the parents revealed that the child's uncle had become ill during his military service and stayed at their home during his medical examination period. The uncle had been diagnosed with tuberculosis 5 months previously. There were no other cases of tuberculosis in the family.

During physical examination, the child was in a generally good condition with a weight of 8.8 kg and height of 70 cm. Multiple firm lymphadenopathies (the largest 2 cm × 2 cm) in the right cervical region and a fluctuated, hyperaemic lymph node (2 cm × 1.5 cm) in the left cervical region were observed. A draining lesion on her right forearm was also found. Pulmonary auscultation was normal. She had been vaccinated with bacillus Calmette–Guérin when she was 2 months old. Tuberculin skin test, which was done after she was admitted to our hospital, was positive, with an induration of 23 mm. HIV assay was negative. The left cervical node was drained and cultured. Direct microscopy of the lymph node exudate showed acid-fast bacilli. Nucleic acid amplification polymerase chain reaction assays of the early morning gastric aspirate and lymph node exudate were positive for *M. tuberculosis*. Chest X-ray showed mediastinal lymphadenitis and consolidation on the right lung. Thorax computerized tomography revealed multiple lymph nodes located in the right paratracheal region, and consolidation on the middle lobe of the right lung. X-ray assay of the right arm showed an osteolytic lesion in the distal end of the right ulna, with soft tissue heterogeneity extending to the skin surrounding the bone (Figure 1). Cranial magnetic resonance imaging assay was performed to evaluate the disseminated tuberculosis. It showed multiple ring-enhancing lesions in the cerebral and cerebellar hemispheres. Moreover, cutaneous biopsy, which was performed on the right forearm, revealed granulomas with epithelioid histiocytes and Langerhans-type giant cells.

On the 7th day of hospitalization, combined anti-tuberculosis therapy with isoniazid (10 mg/kg/day), rifampicin (15 mg/kg/day), pyrazinamide (30 mg/kg/day) and ethambutol (20 mg/kg/day) was started, pending culture and drug susceptibility testing.

Drug susceptibility testing of the uncle revealed MDR tuberculosis (isoniazid, rifampicin, ethambutol and streptomycin resistant). On the 20th day of admission, therefore, rifampicin and ethambutol treatments of the girl were stopped, and anti-tuberculosis treatment was readjusted to high doses of isoniazid (15 mg/kg once daily), pyrazinamide (30 mg/kg/day),

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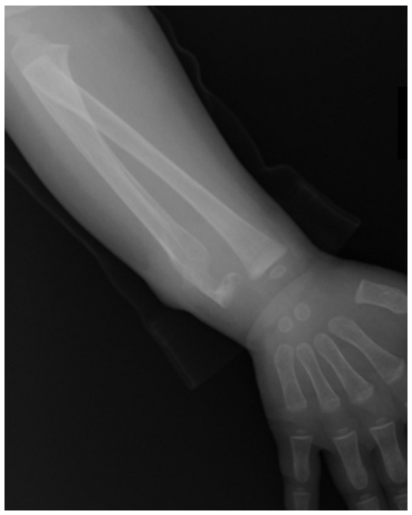

Figure 1 Chest X-ray from a case of disseminated multidrug-resistant tuberculosis in a 9-month-old infant, demonstrating an osteolytic lesion in the distal end of the right ulna with soft tissue heterogeneity extending to the skin surrounding the bone

amikacin (15 mg/kg/day), levofloxacin (10 mg/kg twice daily), linezolid (10 mg/kg twice daily), cycloserine (15 mg/kg once daily) and clofazimine (5 mg/kg once daily) (*8*).

M. tuberculosis was isolated from the early morning gastric aspirate samples and lymph node exudate on the 24th day of admission. The patient's drug susceptibility testing revealed MDR tuberculosis, similar to her uncle's test.

In Turkey, tuberculosis is a notifiable disease, so we declared the patient to the public health authorities in the city of Samsun. A charitable foundation (Dispensary of the War against Tuberculosis) provided the drugs for the patient. During hospitalization, the patient recovered and gained weight. The lesion on her right forearm began to heal, and she was discharged at the end of the 2nd month.

After discharge, directly observed therapy could not be given to the patient, but the family was very cooperative. The mother gave the drugs to the child regularly and the patient was followed up in our outpatient clinic at 1-month periods. Unfortunately, we could not monitor the serum levels of the drugs. Hearing tests were done regularly. At the end of the 3rd month of therapy, amikacin was given every other day and was stopped at the end of the 4th month. Linezolid therapy was also stopped in the 3rd month of therapy because of bone marrow suppression. Pyrazinamide was given for 9 months. The other drugs were given for 18 months. No drug side-effects were observed, except for red-brown skin coloration due to clofazimine.

A follow-up cranial magnetic resonance image scan was conducted in the 3rd month of therapy, and revealed that the nodular lesions in the brain had disappeared. Moreover, osteomyelitis on the ulna recovered. At the end of the therapy, the patient was in excellent health, with a weight of 13 kg and a height of 86 cm.

Discussion

Young children usually contract tuberculosis through the transmission of tuberculous bacilli from a close contact in the family. In the absence of preventive therapy, infected infants younger than 12 months have up to 50% of lifetime risk of progression to disease following infection. Young children also have an increased risk of developing severe forms of the disease, such as miliary tuberculosis and tuberculosis meningitis (*9,10*). In our patient, an uncle was the source case, and we diagnosed disseminated tuberculosis in the patient, probably due to her immature immune system. The transmission of MDR bacilli from a close contact is one of the main causes of MDR tuberculosis in children. Seddon et al. reported that the most frequent sites of extrapulmonary tuberculosis in children with MDR tuberculosis were peripheral lymph node tuberculosis (42.1%), bone, joint or spinal tuberculosis (23.7%), and abdominal tuberculosis (21.1%) (*4*). They also found that HIV infection, malnutrition and extrapulmonary involvement were independent risk factors for death. Our patient also had lymph node, bone, cutaneous and central nervous system tuberculosis, aside from pulmonary tuberculosis. Fortunately, she recovered completely with the therapy, despite the extrapulmonary involvement.

MDR tuberculosis therapy should contain at least 4, preferably 5, drugs to which the organism is susceptible. Treatment recommendations for children with MDR tuberculosis are based on clinical experience in adults, and second-line drugs are generally well-tolerated by children (*7*). We gave our patient a high dose of isoniazid and pyrazinamide (first-line agents), amikacin (injectable agent), levofloxacin (a floroquinolone), cycloserine (oral bacteriostatic second-line agent), and clofazimine and linezolid (agents with unclear efficacy), according to WHO recommendations (*8*). Her clinical condition was very good in the follow-up visits. We did not detect hearing loss due to amikacin therapy or side-effects due to levofloxacin therapy. However, we had to stop linezolid therapy because of myelosuppression in the 3rd month of treatment. The other side-effect we observed was red-brown hyperpigmentation of the skin caused by clofazimine, but we could have completed the therapy without any major complications. The patient recovered completely despite the disseminated disease.

The optimal duration of treatment for children with MDR tuberculosis is uncertain. Therapy of at least 18 months is recommended for adults. This duration may be too long for children with paucibacillary disease, but we gave an 18-month therapy considering the disseminated nature of the patient's disease.

There is a high prevalence of tuberculosis in children who live with drug-resistant tuberculosis patients, regardless of the age of the child. Therefore, it is very important that all child

contacts of all drug-resistant patients are screened promptly for tuberculosis (*11*,*12*). Preventive therapy for the contacts of MDR tuberculosis patients remains controversial, and no consensus has been reached on what regimen(s) should be used (*13*). However, it is generally agreed that preventive therapy is necessary for high-risk contacts, such as young children and immunocompromised individuals (*14*,*15*).

This case serves as a reminder that child contacts of infectious MDR tuberculosis source cases should be closely followed up for a minimum of 2 years, and appropriate treatment should be started as soon as tuberculosis is diagnosed. Effective and safe preventive therapy regimens for drug-resistant tuberculosis are urgently needed.

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Invited commentary

Ethics in health practice and research: an EMR perspective

Mohamed Salah Ben Ammar,[1] Ahmed Mandil [2] and Samar El-Feky [3]

Background

Ethics has been an integral part of medicine at least as far back as the time of Hippocrates.

While the terms bioethics and medical ethics are often used interchangeably, traditionally medical ethics is mainly patient-oriented and focuses on health care services while bioethics is predominantly society-oriented and centres on maximizing total human well-being. Medical ethics and law are closely related and regulations generally exist in countries which govern how physicians should handle ethical issues in patient care and research (*1*). Conversely, bioethics usually concerns ethical questions related to health research and the application of biotechnology in medicine and biology (*2*).

Research ethics as a particular area of concern evolved from the growing conduct and formalization of research and the need to address ethical issues arising from such research on human subjects (*3*). The key ethical principles of health research include honesty, objectivity, integrity, carefulness, openness, respect for intellectual property, confidentiality, responsible publication, responsible mentoring, respect for colleagues, social responsibility, non-discrimination, competence, legality, animal care and human subjects' protection (*4*).

In this regard, the World Medial Association has developed internationally recognized global policies on key ethical issues related to medical practice and research, including the Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects and the International Code of Medical Ethics and Human Rights. Other documents guiding ethical standards have been developed by organizations including WHO, the Council for International Organizations of Medical Sciences (CIOMS), UNESCO, the Committee on Publication Ethics, the International Committee of Medical Journal Editors, and the World Association of Medical Editors. In fact, such ethical standards promote other important moral and social values such as social responsibility, human rights, patient welfare and safety, and compliance with the law (*5,6*).

Regionally, the Eastern Mediterranean Health Journal (EMHJ), the flagship journal of the WHO Regional Office for the Eastern Mediterranean, has recently formulated ethical guidelines for scientific research and publication, based on these international guidelines, to ensure that articles submitted for publication in the Journal conform to these standards (*7*).

Developing bioethics in the EMR

Ethics is an important aspect of the work of WHO and the Organization provides guidance and resources for Member States on a range of bioethics issues, supports training on public health and research ethics, and hosts the secretariat of WHO's Research Ethics Review Committee.

In the WHO Eastern Mediterranean Region (EMR), in order to plan for the most doable and needed interventions to scale up bioethics in countries of the Region, the WHO Regional Office conducted a bioethics survey in 2015 to map the current situation in Member States and to identify areas of progress and improvement in bioethics for each country. The mapping survey aimed to analyse the situation in the Region in order to better assist Member States through prioritizing the needs and identifying the most appropriate approaches in view of the strengths and constraints identified.

The results of the survey revealed a scarcity of structured curricula or training programmes on bioethics in most health sciences' colleges across the Region (the Islamic Republic of Iran being among the few examples where it exists). Only a few countries in the Region offer formal training facilities for bioethics education. Furthermore, the laws, policies and rules related to bioethics are not always well understood by health professionals and the community.

The results underscored the need to determine some key actions for further improvement of bioethics in the Region, including enhancing the role of civil society, as a key stakeholder, establishing laws according to local needs and context, and developing/fostering a core bioethics curriculum within the health sciences' curricula of academic institutions in the Region.

The 2013 World Health Report, Research for universal health coverage (*8*), emphasized the role of WHO in advancing research that addresses

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the dominant health needs of Member States, supporting national health research systems, setting norms and standards for the proper conduct of research, and accelerating translation of research findings into health policy and practice. To ensure the scientific rigour and ethical conduct of health research recommended for WHO funding, an essential requirement of the research is its compliance with recognized ethical standards. Therefore, the Eastern Mediterranean Ethics Review Committee was established in 2007. It was reformulated in 2014 to include external (from Egypt, Islamic Republic of Iran, Lebanon, Morocco, Tunisia, UNESCO) and in-house (WHO) members and was renamed the "Eastern Mediterranean Research Ethics Review Committee". Its primary function is to "review the protocols of all health research projects involving human subjects submitted to WHO for funding in the Region" in order to safeguard the dignity, integrity, human rights, safety and well-being of all the human participants. The Review Committee can also has verify that ongoing studies comply with WHO policies and regulations for the conduct of health research in the Region.

In view of the recent reformulation of the Committee, the Regional Office convened a meeting of the Committee in September 2015. The objectives were to: review the work of the Committee since October 2014 when its functions were updated; ensure compatibility of the work with international guidelines for review of health research on human subjects; update the current review process for health research supported by WHO; and address new health research challenges in the Region, including health policy and systems research (9). To enhance ethics in medical practice and health research in EMR, attention was given to ensuring compatibility of the Committee's work with international guidelines for health research (including CIOMS, WHO and UNESCO guides). Additionally, the ethical review process was updated through critical review of current checklists for evaluating submitted research proposals and sections on "conflict of interest" and "informed consent process for vulnerable groups", (including minors, pregnant women, emergencies, and mentally challenged persons) were added.

Moreover, the Committee recommended: developing national laws and regulations which govern bioethics and related research; developing/accrediting national bioethics committees which could oversee the work of institutional committees; establishing ethical review committees according to need (e.g. for research on human subjects, on animals); establishing national registries for clinical trials and research; regulating pharmaceutical companies' contributions to clinical studies; and ensuring a rigorous ethical review process on different levels (institutional, national, regional).

For its part, the Regional Office aims to use the expertise of global WHO collaborating centres for bioethics-related matters, establish a regional WHO collaborating centre network on bioethics, and support capacity-building activities in bioethics and ethical conduct of health research. Furthermore, WHO is encouraging research on public health priorities in the Region, especially on crises and emergencies, in order to generate much-needed, ethically sound, health-related data and evidence to support health policy-making.

The effort to develop bioethics has been undertaken to serve all, within and beyond the Region, in particular to ensure that the voice of the voiceless is heard and taken into account globally.

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WHO events addressing public health priorities

Work of the research ethics review committee in the Eastern Mediterranea Region

Background

The World Health Organization (WHO) is mandated by its constitution[1] (*1*) to support and promote health research The World Health Report: research for universal health coverage (2013) (*2*) emphasized WHO's role in advancing research that addresses the dominant health needs of its Member States, supporting national health research systems, setting norms and standards for the proper conduct of research and accelerating translation of research findings into health policy and practice in order to accelerate progress towards universal health coverage (UHC).

In addition, in the WHO Regional Office for the Eastern Mediterranean (WHO/EMRO), the strategic document, Shaping the future of health in the WHO Eastern Mediterranean Region: reinforcing the role of WHO (2012) (*3*), outlined the following five strategic health priorities for the Region: health system strengthening; emergency preparedness and response; maternal, reproductive and child health and nutrition; noncommunicable diseases, in addition to the unfinished agenda of communicable diseases. A key element within all the priority areas is building national capacities in research for health (*4*).

To help realize WHO's role in health research and target the Eastern Mediterranean Region's priorities, under the department of Information, Evidence & Research, the WHO/EMRO has the Research, Development & Innovation group and a Research Policy & Development unit, which (among other functions) serves as the Secretariat of the Eastern Mediterranean Research Ethics Review Committee. Moreover, the unit coordinates three types of health research grants, namely Research in Priority Areas of Public Health grants which addresses the five strategic health priorities of the Region; the Improved Programme Implementation through Embedded Research grants offered in collaboration with the Alliance for Health Policy & Systems Research (WHO/HQ), and the Tropical Disease Research – Small Grants Scheme, offered in collaboration with the WHO/UNDP/World Bank Special Programme for Research and Training in Tropical Diseases (WHO/HQ). In this respect, it is worth referring to the current cooperation of WHO/EMRO with different stakeholders, including UN agencies such as UNESCO's Regional Office in Cairo, in the field of bioethics applications with special emphasis on ethical conduct of health research.

A recent WHO/EMRO survey for situation analysis of bioethics in the Region (Bioethics in the EMR: a situation analysis, unpublished report, 2015) showed that most Member States have either national bioethics committees or institutional review boards, which safeguard ethical conduct of health research and protect the dignity, human rights, and well-being of its human participants. However, they still need technical support to develop the capacities needed to maintain such bodies. In addition, a recent review of research published in our flagship Journal, the Eastern Mediterranean Health Journal (EMHJ), for the period 1995–2014 (*5*), showed almost equal distribution of health research published on all the regional strategic health priorities, except emergency preparedness and response. With the Region suffering from crises/emergencies in more than half of its Member States, this is an area which urgently needs evidence generated from sound health research.

Eastern Mediterranean Research Ethics Review Committee

In order to ensure scientific rigour and ethical conduct of health research recommended for funding under

1 The Constitution was adopted by the International Health Conference held in New York from 19 June to 22 July 1946, signed on 22 July 1946 by the representatives of 61 States (Off. Rec. Wld Hlth Org., 100 ,2), and entered into force on 7 April 1948. Amendments adopted by the Twenty-sixth, Twenty-ninth, Thirty-ninth and Fifty-first World Health Assemblies (resolutions WHA26.37, WHA29.38, WHA39.6 and WHA51.23) came into force on 3 February 20 ,1977 January 11 ,1984 July 1994 and 15 September 2005 respectively.

Committee members: *Gamal Aboul-Serour (co-chair, Egypt), Jamela Al-Raiby (WHO/EMRO), Thalia Arawi (Lebanon), Hoda Atta (WHO/EMRO), Mohamed Ben Ammar (Tunisia), Nouzha Guessous (Morocco), Orio Ikebe (UNESCO), Bagher Larijani (co-chair, Islamic Republic of Iran), Ahmed Mandil (secretariat, WHO/EMRO), Awad Mataria (WHO/EMRO), Arash Rashidian (WHO/EMRO), Slim Slama (WHO/EMRO).*

the above-mentioned grants, the Regional Director re-formulated the Eastern Mediterranean Research Ethics Review Committee to include external (from Egypt, Islamic Republic of Iran, Lebanon, Morocco, Tunisia, UNESCO) as well as in-house members with an essential function to "review the protocols of all health research projects involving human subjects submitted to WHO for funding in the Region". Such review aims to protect the dignity, integrity, human rights, safety and well-being of all the people participating in such research. The Committee also has the authority to verify that ongoing studies comply with the Organization's policies and regulations for conduct of health research in the Region.

During the review process of the health research protocols, the Committee is expected to ensure compliance with the International Ethical Guidelines for Biomedical Research Involving Human Subjects (*6*), as well as other international guidelines which govern ethical conduct of health research (*7–10*), including equitable selection of subjects, appropriate safeguards to protect the rights and welfare of research participants, especially vulnerable groups, full informed consent process and protection/maintenance of privacy of individuals and confidentiality of the data collected. Methodologically, the review should ensure that the health research topic will add to scientific knowledge and is relevant to institutional and community interests, and that the research design is appropriate and study instruments are acceptable. For interventional studies, the review has to safeguard that clinical research facilities at the study site are appropriate, that all researchers involved have appropriate qualifications, training and experience, and that potential benefits to be gained from the research outweigh any expected risks. Moreover, operational health research must provide evidence which supports sound health policy and decision-making in the Region (knowledge translation).

First meeting of the re-formed Committee

In light if the re-formulation of the Eastern Mediterranean Research Ethics Review Committee the Regional Office recently convened a meeting of the Committee during the period 6–7 September, 2015. The objectives of the meeting were to: review the Committee's work in light its updated functions; ensure compatibility of the Committee's work with international guidelines for review of health research on human subjects; update the current review process for health research supported by WHO; and address new health research challenges in the Eastern Mediterranean Region, including health policy and systems research. Following the 2-day deliberations, the meeting provided a set of recommendations for ensuring compatibility of the Committee's work with international guidelines for health research (*7–10*), updating the ethical review process (with special focus on its checklists) and providing special advice for current challenges in health policy and systems research.

Recommendations

The Committee made the following recommendations: encourage/solicit research on public health priorities in the Region, especially on crises and emergencies; develop/enforce national laws and regulations which govern bioethics and related research; emphasize vigilance by editors of scientific journals to avoid fraud and falsification of health research submitted for consideration for publication; develop/support/accredit national bioethics committees which could oversee the work of institutional committees, including institutional review boards; establish different ethical review committees according to need (e.g. for research on human subjects; on animals, etc.); promote rigorous ethical review process on different levels (institutional/national/regional); use the expertise of the global WHO-Collaborating Centres on bioethics and regional technical collaborating centres; establish a regional collaborating centre on bioethics; support capacity-building activities in bioethics/ethical conduct of health research; supporting institutional clearance (in the absence of national clearance); establish national registries for clinical trials and research; regulate pharmaceutical companies/clinical studies.

The Committee also advised that proposals on health policy and systems research should be reviewed using an expeditious process/applicable questions in checklists. In addition, it recommended that some members of review committees (especially at a national/institutional level) should have training in health policy and systems research and that different stakeholders should be involved with the review process (as applicable).

The Committee carefully reviewed the currently used checklists for review of submitted research proposals recommended for WHO funding. It recommended modification/addition of some questions and added a section on conflict of interest as well as special sections for "informed consent process for vulnerable groups", including minors, pregnant women, emergencies, and mentally challenged people. These are to be drafted in the near future.

In the closing session, the Regional Director strongly supported the role and functions of the Committee in evaluating the ethical conduct of WHO-funded health research carried out in the Region and emphasized the importance of collaboration with UN organizations working in the field of bioethics, especially UNESCO (with special focus on supporting national bioethics committees and inclusion of bioethics in curricula of health sciences' colleges).

References

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3. Shaping the future of health in the WHO Eastern Mediterranean Region: reinforcing the role of WHO. Cairo: World Health Organization Regional Office for the Eastern Mediterranean; 2012.
4. Technical paper: Strategic directions for scaling up research for health in the Eastern Mediterranean Region. Fifty-eighth Session Regional Committee for the Eastern Mediterranean. Cairo: World Health Organization, 2011Eastern Mediterranean Health Journal: 1995-2014 Review. Presentation at the Expanded EMHJ Board Meeting, WHO Regional Office for the Eastern Mediterranean, Cairo, 6–7 June, 2015.
5. International ethical guidelines for biomedical research involving human subjects. Geneva: Council for International Organizations of Medical Sciences (CIOMS); 1992.
6. International ethical guidelines for epidemiological studies. Geneva: Council for International Organizations of Medical Sciences (CIOMS); 2009.
7. Standards and operational guidance for ethical review of health-related research with human participants. Geneva: World Health Organization; 2011.
8. Universal declaration on bioethics and human rights. Paris: UNESCO; 2005.
9. Bioethics committees at work: procedures and policies (Guide 2). Paris: UNESCO; 2005.

Health and the sustainable development agenda: enhancing the role of civil society organizations

From MDGs to SDGs

September 2015 was the target date set for achievement of the Millennium Development Goals (MDGs) and the United Nations (UN) has been working on a post-2015 development agenda. The process of shaping the agenda of the Sustainable Development Goals (SDGs) that are replacing the MDGs has been led by Member States with the involvement of a broad participation of groups and civil society organizations. Since 2014, a number of civil society organizations worldwide have been closely involved through consultations and publications of position papers on governance, health, gender, equity and children, among other issues. There are 17 SDGs and 169 targets that build on the work done on the MDGs. Goal 3 ("Ensure healthy lives and promote well-being for all at all ages") addresses health specifically, and covers four of the main regional health priorities: universal health coverage, maternal and child health, communicable diseases (HIV/AIDS, malaria, tuberculosis) and noncommunicable diseases prevention and control. The other goals refer to the social determinants of health.

The SDG agenda poses several challenges and governments will be unable to make progress alone. Other stakeholders, including civil society, will have an important role to play. The SDGs contain cross-cutting issues beyond health, providing an opportunity for cross-sectoral collaboration and the development of multisectoral partnerships with key stakeholders. Mainstreaming health in the SDGs will require the involvement of civil society organizations to ensure that upstream determinants of ill-health are not ignored.

The MDGs created opportunities for the involvement and engagement of civil society organizations to ensure that community priority needs were considered in health and political agendas. It is important that the SDGs build on the work of civil society organizations and make use of existing platforms and networks. Since civil society participated in the development of SDGs at a global level, it is important that civil society organizations play an active role in implementation at country level.

In this context, the League of Arab States has been holding a series of consultations in preparation for the launch of the "Arab decade for civil society organizations 2015–2025". The Decade provides a platform for strengthening and mobilizing civil society organizations in the Arab region to become effective partners in achieving the SDGs. WHO is cooperating with this initiative by helping to identify the specific role that civil society organizations can play in achieving SDG 3 (the health goal).

As part of this, and in an effort to strengthen the engagement of civil society organizations in the Eastern Mediterranean Region in advancing the health and SDG agenda, the League of Arab States and the WHO Regional Office for the Eastern Mediterranean held a joint regional consultation on 23 and 24 August in Cairo, Egypt, bringing together representatives of the main civil society organizations in the Region dealing with health and its determinants.

The main objectives of the consultation were to:

- understand the current domain of activities of civil society organizations and the available capacities;
- identify gaps and challenges in the current civil society organization work in the Region;
- discuss how to overcome these challenges; and
- deliberate on the main role of civil society organizations in the SDGs and in addressing the five regional health priorities.

The consultation was attended by 20 representatives of civil society organizations from Egypt, Jordan, Kuwait, Morocco, Oman, Palestine, Saudi Arabia and Tunisia, in addition to regional civil groups and networks, including the Arab Scout Regional Office.

The role of civil society organizations

Civil society organizations have a key role to play in progress on the health-related SDG agenda, including in health literacy, advocacy, social mobilization and service provision, especially in countries in crisis and emergency situations. In the Region, civil society organizations vary in number according to country, but are increasing in

This report is an abridged version of the report on the the Joint WHO and League of Arab States regional consultation to enhance the role of civil society organizations in the health and sustainable development agenda in the Eastern Mediterranean Region held in Cairo in Cairo on 23–24 August 2015. The complete report is available at: http://applications.emro.who.int/docs/IC_Meet_Rep_2015_EN_16665.pdf?ua=1

number and influence. They play a crucial role in addressing population health problems, providing institutional vehicles to address community needs and expectations, and complementing government action in implementing programmes not considered to be a priority or targeting marginalized population groups. Civil society organizations also provide frontline services in countries with acute crises where governments are weakened or partially-absent (several countries in the Region). They facilitate community interaction with services such as those for hygiene, water and sanitation, support access to vaccines and promote health through information dissemination, such as in Ebola virus disease outbreaks and natural disasters, and for smoking prevention and promotion of healthy diet and physical activity. They also influence policy development, for instance through the Framework Convention on Tobacco Control and in HIV/AIDS, and contribute in resource mobilization, including for polio eradication and girls' education.

Impediments and challenges

The role of civil society organizations and the importance of partnership with civil society are not well recognized by governments in the Region. There is a lack of legal frameworks for the establishment of civil societies and networks. As a consequence, inadequate trust exists between governments and civil society, and coordination is difficult. Moreover, little use is made by government of the results of the research conducted by civil society organizations.

Additionally, there is a weak culture of volunteering in the Region and poor understanding of its importance in development. Furthermore, cultural and social norms exist that prevent specific groups from participating in civil society.

Specific challenges related to civil society organizations include weak strategic planning, inadequate staff capacity, and weak governance and management, with often limited transparency in funding. There is an absence of tools to support inclusion of all members to ensure democratic processes and weak team work towards common goals. Working conditions do not attract high calibre and skilful staff, and there is a lack of plans for capacity-building of staff. The focus of work is often on activities rather than programmes and is frequently donor- rather than need-driven. There is weak utilization of information technology for database building and weak self-assessment at the institutional and performance levels, with no or limited tools being used. In general, there is a lack of mechanisms for collaboration between civil society organizations.

Next steps

The consultation concluded by offering recommendations for the League of Arab States and WHO and highlighting the next steps needed to move forward on enhancing the role of civil society organizations in the health and sustainable development agenda (Box 1).

To the League of Arab States

1. Finalize the criteria governing the relationship between civil society organizations and organs of the League of Arab States with a view to fostering close cooperation between civil society and the League.
2. Organize regular forums, workshops and training courses for civil society organizations in Arab states to raise awareness of the SDGs and promote civil society participation in them.

To WHO

1. Support the development of criteria for assessment of civil society organizations, particularly for those that are health-related.
2. Establish a network of civil society organizations working in the field of health in the region.
3. Map health-related civil society organizations and create an online database.
4. Raise the awareness of health-related civil society organizations on the SDGs and develop discussion on them through regular forums to address problems.
5. Support capacity-building of civil society organizations through organizing training-of-trainers courses to ensure sustainability.
6. Build capacities in health priorities, proposal writing, project planning and implementation, and promotional campaigns.
7. Support the establishment of liaison offices at ministries of health to act as an interface with civil society organizations.

Box 1 Next steps

1. Disseminate recommendations to all countries to inform them about the SDGs and the necessity to engage civil society organizations.
2. Establish a regional civil society organization database (by December 2015). WHO should seek names of civil society organizations from consultation participants and the Gulf Cooperation council, and participants should review the list.
3. Develop an information sheet on civil society organizations (by 1 October 2015).
4. Make the database available online (by December 2015).
5. Conduct training on needs assessment through a rapid survey.
6. Develop training programmes, for instance on health-related topics, including the regional health priorities and the SDGs (by January 2016), and on management, strategic planning, advocacy, fund raising, proposal writing, monitoring and evaluation, and reporting (by September 2016).
7. Develop a standard training curriculum in the Arabic language.
8. Establish a regional roster of experts via email (by November 2015).
9. Develop a capacity self-assessment checklist for civil society organizations.
10. Conduct advocacy for involvement of civil society organizations in the SDGs through a regional forum.
11. Develop infographics on the SDGs for decision-makers.
12. Request ministries of health to establish a liaison office as an interface with other

Strengthening the role of public health associations in the Region

The need for strengthening the role of public health associations

The Eastern Mediterranean Region faces myriad public health challenges. It hosts the highest burden of refugees, migrant workers and displaced populations and political unrest and conflict are ongoing in several countries. Demographic and epidemiological shifts have resulted in an increased incidence of noncommunicable diseases in many countries, while communicable diseases remain as serious problems in others. This is all in addition to emerging health threats such as novel coronavirus, Ebola virus and antimicrobial drug resistance.

In this regard, the WHO Regional Office for the Eastern Mediterranean has identified five main priorities for the work of WHO in the Region during 2012–2016:

- strengthening health systems and the pursuit of universal health coverage;
- intensifying action to prevent communicable diseases, including poliomyelitis eradication;
- scaling up actions to promote health, including maternal and child health;
- preventing and controlling noncommunicable diseases;
- providing special support to countries experiencing humanitarian crises.

Putting the priorities into context, WHO has been constantly updating its way of work to support member countries. However, WHO cannot deliver alone: its influence will remain incomplete without the engagement, cooperation and political will of the countries themselves. While WHO's principal partner is the Ministry of Health, responding to the ongoing challenges means that both WHO and the countries need to change their procedures. In this regard, WHO intends to extend partnership also to academic institutions and public health institutes and associations in order to address the regional priorities effectively and sustainably.

To facilitate this, the WHO Regional Office for the Eastern Mediterranean organized a regional meeting of national public health associations and institutions in Cairo on 29–30 June 2015. Participants included representatives from public health associations and institutes from 18 countries in the Region.

The meeting aimed to discuss ways of promoting public health in the Region through exchange of global and regional experiences and challenges, ways to strengthen networking and collaboration with associations and institutes, why public health associations and institutes have been unable to influence public health response in the Region so far. The objectives were to identify the barriers to the functionality of public health associations and institutes, develop recommendations to strengthen their roles in the national public health response in the Region, and explore options for support from WHO.

Barriers to the effective contribution of public health associations

There is a lack of clearly defined, standardized roles for public health associations and existing local partnerships are fragile. This absence impedes collaboration and prevents academic institutes and other bodies effectively contributing in public health response.

The discussions focused on three topics important for the Region:

- the priority actions to promote public health,
- how national public health associations can be strengthened,
- what needs to be done for networking among public health associations and institutions.

There was strong consensus that the regional role of national and local public health institutes and associations has been limited and not well defined till now. Possible underlying causes of weak performance include the multidisciplinary nature of public health, which necessitates the engagement of non-health stakeholders; this is currently absent in the public health response. Related to this is the gap between the public health, clinical and non-health sectors, i.e. the lack of involvement of public health professionals. In addition, public health education is limited in the curricula of primary and secondary schools. There is also a shortage of multidisciplinary undergraduate and postgraduate public health courses to train health and non-health professionals on taking action in unstable political and emergency settings. Uneven political commitment and lack of "know-how"; overdependence on a single institution (mainly the Ministry of Health) that

This report is an abridged version of the report on the Meeting of the National Public Health Associations and Institutions in the Eastern Mediterranean Region held in Cairo in Cairo on 29–30 June 2015. The complete report is available at: http://applications.emro.who.int/docs/IC_Meet_Rep_2015_EN_16666.pdf?ua=1

is not equipped to deliver all tasks and initiatives and to coordinate with other sectors; and limited public health human and financial resources also impede the inclusion and effective functioning of public health institutes and associations

Supporting measures

Among the steps identified towards strengthening public health in the Region were:

- standardizing and harmonizing public health education across the Region, taking into account regional diversity and priorities;
- strengthening intersectoral partnership and collaboration between public institutes and associations with clearly identified roles, mandates and responsibilities;
- bringing priority stakeholders from outside the health sector into discussions (e.g. ministries of interior, finance and social affairs);
- promoting a sense of ownership of health in the general population "public health is for the public";
- integrating public health leadership into formal public health education and capacity-building efforts;
- integrating regional essential public health functions into public health education, including leadership, research and monitoring and evaluation of the national public health response process;
- strengthening multidisciplinary public health capacities to deliver both regional and national priorities.

Actions needed

For WHO

- Engage national public health associations and institutions in the work of WHO through relevant meetings and workshops, and improve regular communication and dissemination of guidelines, approaches and actions developed.
- Review and strengthen public health curricula.
- Dedicate more scholarships to public health. Map public health associations and institutions and apply essential public health functions.
- Establish a regional and international roster and network of public health experts, associations and institutions.

EMHJ Guidelines on Ethical Conduct and Publication of Health Research

Published on the following pages are the EMHJ Guidelines on Ethical Conduct and Publication of Health Research. They are also available on the EMHJ webpage. These Guidelines set out key issues related to research and publication ethics and EMHJ's expectations of papers submitted for possible publication. They are intended as a reference for both authors and reviewers.

Background to the development of the Guidelines

Adherence to ethical standards for the conduct and reporting of research is not only a moral imperative but it also results in better and more meaningful research.

As with all research journals, EMHJ has encountered cases of suspected infringement of ethical research conduct and publication, including lack of ethical clearance and/or informed consent of participants when needed and instances of plagiarism and duplicate publication. Our experience in addressing such incidents suggested that in some cases the authors were genuinely unaware of or unfamiliar with key ethical aspects of research conduct and publication, for example what constitutes plagiarism, why duplicate publication is unacceptable. While we provide brief information in the EMHJ authors' guidelines and links to relevant sites and publications, we have had no explicit or detailed guidelines on research and publication ethics and EMHJ's position on these issues and response to cases of suspected ethical misconduct.

It was considered that such guidelines were needed to make EMHJ's position known and transparent and to provide authors with clear and easily accessible information on the important ethical issues to help ensure that their papers were ethically compliant. Therefore review and endorsement of draft guidelines on ethical conduct and publication of health research was included in the agenda of the Expanded EMHJ Editorial Meeting in June 2015.

In preparation for the meeting, and based on key resources and documents from leading institutions and associations for research and publication ethics, guidelines were drafted and revised inhouse in April and May 2015. These were shared with the Editorial Board members and other invited participants of the Expanded Board meeting before the meeting and their comments invited. All participants provided their observations and these were compiled for review at the meeting. In follow-up and in line with the discussions and observations made at the meeting, the guidelines were further revised and finalized.

EMHJ would like to thank all the Board Members and participants of the Expanded EMHJ Editorial Meeting for their valuable contribution to the preparation of these Guidelines.

EMHJ Guidelines on Ethical Conduct and Publication of Health Research

EMHJ endeavours to maintain the highest ethical standards for the articles it publishes. In order to do so, the Journal follows established international standards and guidelines on the conduct and publication of health research including: World Medical Association's Declaration of Helsinki; the *Council for International Organizations of Medical Sciences* (CIOMS); the Committee on Publication Ethics (COPE); the International Committee of Medical Journal Editors (ICMJE); and the World Association of Medical Editors (WAME).

These guidelines explain the EMHJ's position on specific ethical aspects of the conduct and reporting of research. They provide authors with guidance on the ethical standards they are expected to conform to in their papers submitted for consideration for publication, and outline EMHJ's procedures if standards are breached.

Authors' responsibilities

Papers submitted for consideration for publication to the EMHJ should comply with the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals of the ICMJE.

Ethical approval

EMHJ expects authors to adhere to the Ethical Principles for Medical Research Involving Human Subjects laid down in the World Medical Association's Declaration of Helsinki and CIOMS. For research involving humans, every research article submitted to EMHJ must include a declaration that before carrying out its field work, the study had obtained ethical clearance from a recognized body in the country, for example from institutional review boards or research ethics committees. Ethical clearance from non-national bodies might be acceptable if there is a valid justification (e.g. lack of any national or local ethics committee). EMHJ may require to see the relevant documentation of ethical approval. Research involving animals will also be expected to follow the related standards of ethical research. If ethical clearance was not considered to be required, a statement to that effect must be provided indicating the reasons it was not required. In any case, the authors are expected to follow all requirements of ethical conduct of research, reporting of the findings and preparation of the manuscript.

Informed consent

EMHJ requires, where appropriate, a statement from the authors that all persons who participated in research had given their voluntary, informed written consent. Verbal consent might be acceptable, however, if there is a reasonable justification or where sanctioned by the body providing the ethical approval. Where participants were unable to give such consent, surrogate consent might be acceptable (e.g. from a parent), however surrogate consent always requires ethical approval. Authors may be asked to provide copies of detailed informed consent form, including explanatory information provided to participants.

Participant confidentiality and respect

Manuscripts should be prepared to preserve participants' confidentiality. Authors are expected to obtain an individual's explicit consent for the use of any personal or medical information that may make the participant identifiable. Authors are expected to ensure the dignity and respect of the participants and their communities in the manuscript.

Competing interests

EMHJ requires authors to provide details of any competing interests. A competing interest may occur when the author(s) personal, family or institutional interests (e.g. sources of funds, earnings, relationships, etc.) might be affected by the research, its findings or publication of the manuscript. EMHJ will not reject a paper solely on the basis of a declared competing interest but will take this into consideration when assessing a paper and, if considered relevant, it may be included in the published paper.

Funding

EMHJ requires authors to state all sources of funding for the study.

Clinical trials registration

EMHJ requires registration of clinical trials in a public trials registry before undertaking the trial as a condition of consideration for publication (more information can be obtained by visiting the web link: http://www.who.int/ictrp/trial_reg/en/).

Authorship

EMHJ follows the ICMJE Recommendations on authorship credits, which aim to ensure that all and only those who have made material contribution to the research are named as authors. These require that all four of the following criteria be met to be considered an author:

- substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- drafting the work or revising it critically for important intellectual content; AND
- final approval of the version to be published; AND
- agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Every person who meets all four criteria should be identified as an author. Those who meet some but not all of these criteria should be included in an acknowledgement. It should be noted that data collection, laboratory testing, data management, acquisition of funds, provision of support for the study, etc. do not qualify (on their own) for being included in the list of authorship.

Previous publication

EMHJ expects papers submitted to be original and not published, accepted for publication or currently under consideration for publication elsewhere. EMHJ requires authors to affirm this and disclose any papers that overlap with the submitted paper. This applies to paper(s) published in other languages, although translation may occasionally be considered with the agreement of the other journal. Oral presentation of study findings at a conference or publication of an abstract only in conference proceedings does not normally prohibit submission of the full paper to the EMHJ. Such abstracts should not exceed 500 words.

Scientific misconduct

EMHJ takes any allegation or evidence of scientific misconduct seriously. Examples of scientific misconduct include:

Violation of ethical research standards: failing to adhere to standards for research involving humans and animals.

Fabrication and falsification of data and abuse of accepted research practices: making up data, deliberately suppressing and/or altering data, and manipulating experiments/analysis to obtain desired results.

Plagiarism: using the published language, ideas of others without appropriate acknowledgment of their source and representing them as one's own. When referring to the published ideas/opinions of others full referencing is expected. Brief quoted statements could be acceptable, if good justification is provided and they are placed within inverted commas.

Duplicate publication: this refers to publication of a paper by at least some of the same authors that overlaps substantially with another one already published, without clear reference to the previous publication. Duplicate publication is considered unethical in particular for original research because it can lead to double-counting of data and inappropriate weighting of the results of a single study.

Improprieties of authorship: this refers to improperly assigning authorship credit either by inclusion ("guest" authorship) or exclusion ("ghost" authorship).

Any misconduct in the conduct of research, and preparation or submission of the manuscript is considered unacceptable for publication in the EMHJ.

EMHJ's response to possible scientific misconduct

EMHJ takes seriously any suspected misconduct in research, publication or professional behaviour. EMHJ will investigate, in confidence, any cause of concern on a case-by-case basis and seek resolution.

EMHJ will follow the guidelines and recommendations of recognized bodies including COPE, the ICMJE, and the World Association of Medical Editors (WAME). EMHJ may seek advice from internal or external sources of advice if needed.

In most cases, EMHJ will endeavour to resolve the issue in the first instance by discussion with the author(s). However if concerns remain, the case may be reported to the appropriate authorities, including supervisors/employers, and relevant professional body(ies).

Submitted papers found to be in breach of publication ethics will be rejected. Even if an article would be rejected for other scientific reasons, if it is considered unethical, EMHJ may nonetheless take further action. In the case of an already published

paper, unethical behaviour may result in retraction of the paper. Authors found to have infringed ethical standards will be kept on record and may be banned from publishing in EMHJ in the future.

EMHJ responsibilities

EMHJ upholds the authors' right to fair, objective and ethical handling of their papers. EMHJ follows the WAME recommendations on best practices for Peer Review Selection. EMHJ operates a double blind peer review system and endeavours to ensure that neither the authors nor the reviewers are aware of the each other's identities. Editors and reviewers are required to declare any conflicts of interests and to maintain the confidentiality of the manuscript under review. Reviewers may not refer the manuscript to a colleague without the permission of the Editor nor make use of any part of it before publication.

Authors may appeal decisions on their papers if they believe there is good case for making an appeal. Appeals will be carefully considered.

Key resources

1. World Medical Association's Declaration of Helsinki (http://www.wma.net/en/30publications/10policies/b3/)
2. Council for International Organizations of Medical Sciences (http://www.cioms.ch/)
3. International Ethical Guidelines for Biomedical Research Involving Human Subjects (http://www.cioms.ch/publications/layout_guide2002.pdf)
4. International Guidelines for Ethical Review of Epidemiological Studies (http://www.ufrgs.br/bioetica/cioms2008.pdf)
5. Committee on Publication Ethics (http://publicationethics.org/)
6. International Committee of Medical Journal Editors (http://www.icmje.org/)
7. Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals of the International Committee of Medical Journal Editors (http://www.icmje.org/icmje-recommendations.pdf)
8. World Association of Medical Editors. Recommendations on Publication Ethics Policies for Medical Journals (http://www.wame.org/about/recommendations-on-publication-ethics-policie)

Additional publications and resources
WHO

1. Ethical issues in patient safety research: interpreting existing guidance (2013) (http://apps.who.int/iris/bitstream/10665/85371/1/9789241505475_eng.pdf)
2. Standards and operational guidance for ethics review of health-related research with human participants (2011) (http://apps.who.int/iris/bitstream/10665/44783/1/9789241502948_eng.pdf?ua=1&ua=1)
3. Quality practices in basic biomedical research (QPBR) training manual (2010) (http://apps.who.int/iris/bitstream/10665/44293/1/9789241599207_eng.pdf?ua=1 and http://apps.who.int/iris/bitstream/10665/44293/2/9789241599214_eng.pdf)
4. Casebook on ethical issues in international health research (2009) (http://apps.who.int/iris/bitstream/10665/44118/4/9789241547727_eng.pdf?ua=1 and http://apps.who.int/iris/bitstream/10665/44118/17/9789290219576_ara.pdf)
5. Research ethics committees: basic concepts for capacity-building (2009) (http://apps.who.int/iris/bitstream/10665/44108/1/9789241598002_eng.pdf?ua=1)
6. Marshall PA. Ethical challenges in study design and informed consent for health research in resource-poor settings. UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases http://apps.who.int/iris/bitstream/10665/43622/1/9789241563383_eng.pdf?ua=1)
7. WHO ethical and safety recommendations for researching, documenting and monitoring sexual violence in emergencies (2007) (http://apps.who.int/iris/bitstream/10665/43709/1/9789241595681_eng.pdf and http://apps.who.int/iris/bitstream/10665/43709/2/9789241595681_ara.pdf)

8. Scientific working group on life science research and global health security: report of the first meeting, Geneva, Switzerland, 16-18 October 2006 (2007) (http://apps.who.int/iris/bitstream/10665/80111/1/WHO_CDS_EPR_2007.4_eng.pdf)
9. Handbook: quality practices in basic biomedical research 2006 (http://apps.who.int/iris/bitstream/10665/43512/1/9241594454_eng.pdf)
10. A practical guide for health researchers (2004) (http://applications.emro.who.int/dsaf/dsa237.pdf)
11. Manual for editors of health science journals (2009) (http://applications.emro.who.int/dsaf/dsa1034.pdf)
12. Regulation of privacy and data protection in the use of electronic health information. An international perspective and reference source on regulation and legal issues related to person-identifiable health databases. Pan American Health Organization (2001).

Further WHO publications related to the ethics of specific issues can be found at: http://www.who.int/ethics/publications/year/en/

Other

1. Council of Science Editors. White Paper on Publication Ethics (http://www.councilscienceeditors.org/resource-library/editorial-policies/white-paper-on-publication-ethics/)
2. The Office of Research Integrity (http://ori.hhs.gov/about-ori)
3. National Institutes of Health. Office of Clinical Research and Bioethics Policy (http://osp.od.nih.gov/office-clinical-research-and-bioethics-policy)
4. Ethics and Research Guidance. Medical Research Council, UK (http://www.mrc.ac.uk/research/research-policy-ethics/)
5. Equator Network (Enhancing the QUAlity and Transparency Of health Research). Research ethics, publication ethics and good practice guidelines (http://www.equator-network.org/library/research-ethics-publication-ethics-and-good-practice-guidelines/#etguid)
6. Miguel Roig. Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing (2006) (http://www.cse.msu.edu/~alexliu/plagiarism.pdf)
7. Danis M, Largent E, Grady C, Wendler D, Chandros Hull S, Shah S, et al. Research ethics consultation: a casebook. OUP; 2012.

Guidelines for authors

1. Papers submitted for publication to the Eastern Mediterranean Health Journal (EMHJ) must not have been published, accepted for publication or currently be under consideration for publication elsewhere. The World Health Organization (WHO) Regional Office for the Eastern Mediterranean reserves all rights of reproduction and republication of material that appears in the EMHJ.
2. Papers submitted for publication to the EMHJ should conform with the Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals (http://www.icmje.org/icmje-recommendations.pdf) of the International Committee of Medical Journal Editors (ICMJE).
3. **Ethical considerations:** Where applicable, a statement must be included indicating approval for the study was granted by the ethics committee/institutional review board of the relevant institution. Authors should verify where appropriate that all persons on whom research has been carried out have given their voluntary, informed, written consent, and where participants (living or dead) were unable to give such consent, that surrogate consent was obtained. Authors may be asked to supply such consent forms. In cases where participants cannot read and write, oral consent is acceptable.
   Conflicts of interest: Authors will be asked to provide details of any competing interests and funding. Please see the ICMJE Recommendations.
4. **Reporting guidelines:** EMHJ encourages and recommends authors to adhere to the best research protocols available and follow established reporting guidelines. Reporting guidelines are available at the EQUATOR Network (http://www.equator-network.org/). The key guidelines for research in the field of public health are: CONSORT (guidelines for reporting randomized trials); STROBE (guidelines for reporting observational studies); PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses); STARD (Standards for Reporting of Diagnostic Accuracy); COREQ (Consolidated criteria for reporting qualitative research); CARE (guideline for clinical case report) as well as the COCHRANE handbook (for systematic reviews of interventions). Links to these sites and other useful resources are available under "Useful resources for authors and reviewers" (http://www.emro.who.int/emh-journal/links/).
5. Following WHO and ICMJE recommendations, EMHJ requires registration of clinical trials in a public trials registry as a condition of consideration for publication. Authors are recommended to register in one of the clinical trials registries certified by WHO and ICMJE which are available at the International Clinical Trials Registry Platform (http://www.who.int/ictrp/en/).
6. **Submission:** Original papers written in Arabic, English or French may be submitted for consideration through our online submission system. Instructions on submitting a manuscript through the online system and access to the system can be found on our website at: http://www.emro.who.int/emh-journal/authors/ and by clicking on Editorial Manager.
7. Abstracts of papers accepted for publication will be translated into all three languages. To ensure the correct spelling of authors' names to accompany the Arabic abstract, authors writing in English or French but whose mother tongue is written using Arabic characters should provide their full names in Arabic script along with transliterations in English or French.
8. Manuscripts should be prepared in word processed format (preferably Microsoft Word) double-spaced, single column, preferably using Times New Roman script, font size 12.
9. All papers considered for publication will be peer reviewed. The Editorial Board reserves the right to accept or reject any paper based on the reviewers' comments, scientific rigor and suitability for the journal. 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.
10. **Topics:** The subject of the paper should pertain to public health or a related biomedical or technical subject within the field of interest of the WHO, and should have particular relevance to the Eastern Mediterranean Region.
11. The title of the paper should be as concise as possible, preferably not more than 15 words. All authors should have made material contribution to the design, analysis or writing of the study and have approved the final version submitted. No change in authorship will be permitted after the paper has been accepted for publication and any change before this must be agreed by all authors listed. Authors may be asked to verify their contribution. Names of other contributors may be included in the acknowledgements. Please see the ICMJE Recommendations for authorship and contributorship.
12. **Research articles:** Papers reporting original research findings should follow the IMRAD format: Introduction; Methods; Results; Analysis; and Discussion. The text of Research articles and Reports should not exceed 3000 words (excluding the accompanying abstract, references, tables and figures). An abstract of not more than 200 words should be supplied, clearly and briefly stating the context, objectives, methodology, results and conclusions. The maximum number of references permitted is 35. The number of tables and figures should not exceed 5.
13. **Review articles:** (i.e. critical assessments of research on topics of relevance to public health in the Region). These should contain sections dealing with objectives, sources, methods of selection, compilation and interpretation of data and conclusions. The text should not exceed 3000 words (excluding the accompanying abstract, references, tables and figures), and should be accompanied by an abstract of not more than 200 words. The number of tables and figures should not exceed 5.
14. **Reports:** (i.e. papers reporting on projects of public health relevance to the Eastern Mediterranean Region). Manuscript specifications (length, references, tables/figures) are the same as a research article.
15. **Short communications:** Articles which do not constitute a complete research study but are of particular relevance or importance to public health issues in the Region may be considered for publication. The text should not exceed 1500 words (excluding

the accompanying abstract, references, tables and figures), and should be accompanied by an abstract of not more than 150 words. The number of tables and figures should not exceed 3.

16. **Case reports:** Only reports of cases of an unusual nature are considered for publication. Text should include an Introduction, the Report of the case(s) and a Discussion. The text should not exceed 1500 words and the number of references kept to a minimum. No abstract is required.
17. **Letters to the Editor:** Letters commenting on published articles are welcome. Letters will be sent to the authors of the original article for their comments, and these will be published along with the letter. The text of letters should be kept as short as possible.
18. **References:** In-text citations of published works should be limited to essential up-to-date references. These should be numbered separately as they occur in the text with sequential Arabic numerals in parentheses, e.g. (1,5–8). These references should appear in a numbered list on a separate page after the Discussion. They should contain the following elements as appropriate: name(s) and initial(s) of author(s); title of paper or book in its original language plus translation; for research articles, abbreviated name of journal plus volume number and page range; for books and other texts, place of publication (city and country) and name of publisher (commercial or institutional); and date of publication; for texts published exclusively on the Internet, exact URL of the page cited and date when last accessed.
For texts with up to 6 authors, all authors must be named. For texts with more than 6 authors, the first 6 authors should be named followed by "et al".
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:
Rehmani R, Elzubair AG, Al Maani M, Chaudary IY, Al Qarni A, Khasshogi T et al. Population-based health survey in eastern region of Saudi Arabia. East Mediterr Health J. 2013; 19(5):417–25.
Document:
Al-Itneen M, ed. The principles of uncertainty. Geneva: World Health Organization; 1985 (WHO/DOC/537).
Thesis
Smith S. Use of healthcare services by the elderly with the introduction of technical innovations. London: Drake University; 2013.
Web text:
Child growth standards. Geneva: World Health Organization; 2006 (http://www.who.int/childgrowth/en/, accessed 8 October 2008).
19. Figures and tables with appropriate captions should each be on a separate page and numbered sequentially with Arabic numerals. Each figure and table must be referred to in the text. Where appropriate, sources should be given. 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.
Figures must be supplied in a format which can be edited, preferably Microsoft Excel format, and figures derived from data must be accompanied by those data, e.g. Excel data sheet, to enable redrawing if necessary. Photographs and illustrations should also be sent as separate files. The preferred format is JPG or TIFF; resolution should be minimum 300 dpi.
20. Submissions that do not comply with these guidelines will be returned to the author for correction before being considered for publication.

دلائل إرشادية للمؤلفين

1. ينبغي لورقات البحث المقدَّمة للنشر في المجلة الصحية لشرق المتوسط ألا تكون قد نشرت أو قُبلت للنشر أو تكون محلاً للنظر في نشرها في مكان آخر. ويحتفظ المكتب الإقليمي لمنظمة الصحة العالمية لشرق المتوسط بجميع حقوق إعادة إنتاج المواد التي تُنشر في المجلة الصحية لشرق المتوسط أو إعادة نشرها.
2. ينبغي لورقات البحث المقدَّمة للنشر في المجلة الصحية لشرق المتوسط أن تلبِّي التوصيات حول السلوكيات والإبلاغ والتحرير والنشر للأعمال العلمية في المجلات الطبية التي أصدرتها اللجنة الدولية لمحرري المجلات الطبية.
3. **اعتبارات البُعد الأخلاقي**: بحسب الاقتضاء يجب إرفاق الورقة المقدَّمة للنشر في المجلة الصحية لشرق المتوسط بما يفيد الموافقة على الدراسة من جانب لجنة الأخلاقيات/ مجلس المراجعة المؤسسية في المؤسسة ذات الصلة بالبحث، كما يجب على المؤلفين التأكد، حيثما كان ذلك مناسباً، من أن جميع الأشخاص الذين شملهم البحث قد قدموا موافقة كتابية طوعية مستنيرة، وعندما يتعذر ذلك على المشاركين في البحث (سواءً الأحياء منهم أو الأموات)، يجب على المؤلفين الحصول على موافقة بديلة. وقد يُطلب من المؤلفين تقديم نماذج هذه الموافقات. كما يمكن قبول الموافقة الشفهية في حالة عدم معرفة المشاركين القراءة والكتابة.

   تضارب المصالح: سيطلب من المؤلفين تقديم معلومات تفصيلية حول أي تضارب في المصالح وحول التمويل. يُرْجَى الاطلاع على توصيات حول السلوكيات والإبلاغ والتحرير والنشر للأعمال العلمية في المجلات الطبية.
4. دلائل إرشادية حول إعداد التقارير: تشجع المجلة الصحية لشرق المتوسط المؤلفين وتوصيهم بالالتزام بأفضل بروتوكولات البحوث المتاحة، واتباع الدلائل الإرشادية المعتمدة في إعداد التقارير، ويمكن الاطلاع على الدلائل الإرشادية حول كتابة التقارير على شبكة EQUATOR (http://www.wqator-network.org). وتتمثَّل الدلائل الإرشادية الرئيسية للبحوث في ميدان الصحة العمومية فيما يلي: المعايير المجمّعة لكتابة التقارير حول الدراسات (CONSORT) وهي الدلائل الإرشادية لإعداد التقارير حول الدراسات المعشّاة، وSTROBE وهي الدلائل الإرشادية حول كتابة التقارير للدراسات الملاحظة، والمكونات المفضلة في كتابة تقارير المراجعات المنهجية والتحليل البعدي PRISMA ومعايير إعداد التقارير حول الدقة التشخيصية STARD، والمعايير المجمّعة لكتابة التقارير حول البحوث النوعية COREQ، وكتيب كوكرين COCHRANE (للمراجعات المنهجية للتدخلات). والروابط إلى تلك المواقع وغيرها من المصادر المفيدة متاحة على الرابط "المصادر المفيدة للمؤلفين والمراجعين" (www.emro.who.int/emh-journal/links/).
5. وفقاً لتوصيات منظمة الصحة العالمية وتوصيات اللجنة الدولية لمحرري المجلات الطبية، فإن المجلة الصحية لشرق المتوسط تطلب تسجيل الدراسات السريرية (الإكلينيكية) في سجل للدراسات العامة كشرط للنظر في نشرها، ويُوصَي المؤلفون بالتسجيل في أحد سجلات الدراسات السريرية المشهود لها من قِبَل منظمة الصحة العالمية واللجنة الدولية لمحرري المجلات الطبية، وتتوافرَ هذه السجلات على البوابة الدولية لسجل الدراسات السريرية (http://www.who.int/ictrp/ar/).
6. **تقديم ورقات البحث**: يمكن تقديم الورقات البحثية الأصلية المكتوبة باللغة العربية أو الإنكليزية أو الفرنسية للنظر فيها وذلك من خلال نظام التقديم عبر الإنترنت الخاص بالمجلة الصحية لشرق المتوسط. ويمكن الاطلاع على التعليمات حول تقديم مخطوطة الورقة عبر نظام التقديم على الإنترنت والدخول على ذلك النظام على موقع المجلة الصحية لشرق المتوسط على الإنترنت، وهو www.emro.who.int/emh-journal/authors/ ثم الضغط على أيقونة مدير التحرير.
7. سوف تُترجم ملخصات ورقات البحث التي قُبلت للنشر إلى اللغات سوف تُترجم ملخصات ورقات البحث التي قُبلت للنَشر إلى اللغات الثلاث، ومن أجل ضمان الكتابة الصحيحة لأسماء المؤلفين في سياق الملخص بالعربية، فإن على المؤلفين الذين كتبوا بحوثهم بالإنكليزية أو الفرنسية ولكن لغتهم الأم تكتب بالحروف العربية أن يكتبوا أسماءهم بالحروف العربية مع مقابلاتها باللغة الإنكليزية أو بالفرنسية.
8. يجب إعداد المخطوطة باستخدام برامج معالجة الكلمات (ويفضل برنامج ورد – ميكروسوفت) وأن تكتب بفواصل مضاعفة بين الأسطر وفي عمود واحد ويفضل استخدام الخط Times New Roman وأن يكون حجم الخط 12.
9. تخضع جميع الورقات التي تقدم للنشر لمراجعة الزملاء، وتحتفظ هيئة التحرير بحق قبول أو رفض أي ورقة استناداً إلى الملاحظات التي يبديها المراجعون، وإلى السلامة العلمية، وإلى ملاءمة الورقة للمجلة. ومن المتفق عليه أن قبول الورقات يستند إلى مراجعتها إحصائياً وتحريرياً وفق ما تقتضيه الحاجة، ويتضمن ذلك اختصار النص وحذف بعض الجداول أو الرسوم البيانية.
10. المواضيع يجب أن يكون موضوع الورقة له صلة بالصحة العمومية أو بأي مادة تقنية أو طبية حيوية في مجال يحظى باهتمام منظمة الصحة العالمية وله أهمية خاصة لإقليم شرق المتوسط.
11. ينبغي لعنوان الورقة أن يكون مختصراً على قدر المستطاع، ويفضل ألا يزيد على 15 كلمة. وينبغي لجميع المؤلفين أن يكونوا قد أسهموا مساهمة مادية في تصميم الدراسة أو تحليلها أو كتابتها، وأن يكونوا قد وافقوا على النسخة النهائية المقدمة. ولن يسمح بأي تغيير في ما يتعلق بتأليف الورقة بعد قبولها للنشر، كما يجب أن يحظى كل تغيير على موافقة مسبقة من جميع المؤلفين المذكورة أسماؤهم. وقد يطلب من المؤلفين إثبات إسهاماتهم، كما يمكن إدراج أسماء مساهمين آخرين في عبارات الشكر، ويُرْجَى النظر في توصيات حول السلوكيات والإبلاغ والتحرير والنشر للأعمال العلمية في المجلات الطبية حول التأليف والإسهام.
12. مقالات البحوث: يجب أن تتقيد الورقات التي تتضمن الإبلاغ عن نتائج أصلية للبحوث بالنموذج الخاص بالمقدمة والطرق والنتائج والتحليل والمناقشة IMROD. ويجب ألا تتجاوز مقالات البحث والتقارير 3000 كلمة (دون أن يتضمن ذلك ما يرافقها من الملخص والمراجع والجداول والأشكال). ويجب ألا يتجاوز الملخص 200 كلمة، وأن يوضح بإيجاز السياق والأهداف والطريقة والنتائج والاستنتاجات. أما العدد الأقصى المسموح به للمصادر والمراجع فهو 35 مصدراً ومرجعاً، كما يجب ألا يتجاوز عدد الجداول والأشكال 5 جداول وأشكال.
13. **مقالات المراجعة**: وهي تقييمات دقيقة للبحوث حول المواضيع ذات الصلة بالصحة العمومية في الإقليم. وينبغي لهذه المقالات أن تضم فقرات تتعلق بالأهداف والمصادر وطرق اختيار البيانات وتجميعها وتفسيرها والاستنتاجات. وينبغي للنص ألا يزيد عن 3000 كلمة (ولا يتضمن ذلك ما يرافقه من ملخص ومراجع وجداول وأشكال)، كما يجب أن يرفق بملخص لا يتجاوز 200 كلمة، وألا يتجاوز عدد الجداول والأشكال 5.
14. **التقارير**: وهي تقارير أعدت حول مشاريع ذات صلة بالصحة العمومية في إقليم شرق المتوسط، وتتطابق مواصفات المخطوطات (من حيث الطول والمراجع والجداول والأشكال) مع ما هو مطلوب بالنسبة لمقالات البحث.
15. مراسلات قصيرة: يمكن النظر في نشر مقالات لا تضم دراسة بحثية كاملة، ولكنها ذات صلة أو أهمية خاصة فيما يتعلق بقضايا الصحة العمومية في الإقليم. وينبغي للنص ألا يتجاوز 1500 كلمة (ولا يتضمن ذلك ما يرافقه من ملخص ومراجع وجداول وأشكال)، كما يجب أن يرفق بملخص لا يزيد عن 150 كلمة، أما عدد الجداول والأشكال فيجب ألا يزيد عن 3 جداول وأشكال.
16. **تقارير حالات**: لا ينظر للنشر إلا في تقارير حالات ذات طبيعة غير معتادة. وينبغي أن يتضمن النص مقدمة وتقريراً عن الحالة أو الحالات ومناقشة. وينبغي ألا يزيد النص على 1500 كلمة، وأن يكون عدد المراجع في حده الأدنى، ولا يُشترط كتابة ملخص.
17. رسالة إلى المحرر: إن الرسائل التي تتضمن تعليقاً على المقالات المنشورة هي موضع ترحيب، وترسل هذه الرسائل إلى مؤلفي المقالة الأصلية للتعليق عليها، ثم تنشر تلك التعليقات مع الرسائل. ويجب الإيجاز قدر الإمكان.
18. **المراجع**: يجب أن يقتصر الاقتباس من الأعمال المنشورة على المراجع الأساسية والمحدّثة. ويجب ترقيم هذه المنشورات على نحوٍ منفصل وفق ظهورها في

النص مع استخدام أرقام عربية متتابعة، مثل (8–15). ويجب عرض هذه المراجع في شكل قائمة مرقمة على صفحة منفصلة بعد قسم المناقشة، وينبغي للمراجع أن تتضمن العناصر التالية، وفق المقتضى: اسم المؤلف ولقبه وعنوان الورقة أو الكتاب باللغة الأصلية مع ترجمته؛ وينبغي لمقالات البحث أن تتضمن الاسم المختصر للمجلة مع رقم المجلد وحدود الصفحات. وينبغي للكتب وغيرها من النصوص أن تتضمن مكان النشر (المدينة ثم البلد)، واسم الناشر (تجاري أم مؤسسة)، وتاريخ النشر. وينبغي للنصوص التي اقتصر نشرها على الإنترنت أن تتضمن العنوان الإلكتروني للصفحة المقتبسة وتاريخ الدخول عليها آخر مرة. وينبغي للنصوص التي لا يزيد عدد المؤلفين لها عن 6 مؤلفين أن يذكر أسماء جميع المؤلفين، أما النصوص التي يزيد عدد المؤلفين لها على 6 مؤلفين، فتُذكر أسماء المؤلفين الستة الأوائل متبوعة بكلمة "وزملاؤهم".

وفي ما يلي أمثلة على النمط التي يفضل اتباعه في المجلة الصحة لشرق المتوسط:

كتاب:

الحمزة؛ سميت العلامة الخامسة للهوية، القاهرة، مطبعة الجامعة الأمريكية، 1990.

مقالة في مجلة:

رحماتي، الزبير، المعاني، شودري، القرين، خشوقي وزملاؤهم. مسح صحي يرتكز على السكان في المنطقة الشرقية للمملكة العربية السعودية؛ المجلة الصحية لشرق المتوسط، 2013; 19 (5): 25-417.

وثيقة

العطين م، إد. مبادئ الارتياب. جنيف، منظمة الصحة العالمية، 1985 (م ص ع/ د/ 537).

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سميث: انتفاع المسنين بخدمات الرعاية الصحية مع إدخال مبتكرات تقنية، لندن، جامعة دريك، 2013.

نص منشور على الانترنت:

معايير نمو الأطفال، جنيف، منظمة الصحة العالمية: http://www.who.int/childgrowth/en تم الدخول عليه في 8 تشرين الأول/ أكتوبر 2008.

19. الأشكال والجداول المشفوعة بشروحات ملائمة، ينبغي لكل منها أن يكون في صفحة مستقلة، وأن تُعطى أرقاماً متتالية بأعداد عربية. ويجب الإشارة في النص لكل شكل ولكل جدول. ويجب توضيح المراجع حيثما كان ملائماً. وإذا ما نسخ المؤلفون أي شكل أو جدول أو مادة أخرى من مراجع أخرى، فإنهم يتحملون وحدهم المسؤولية عن تأمين الإذن اللازم للقيام بذلك. وبغية تفادي مشكلات التنسيق في مرحلة الإخراج النهائي، يجب الاقتصار على أقل عدد ممكن من الجداول ومن الأشكال.

ويجب تقديم الأشكال في صيغة قابلة للتعديل، ويفضل إكسل – ميكروسوفت، كما أن الأشكال المستخلصة من البيانات يجب أن تُرفق بها تلك البيانات، مثلاً صفحة إكسل للبيانات، حتى يصبح بالإمكان إعادة إنتاجها عند الضرورة. كما يجب إرسال الصور الفوتوغرافية والرسومات التوضيحية في ملفات منفصلة، ويفضل أن تكون في شكل ملفات JPG أو TIFF، كما يجب أن يكون الوضوح بدرجة لا تقل عن 300 نقطة لكل بوصة.

20. ستُعاد الورقات البحثية المقدمة التي لا تلتزم بالدلائل الإرشادية المذكورة إلى المؤلفين من أجل تصحيحها قبل النظر في نشرها.

Directives à l'intention des auteurs

1. Les articles soumis pour publication à *La Revue de Santé de la Méditerranée orientale* ne doivent pas avoir été publiés, avoir été acceptés pour publication dans d'autres revues ou être en cours d'examen par d'autres revues. Le Bureau régional de l'Organisation mondiale de la Santé (OMS) pour la Méditerranée orientale se réserve tous les droits de reproduction et de republication des matériels qui paraissent dans La Revue de Santé de la Méditerranée orientale.
2. Les articles soumis pour publication à *La Revue de Santé de la Méditerranée orientale* doivent être conformes aux Recommandations pour la conduite, la présentation, la rédaction et la publication des travaux de recherche soumis à des revues médicales (http://www.icmje.org/recommendations/translations/french2015.pdf) de *l'International Committee of Medical Journal Editors* (Comité international des éditeurs de revues médicales, ICMJE).
3. **Considérations éthiques :** Le cas échéant, une déclaration devra être incluse, indiquant que le Comité d'éthique ou le Comité d'examen institutionnel de l'organisme concerné a donné son accord à l'étude. Les auteurs doivent vérifier, le cas échéant, que toutes les personnes sur lesquelles la recherche porte ont donné leur consentement volontaire et informé par écrit et que si certains participants (en vie ou décédés) n'ont pas pu le donner, un consentement de substitution a été obtenu. Il peut être demandé aux auteurs de fournir ce type de formulaire de consentement. Lorsque les participants ne savent ni lire ni écrire, un consentement oral est acceptable.
   Conflits d'intérêts : Il sera demandé aux auteurs de préciser tout conflit d'intérêts et financement. Veuillez vous reporter aux recommandations de l'ICMJE.
4. **Directives de présentation :** La Revue de Santé de la Méditerranée orientale encourage les auteurs à respecter les meilleurs protocoles de recherche disponibles et leur recommande de suivre les directives de présentation établies. Les directives de présentation sont disponibles sur le site Web du réseau EQUATOR (http://www.equator-network.org/). Les principales directives pour la recherche en santé publique sont les suivantes : directives CONSORT (essais randomisés) ; directives STROBE (études observationnelles) ; directives PRISMA (revues systématiques et méta-analyses) ; directives STARD (normes de présentation de rapports concernant l'exactitude de diagnostic) ; critères COREQ (recherche qualitative) ; directives CARE (publication de cas cliniques) et le manuel COCHRANE (pour les revues systématiques des interventions). Les liens vers ces sites Web et d'autres ressources utiles sont disponibles sous la rubrique « Ressources à l'intention des auteurs et des réviseurs » à l'adresse suivante : http://www.emro.who.int/fr/emh-journal/links/.
5. Suite aux recommandations de l'OMS et de l'ICMJE, *La Revue de Santé de la Méditerranée orientale* impose comme condition de publication que les essais cliniques soient enregistrés auprès du registre public des essais cliniques. Il est recommandé aux auteurs d'enregistrer leurs essais dans un des registres des essais cliniques certifiés par l'OMS et l'ICMJE disponibles dans la base de données du Système d'enregistrement international des essais cliniques (http://www.who.int/ictrp/fr/).
6. **Soumission :** Les articles originaux rédigés en anglais, arabe ou en français peuvent être soumis pour examen en utilisant notre système en ligne. Les instructions relatives à la soumission d'un manuscrit en utilisant le système en ligne sont disponibles en anglais sur notre site Web accessibles à l'adresse suivante : http://www.emro.who.int/emh-journal/authors/, et en cliquant sur « Editorial Manager ».
7. Les résumés des articles acceptés pour publication seront traduits dans les trois langues. Pour assurer que les noms des auteurs soient correctement écrits dans les résumés en arabe, les auteurs rédigeant en anglais ou en français mais dont la langue maternelle s'écrit en caractères arabes doivent fournir leur nom complet en écriture arabe avec une translittération de leur nom en anglais ou en français.
8. Les manuscrits doivent être préparés en format traitement de texte (Microsoft Word, de préférence), avec double interlignage, mise en page d'une seule colonne, police Times New Roman, taille de caractère 12.
9. Tous les articles dont la publication est envisagée seront revus par des pairs. Le Comité de rédaction se réserve le droit d'accepter ou de refuser tout article, sur la base des commentaires des réviseurs, de la rigueur scientifique et de la pertinence de l'article pour La Revue. Les articles sont acceptés sous réserve de la révision statistique et rédactionnelle dont ils feront l'objet, comme jugé nécessaire, ce qui peut amener à abréger le texte et à supprimer certaines données présentées sous forme de tableaux ou de graphiques.
10. **Sujets :** Le sujet de l'article doit concerner la santé publique ou un autre sujet biomédical ou technique connexe faisant partie du champ d'intérêt de l'OMS, et se rapporter plus particulièrement à la Région de la Méditerranée orientale ou revêtir une importance particulière pour celle-ci.
11. Le titre de l'article doit être aussi concis que possible, et de préférence ne pas dépasser 15 mots. Tous les auteurs devraient avoir apporté une contribution importante à la conception, à l'analyse ou à la rédaction de l'étude et avoir approuvé la version finale soumise. Aucun changement dans les noms des auteurs ne sera autorisé après l'acceptation de l'article pour publication ; avant cette acceptation, tout changement doit être accepté par l'ensemble des auteurs figurant dans la liste. Une vérification de leur contribution peut être demandée aux auteurs. Les noms d'autres contributeurs peuvent être inclus dans les remerciements. À ce sujet, veuillez vous reporter aux *ICMJE recommendations for authorship and contributorship* [Recommandations de l'ICMJE relatives à la qualité d'auteur et de contributeur].
12. **Articles de recherche :** Les articles présentant des résultats de recherche originale devront suivre le format IMRAD : introduction, méthodes, résultats, analyse et discussion. Le texte des articles et des rapports de recherche ne doit pas excéder 3 000 mots (résumé, références, tableaux et figures exclus). Un résumé de 200 mots maximum sera fourni et mentionnera clairement et brièvement le contexte, les objectifs, la méthodologie, les résultats et les conclusions. Le nombre maximal de références autorisées est de 35. Il ne faut pas inclure plus de cinq tableaux ou figures.

13. **Articles d'analyse :** il s'agit d'évaluations critiques d'études de recherche sur des sujets pertinents concernant la santé publique dans la Région. Ils doivent être composés de paragraphes traitant des objectifs, des sources, des méthodes de sélection, de la compilation et de l'interprétation des données et des conclusions. Le texte ne doit pas excéder 3 000 mots (résumé, références, tableaux et figures exclus) et doit être accompagné d'un résumé de 200 mots au maximum. Le nombre maximal de tableaux et de figures autorisé est de 5.
14. **Rapports :** il s'agit d'articles présentant des projets pertinents de santé publique dans la Région de la Méditerranée orientale. Le format des manuscrits (longueur, références, tableaux et figures) est le même que pour les articles de recherche.
15. **Communications brèves :** Les articles ne constituant pas une étude de recherche complète, mais présentant un intérêt ou revêtant une importance particulière pour les questions de santé publique dans la Région peuvent être examinés pour publication. Le texte ne doit pas excéder 1 500 mots (résumé, références, tableaux et figures exclus) et doit être accompagné d'un résumé de 150 mots au maximum. Le nombre maximal de tableaux et de figures est de 3.
16. **Études de cas :** Seules les études de cas inhabituels seront examinées pour publication. Le texte doit comprendre une introduction, un exposé du/des cas et une discussion. Il ne doit pas excéder 1 500 mots et le nombre de références doit être minimal. Il n'est pas nécessaire de fournir un résumé.
17. **Lettres à la rédaction :** Les lettres commentant des articles publiés sont les bienvenues. Elles seront envoyées aux auteurs de l'article afin qu'ils fournissent leurs commentaires, qui seront publiés aux côtés de la lettre. Le texte des lettres doit être aussi court que possible.
18. **Références :** Les citations dans le texte de travaux publiés doivent être limitées aux références essentielles récentes. Elles doivent être numérotées séparément à l'aide de chiffres arabes indiqués entre crochets, par exemple (1,5–8). Les références doivent figurer sous forme de liste numérotée sur une page séparée après la partie « Discussion ». Elles doivent contenir les éléments suivants, selon le cas : nom(s) et initiales du ou des auteurs ; titre de l'article ou de l'ouvrage dans sa langue originale ainsi que sa traduction ; pour les articles de recherche, le nom abrégé de la revue ainsi que le numéro du volume et les pages concernées ; pour les ouvrages et autres textes, le lieu de publication (ville et pays) et le nom de la maison d'édition (commerciale ou institutionnelle) ; la date de publication ; pour les textes publiées exclusivement sur Internet, l'URL exact de la page citée et la date du dernier accès.

    Lorsque les textes comptent moins de six auteurs, tous les auteurs doivent être nommés. Lorsque les textes comptent plus de six auteurs, seul les noms des six premiers auteurs sont mentionnés, suivis de « et al. ».

    Exemples du style préféré de La Revue :

    Livre :

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    Article de revue :

    Rehmani R, Elzubair AG, Al Maani M, Chaudary IY, Al Qarni A, Khasshogi T et al. Population-based health survey in eastern region of Saudi Arabia. East Mediterr Health J. 2013; 19(5):417–25.

    Document :

    Al-Itneen M, ed. The principles of uncertainty. Geneva, World Health Organization, 1985 (WHO/DOC/537).

    Thèse :

    Smith S. Use of healthcare services by the elderly with the introduction of technical innovations. London: Drake University; 2013.

    Texte Web :

    Child growth standards. Geneva, World Health Organization, 2006 (http: //www. who. int/childgrowth/en/, consulté le 8 octobre 2008).
19. Les figures et les tableaux accompagnés des légendes appropriées doivent être placés chacun sur une feuille séparée, numérotés en chiffres arabes selon leur ordre. Chaque figure et chaque tableau doivent être référencés dans le texte, et le cas échéant, les sources doivent être indiquées. Si des figures, tableaux ou d'autres matériels ont été copiés d'autres sources, les auteurs portent l'entière responsabilité d'obtenir les autorisations nécessaires. Afin d'éviter les problèmes de mise en page lors de la production finale, le nombre de tableaux et de figures doit être aussi limité que possible.

    Les figures doivent être fournies dans un format permettant les modifications, de préférence Microsoft Excel, et celles qui sont établies à partir de données doivent être accompagnées de ces données, sur une fiche technique Excel par exemple, pour permettre une recomposition, le cas échéant. Les photographies et illustrations doivent être envoyées dans des fichiers séparés. Les formats préférés sont JPG et TIFF, et la résolution des images doit être de 300 dpi au minimum.
20. Les manuscrits ne respectant pas ces directives seront renvoyés à leur auteur pour correction avant d'être examinés en vue de la publication.

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Contents