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# EMHJ

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## The role of access to affordable and quality assured blood and blood products for achieving Universal Health Coverage

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The theme of World Health Day 2018 is 'Universal health coverage: everyone, everywhere' under the slogan 'Health for All'. Universal Health Coverage (UHC), as pertains to blood and blood products, means that all individuals and communities have access to affordable and timely supplies of safe and quality-assured blood and blood products (1,2). Blood and blood products are essential components in the proper management of women suffering from bleeding associated with pregnancy and childbirth; children suffering from severe anaemia due to malaria and malnutrition; patients with blood and bone marrow disorders and immune deficiency conditions; victims of trauma, emergencies, disasters and accidents; and patients undergoing advanced medical and surgical procedures (3).

Globally, the World Health Organization (WHO) has been at the forefront of the movement to improve access to affordable and quality assured blood and blood products as mandated by successive World Health Assembly (WHA) resolutions, namely WHA28.72 'Utilization and supply of human blood and blood products' (4), WHA58.13 'Blood safety: proposal to establish World Blood Donor Day' (5), and WHA63.12 'Availability, safety and quality of blood products' (6). In line with these resolutions, blood and blood products (whole blood, red blood cells, platelets, frozen fresh plasma and plasma-derived medicinal products) were also added to the core list of the WHO Model List of Essential Medicines from 1979 to 2013 (7), and which is still currently valid.

At the regional level, the WHO Regional Committee for the Eastern Mediterranean, in its 63rd session in 2016, adopted resolution EM/RC63/R.5 that endorsed the Regional Strategic Framework for blood safety and availability 2016–2025. The Framework acts as a guide for countries to develop and strengthen national blood systems; improve access to affordable and timely supplies of safe and quality-assured blood and blood products to meet patients' needs; and contributing to achieving UHC (3).

About seven million units of blood are collected annually in the Eastern Mediterranean Region (EMR), with blood donation rates ranging widely among Member States, from 0.7 to 29 units per 1000 population.

Six countries have inadequate supply of blood, with blood donation rates less than 10 units per 1000 population. Only half of the total collection in the Region comes from voluntary, non-remunerated blood donors. Many countries still depend on family/replacement donations, as requested by some healthcare delivery institutions that are short of blood supplies, which compromise safety and sustainability of blood supply. Moreover, the quality and effectiveness of screening tools for detection of transfusion-transmitted infections, covering known and newly emerging pathogens, remain a concern. In addition, the majority of patients with blood, bone marrow disorders and immune deficiency conditions do not have access to life-saving plasma-derived medicinal products, which are often imported at huge cost to governments (8). Out of pocket payments and insufficient public financing of blood and blood products are also main barriers to access in most EMR Member States (9).

At the national level, blood systems are in place in all EMR Member States and have a vital role to play in the delivery on UHC. However, despite previous efforts, inadequate attention has been given to address challenges in meeting the increasing clinical needs of patients for blood and blood products through the establishment of an appropriately regulated, effective national blood supply and transfusion service, as part of the national health system. In some countries, the development of blood systems has been largely restricted to major cities and access is still not guaranteed for those in most critical need for these products.

In January 2016, the global development community committed to the 2030 Agenda for Sustainable Development Goals (SDGs). Those health targets for SDG 3 that pertain to blood and blood products challenge governments and partners to achieve UHC, reduce the global maternal mortality, end preventable deaths of newborns and children under 5 years of age, and end the epidemics of AIDS and hepatitis (10). The increasing global attention on the SDGs and the set targets provide much needed impetus to focus on proven interventions to achieve UHC and other health targets for SDG 3. These cannot be ensured without significant investment in access to affordable and quality assured blood and blood

products.

Ministries of health are responsible for meeting the clinical needs of patients for blood and blood products. These responsibilities include ensuring the quality, safety, availability and equitable distribution of these products through the establishment of an appropriately regulated and effectively managed national blood supply and transfusion services, with financial protection. This requires identifying gaps through in-depth analysis of factors affecting access to affordable and timely supplies of safe and quality-assured blood and blood products and implementing evidence-based interventions, in line with the priority interventions identified in the Regional Strategic Framework for blood safety and availability 2016–2025 (3).

The five priority interventions guiding countries to address gaps in the blood regulatory, supply and transfusion systems are, leadership and governance of

the blood system; strategic partnerships and collaboration between concerned partners (blood donor organizations, patients' associations, academic institutions, among others); provision of safe blood and blood products; appropriate and evidence-based use of safe blood, blood products and patient blood management; and quality system management throughout the blood transfusion chain (3).

In conclusion, national governments and relevant partners must provide the necessary financial resources to address gaps in the blood regulatory, supply and transfusion systems. This is imperative in order to improve supply of blood and blood products that comply with quality standards, as well as ensure good practices from the vein of the blood donor to the vein of the patient (vein-to-vein). Member States need to make the long-term investments and structural changes required to build stronger national blood systems that can contribute towards meeting UHC and SDG commitments.

## References

1. World Health Organization. World Health Day 2018: universal health coverage: everyone, everywhere. Geneva: World Health Organization; 2018 (<http://www.emro.who.int/media/news/world-health-day-2018-universal-health-coverage-everyone-everywhere.html>).
2. World Health Organization. Draft thirteenth general programme of work 2023–2019. Geneva: World Health Organization; 2018 ([http://apps.who.int/gb/ebwha/pdf\\_files/EB142/B3\\_142Rev-2en.pdf](http://apps.who.int/gb/ebwha/pdf_files/EB142/B3_142Rev-2en.pdf)).
3. World Health Organization Regional Office for the Eastern Mediterranean (EMRO). Strategic framework for blood safety and availability 2025–2016. Cairo: EMRO; 2017 ([http://applications.emro.who.int/dsaf/EMROPub\\_2017\\_EN\\_19608.pdf?ua=1](http://applications.emro.who.int/dsaf/EMROPub_2017_EN_19608.pdf?ua=1)).
4. World Health Organization. WHA28.72. Utilization and supply of human blood and blood products. Geneva: World Health Organization; 1975 (<http://www.who.int/bloodsafety/en/WHA28.72.pdf>).
5. World Health Organization. WHA58.13. Blood safety: proposal to establish World Blood Donor Day. Geneva: World Health Organization; 2005 ([http://apps.who.int/iris/bitstream/handle/20363/10665/WHA-13\\_58en.pdf?sequence=1](http://apps.who.int/iris/bitstream/handle/20363/10665/WHA-13_58en.pdf?sequence=1)).
6. World Health Organization. WHA63.12. Availability, safety and quality of blood products. Geneva: World Health Organization; 2010 ([http://apps.who.int/gb/ebwha/pdf\\_files/WHA63/A63\\_R-12en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA63/A63_R-12en.pdf)).
7. World Health Organization. WHO Model Lists of Essential Medicines. Geneva: World Health Organization; 2017 (<http://www.who.int/medicines/publications/essentialmedicines/en/>).
8. World Health Organization Regional Office for the Eastern Mediterranean (EMRO). Regional Status Report on Blood Safety and Availability 2016. Cairo: EMRO; 2017 ([http://applications.emro.who.int/docs/EMROPub\\_2017\\_EN\\_18907.pdf?ua=1](http://applications.emro.who.int/docs/EMROPub_2017_EN_18907.pdf?ua=1)).
9. World Health Organization Regional Office for the Eastern Mediterranean (EMRO). Framework for action on advancing universal health coverage in the Eastern Mediterranean Region. Cairo: EMRO; 2016 ([http://applications.emro.who.int/docs/Technical\\_Notes\\_EN\\_16287.pdf](http://applications.emro.who.int/docs/Technical_Notes_EN_16287.pdf)).
10. United Nations. Sustainable Development Goals. New York: United Nations; 2015. (<https://sustainabledevelopment.un.org/?menu=1300>).

# Adherence to antiretroviral therapy in HIV-positive, male intravenous drug users in Pakistan

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## Abstract

**Background:** Human immunodeficiency virus (HIV) is fifth leading cause of mortality and disability among infectious diseases worldwide. HIV burden is increasing annually and compliance with antiretroviral therapy (ART) is low among intravenous drug users, especially in developing countries.

**Aim:** To determine the adherence level to ART among HIV-positive intravenous drug users in Karachi Pakistan.

**Methods:** A cross-sectional study was conducted in 2015. A pretested questionnaire was administered to 375 of 3000 people who inject drugs, registered at the Civil Hospital in Karachi, Pakistan.

**Results:** The mean age was 30 years, 181 were married, 179 were illiterate and 287 had income < 5000 rupees per month. Only 63 patients were adherent to ART and 343 were alcoholics. Nonadherence was greater in patients who were single and did not have children. The most common reason for missing ART was that they simply forgot to take the tablets.

**Conclusion:** We conclude that adherence to ART among intravenous drug users was low. Family cohesion and support were essential to maintain adherence to ART.

Keywords: HIV, ART adherence, IV drug users, Patient who use drugs (PWIDs), Nation AIDS Control Program

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## Introduction

People who inject drugs (PWIDs) are at high risk of human immunodeficiency virus (HIV) infection. It was estimated in 2016 that there were 11.7 million PWIDs worldwide, and 14% of them were infected with HIV (1). Approximately 78% of HIV-positive PWIDs were living in low- and middle-income countries. The burden of HIV among PWIDs is 3.4 million in Eastern Europe and Central Asia; 3.3 million in South Asia and Southeast Asia; and 2.3 million in East Asia and the Pacific Region (2). The overall global prevalence of HIV among PWIDs ranges between 20 and 40% (3). Mortality among HIV-positive PWIDs is higher than among HIV patients who do not inject drugs (4).

In Pakistan, the prevalence of HIV was < 0.1% in 2001 and it had increased to 0.2% in 2012 (5). The number of patients registered with HIV infection was 130 000; of whom, 8900 were receiving antiretroviral therapy (ART) in 2016 (6). According to the Pakistan Global Aids Response Progress Report, prevalence of HIV among PWIDs increased from 10.8% in 2005 to 37.8% in 2011 (7).

HIV medication adherence is a vital component in viral suppression and decreasing the risk of developing drug resistance. It has been demonstrated that 95% adherence is necessary to maintain viral suppression and halt disease progression (8). An international systematic review of several studies from 7 countries revealed that adherence levels were 33–97% (9). The cumulative

adherence to ART was 70–89% among HIV patients who were receiving health services from Johns Hopkins AIDS Service Center (10). A study from India found that 73% and 77% of HIV patients were > 95% and > 90% adherent, respectively (11).

Active drug use has been associated with poor ART adherence. There are several factors, including sociodemographics, psychosocial factors, patients' experience during treatment, treatment-related issues (regimen, pill burden, dosing frequency, dietary instructions and adverse effects) and opioid substitution treatment (12,13). A cohort study found that lack of stable relationships, depression, and drug injection were strong predictors of adherence failure (14).

Noncompliance with ART among HIV-positive patients is a major issue in Central Asia and Eastern Europe, and the situation is worst among HIV-positive PWIDs (15). Achievement of uniformity in prevention and treatment in PWIDs remains a challenge for healthcare systems and policy makers. The identification of predictors of adherence among PWIDs is crucial for healthcare providers and communities in Pakistan. There has been a lack of research on this important aspect of adherence to ART in HIV-positive patients, and especially among PWIDs in Pakistan. The objective of the present study was to determine the adherence level of ART among HIV-positive intravenous drug users in Karachi, Pakistan.

## Methods

A cross-sectional study was conducted from January to June 2015 at the ART Unit of the Civil Hospital, Karachi. Approximately 3000 HIV-positive PWIDs are currently enrolled at the unit and its outpatient clinic caters for > 50 patients daily. About 375 HIV-positive patients aged  $\geq 18$  years, who had injected drugs at least once in the previous 12 months, were included in the study through purposive sampling after obtaining informed consent. Patients who had multiorgan failure or other complications were excluded. The sample size of 375 was calculated using the World Health Organization (WHO) Calculator software; the frequency of ART adherence was taken as 40% with 95% confidence interval and 5% margin of error. The study was approved by the Research Committee of Dow University of Health Sciences, Karachi, Pakistan, and written permission was obtained from the Sind AIDS Control Program Director. Full confidentiality and privacy were maintained throughout the study.

Information regarding sociodemographics, psychosocial factors and adherence to treatment was obtained using a pretested questionnaire that was adapted from AIDS Control Trial Group (ACTG) Adherence Baseline Questionnaire (16). Adherence to ART was a dependent variable, while sociodemographics and psychosocial factors such as age, marital status, education, monthly income, alcohol dependency and history of unsafe sex practices were independent variables. Patients who missed  $\leq 3$  doses during the previous month were considered to be the > 95% adherence group (adherent group). However, those who missed > 3 doses were considered to be the < 95% adherence group (nonadherent group).

Data were entered and analysed using SPSS version 21.0. Mean and standard deviation (SD) were calculated

for the quantitative data. Frequencies and percentages were calculated for categorical data. Univariate analysis was performed to determine the association between dependent and independent variables, and variables with  $P < 0.10$  were further analysed by multiple logistic regression model. In multiple logistic regression analysis, variables with  $P < 0.05$  were considered significant.

## Results

### Sociodemographic characteristics

Mean age of the respondents was 30.32 (SD, 9.59) years (Table 1). Most of the participants were aged 18–30 years (192, 51.2%) and had a monthly income < 5000 Pakistani rupees (287, 76.5%).

### Adherence to ART among HIV-positive patients

Seventy (18.7%) participants missed up to 3 doses during the past month and were classified as the adherent group, and 305 (81.3%) participants missed > 3 doses of ART during the last month and were classified as the nonadherent group.

### Reasons for missing ART

Three hundred and sixty (96%) respondents reported that they simply forgot to take their medication; 338 (90.2%) missed ART due to lack of family support; 145 (38.6%) missed ART to avoid the adverse effects; and 58 (15.5%) missed ART for other reasons, including feeling that they had too many pills, and feeling sick after taking ART. All patients reported that they never ran out of pills.

### Factors associated with adherence to ART

Seventy patients were adherent to ART: 51 (72.9%) were aged > 40 years; 47 (67.1%) were married; 51 (72.9%) had monthly income < 5000 rupees; 49 (5.7%) reported having intercourse with an HIV-positive man in the past month; 6 (8.6%) reported having intercourse with an HIV-positive women in the past month; and 11 (15.7%) had full family support for treatment and medication (Table 2). In univariate analysis HIV patients who were aged > 40 years, were married, had children and had full family support in taking ART had higher odds of being adherent to ART compared to those who were single, were aged < 40 years, did not have children and did not have complete family support. In multiple logistic regression patients who forgot to take ART > 3 times during the last month were significantly nonadherent to ART while age, marital status, education, income, number of children and family support did not show significant association with adherence to ART.

## Discussion

We found low adherence to ART among HIV patients who were injectable drug users. Seventy (18.7%) of the study participants had missed ART > 3 times during the previous month. Most of the patients simply forgot to take ART.

In this study, adherence to ART was alarmingly low. Similar results have been reported in studies from

**Table 1** Distribution of sociodemographic characteristics among HIV-positive PWIDs (n = 375)

Sociodemographic characteristics	Frequency	Percentage
<b>Age (yr)</b>		
18–30	192	51.2
31–40	112	29.8
> 40	71	19
<b>Marital status</b>		
Single	175	46.7
Married	181	48.3
Divorced	19	5.1
<b>Educational attainment</b>		
Illiterate	179	47.7
5 yr	113	30.1
10 yr	64	17.1
> 10 yr	19	5.1
<b>Monthly income (rupees)</b>		
< 5000	287	76.5
5000–10 000	69	18.4
11 000–15 000	18	4.8
> 15 000	1	0.2

HIV = human immunodeficiency virus; PWIDs = people who inject drugs.



**Table 2** Factors associated with adherence to ART drugs among study participants

Variables	Frequency n = 375	Adherent n = 70	Nonadherent n = 305	Univariate analysis		Multiple logistic regression	
				COR (95% CI)	P	AOR (95% CI)	P
<b>Age (yr)</b>							
> 40	71 (18.9%)	19 (27.1%)	52 (17%)	1.813 (0.989–3.321)	0.054	1.606 (0.849–3.037)	0.967
< 40	304 (81.1%)	51 (72.9%)	253 (83%)	Ref			
<b>Marital status</b>							
Single	175 (46.6%)	23 (32.9%)	152 (49.8%)	2.030 (1.175–3.508)	0.010	1.862 (0.829–4.181)	0.145
Married	200 (53.4%)	47 (67.1%)	153 (50.2%)	Ref			
<b>Educational attainment (yr)</b>							
< 5	292 (77.9%)	53 (75.7%)	239 (78.3%)	1.162 (0.631–2.139)	0.631	–	
> 5	83 (22.1%)	17 (24.3%)	66 (17.7%)	Ref			
<b>Total monthly income in Pakistani rupees</b>							
<5000	287 (76.5%)	51 (72.9%)	236 (77.4%)	1.274 (0.706–2.301)	0.421	–	
> 5000	88 (23.5%)	19 (27.1%)	69 (22.6%)	Ref			
<b>Have children</b>							
Yes	182 (48.5%)	29 (41.4%)	164 (53.8%)	1.644 (0.972–2.783)	0.064	1.862 (0.829–4.18)	0.132
No	193 (51.4%)	41 (58.6%)	141 (46.2%)	Ref			
<b>Family supports treatment</b>							
Yes	37 (9.8%)	11 (15.7%)	26 (8.5%)	2.001 (0.937–4.273)	0.069	1.486 (0.633–3.487)	0.363
No	338 (90.2%)	59 (84.3%)	279 (91.5%)	Ref			
<b>Had intercourse with HIV-positive man during last month</b>							
Yes	16 (4.3%)	49 (5.7%)	12 (3.9%)	0.676 (0.211–2.161)	0.506	–	
No	359 (95.7%)	66 (94.3%)	293 (96.1%)	Ref			
<b>Had intercourse with HIV-positive woman during last month</b>							
Yes	30 (8.5%)	6 (8.6%)	279 (92.1%)	0.918 (0.360–2.337)	0.851	–	
No	343 (91.5%)	64 (91.4%)	24 (7.9%)	Ref			
<b>Forgot to take medication during last month &gt; 3 times</b>							
Yes	360 (96%)	63 (90%)	297 (93.4%)	4.125 (1.443–11.79)	0.005	3.46 (1.086–11.04)	0.036
No	15 (4%)	7 (10%)	8 (2.6%)	Ref			

AOR = adjusted odds ratio; ART = antiretroviral therapy; CI = confidence interval; COR = crude odds ratio; HIV = human immunodeficiency virus; Ref = reference value.

Rwanda (17) and Hanoi (18) in which adherence to ART was significantly lower among PWIDs. This low level of adherence is lower than that in other developing countries such as India (19) and Thailand (20). A study conducted in California reported that 11% of the patients missed 1 dose of ART prior to the day of interview, and the most common reason for missing ART was that they simply forgot (21), which is consistent with the finding of our study. Studies from Canada and United States of America (USA) reported that PWIDs who were on opioid substitution showed improved adherence to ART (22, 23). The low adherence in our study can be attributed to poor utilization of healthcare facilities or lack of new strategies such as opioid substitution therapy or directly assisted ART.

Our univariate model showed that HIV-positive PWIDs who were married and had children were more likely to be adherent to ART. However, these factors remained insignificant in our multivariate model. A previous review has shown that adequate support services for PWIDs are the most important factor in ART adherence (24). A previous meta-analysis has indicated that social support and family coherence are

important for healthcare utilization and conduciveness and adherence to ART among HIV patients (25). These findings highlight the importance of family support in treatment and adherence to ART. HIV patients who are living with their families receive better moral, emotional and financial support, which helps them to be more adherent to ART. It is noteworthy that family relationships are a strong predictor for better adherence to ART, hence family involvement is needed throughout the medication process. Low levels of family support can be attributed to stigmatization of HIV and PWIDs in our society.

A study conducted in Taiwan reported that PWIDs who were illiterate and of low socioeconomic status were less adherent to ART (26). In contrast, we did not report a significant association of education and income with adherence to ART, which could be because most of the patients were illiterate and had low income. Similar findings have been reported from other studies conducted in Columbia and India (27,28). Education has a positive impact on ART adherence by facilitating communication with healthcare providers. Low literacy rate is a major obstacle to taking ART correctly. Another study conducted in Nepal reported that literate patients

were more adherent to ART compared to illiterate patients, which shows that education plays a significant role in adherence to ART (29). It was further observed that knowledge, expectation and belief of participants regarding ART depend on health education and awareness. Another study from India did not find any significant association between literacy and adherence to ART, and it was reported that psychosocial factors influence adherence to ART (30).

We found that most of the respondents missed ART during last month and the most common reason was that they simply forgot to take their medication, and no patients ran out of pills. In contrast, in a study from Mississippi, USA, in which most of the patients missed ART over the last 3 days, the major reason was running out of pills (31). Another study conducted in Uganda showed that similar numbers of participants forgot to take their medication, ran out of pills and felt sick after taking medication (32). Another study from Uganda suggested that willingness for treatment and compliance were major factors affecting adherence to ART (33). In contrast to our findings, a study from Tanzania showed

that major barriers to adherence were the religious festivals of Ramadan among Muslims and Teej among Hindus, and fasting made it difficult to take ART (34).

There were several limitations to our study. First, this was a cross-sectional study, so a temporal association between the independent variables and outcome could not be established. Second, we relied on self-reports for adherence so the results may have been subject to reporting bias.

In conclusion, this study showed that adherence to ART among HIV-positive PWIDs was alarmingly low. Forgetting to take medication was the most common reason for nonadherence to ART. Measures should be taken to provide social support and acceptance of HIV-positive PWIDs in their families and society to make ART programmes successful. Further interventional studies are recommended to integrate opioid substitution therapy and directly observed therapy for PWIDs, which may improve adherence to ART. It is further recommended that an e-reminder network system can be developed that could help patients to remember their medication timing.

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**Competing interests:** None declared.

## Observance du traitement antirétroviral chez les consommateurs de drogue par voie intraveineuse séropositifs au VIH au Pakistan

### Résumé

**Contexte :** L'infection par le virus de l'immunodéficience humaine (VIH) est la cinquième cause principale de mortalité et d'incapacité dues à des maladies infectieuses dans le monde entier. La charge de VIH augmente chaque année et l'observance du traitement antirétroviral (TAR) est faible chez les consommateurs de drogues par voie intraveineuse, en particulier dans les pays en développement.

**Objectif :** Déterminer le niveau d'observance du TAR chez les consommateurs de drogue par voie intraveineuse séropositifs au VIH à Karachi (Pakistan)

**Méthodes :** Une étude transversale a été conduite en 2015. Un questionnaire préalablement testé a été administré à 375 des 3000 consommateurs de drogues par injection enregistrés au *Civil Hospital* de Karachi (Pakistan).

**Résultats :** L'âge moyen était 30 ans, 181 étaient mariés, 179 étaient analphabètes et 287 avaient des revenus inférieurs à 5000 roupies par mois. Seuls 63 patients observaient leur traitement antirétroviral et 343 étaient alcooliques. La non-observance était supérieure chez les patients célibataires et sans enfants. La raison la plus courante justifiant le fait de ne pas prendre le TAR était tout simplement l'oubli de la prise des comprimés.

**Conclusion :** Nous concluons que l'observance du TAR chez les consommateurs de drogues par voie intraveineuse est faible. La cohésion familiale et le soutien des proches sont essentiels pour maintenir l'observance du TAR.

### الالتزام بالعلاج المضاد للفيروسات القهقرية في صفوف الذكور المصابين بفيروس العوز المناعي البشري المتعاطين للمخدرات باستخدام الحقن في باكستان

بخت علي، نغمت نثار، فريال نواب

#### الخلاصة

**الخلفية:** يمثل فيروس العوز المناعي البشري خامس سبب رئيسي للوفيات والإعاقة من بين الأمراض المعدية في جميع أنحاء العالم. ويتزايد عبء فيروس العوز المناعي البشري سنوياً مع انخفاض مستوى الالتزام بالعلاج المضاد للفيروسات القهقرية في صفوف متعاطي المخدرات بالحقن، لا سيما في البلدان النامية.

**الهدف:** تحديد مستوى الالتزام بالعلاج المضاد للفيروسات القهقرية في صفوف متعاطي المخدرات بالحقن المصابين بفيروس العوز المناعي البشري في كراتشي بباكستان.

طرق البحث: أُجريت دراسة مقطعية في عام ٢٠١٥. وإستُخدم استبيان مجرّب مسبقاً لاستجواب ٣٧٥ شخصاً من أصل ٣٠٠٠ شخص يتعاطون المخدرات بالحقن، ومسجّلين في المستشفى المدني في كراتشي بباكستان.

النتائج: وجد أن الالتزام بالعلاج المضاد للفيروسات القهقرية بين متعاطي المخدرات بالحقن الوريدي كان منخفضاً، والتزم ٦٣ مريضاً فقط من أصل ٣٧٥ مريضاً بالعلاج. وكانت غالبية المرضى (٣٤٣ مريضاً) من المدمنين على الكحوليات. وتبين أن المرضى غير المتزوجين وليس لديهم أطفال كانوا أقل التزاماً بتناول العلاج بسبب افتقارهم إلى الدعم الأسري، وذلك بالمقارنة مع المرضى المتزوجين ولديهم أطفال. وكان نسيان تناول الأقراص هو السبب الأكثر شيوعاً لعدم الالتزام بالعلاج المضاد للفيروسات القهقرية.

الاستنتاج: توصلنا إلى استنتاج مفاده انخفاض مستوى الالتزام بالعلاج المضاد للفيروسات القهقرية بين متعاطي المخدرات بالحقن. ويعد التماسك والدعم الأسري عاملين أساسيين للاستمرار في الالتزام بالعلاج بالأدوية المضادة للفيروسات القهقرية.

## References

1. Harm Reduction International. Global state of harm reduction; 2016 (<http://www.hri.global>, accessed 15 November 2017).
2. Preventing HIV among drug users. Global AIDS update 2016 (<http://www.unaids.org/en/targetsandcommitments/preventinghivamongdrugusers>, accessed September 2016)
3. Glass TR, De Geest S, Weber R, Vernazza PL, Rickenbach M, Furrer H, et al. Correlates of self-reported nonadherence to antiretroviral therapy in HIV-infected patients: the Swiss HIV Cohort Study. *J Acquir Immune Defic Syndr*. 2006 Mar;41(3):385–92. PMID:16540942
4. Spiller MW, Wejnert C, Nerlander L, Paz-Bailey G; Centers for Disease Control and Prevention. HIV infection and HIV associated behaviors among persons who inject drugs – 20 cities, United States, 2012. *MMWR Morb Mortal Wkly Rep*. 2015 Mar 20;64(10):270–5. PMID:25789742
5. Bergenstrom A, Achakzai B, Furqan S, ulHaq M, Khan R, Saba M. Drug-related HIV epidemic in Pakistan: a review of current situation and response and the way forward beyond 2015. *Harm Reduct J*. 2015;12(1):1. PMID:25789742
6. HIV and AIDS Estimates. Country fact sheet Pakistan 2016 (<http://www.unaids.org/en/regionscountries/countries/pakistan>, accessed 15 November 2017).
7. Pakistan Global AIDS Response Progress Report (GARPR) 2015. Country Progress Report Pakistan. Islamabad: National AIDS Control Program; 2015 ([http://www.unaids.org/sites/default/files/country/documents/PAK\\_narrative\\_report\\_2015.pdf](http://www.unaids.org/sites/default/files/country/documents/PAK_narrative_report_2015.pdf), accessed 30 October 2017).
8. Kim SH, Gerver SM, Fidler S, Ward H. Adherence to antiretroviral therapy in adolescents living with HIV: systematic review and meta-analysis. *AIDS*. 2014 Aug 24;28(13):1945–56. PMID:24845154
9. Feelemyer J, Des Jarlais D, Arasteh K, Uusküla A. Adherence to antiretroviral medications among persons who inject drugs in transitional, low and middle income countries: an international systematic review. *AIDS Behav*. 2015 Apr;19(4):575–83. PMID:25331268
10. Murphy DA, Belzer M, Durako SJ, Sarr M, Wilson CM, Muenz LR. Longitudinal antiretroviral adherence among adolescents infected with human immunodeficiency virus. *Arch Pediatr Adolesc Med*. 2005 Aug;159(8):764–70. PMID:16061785
11. Pahari S, Roy S, Mandal A, Kuila S, Panda S. Adherence to anti-retroviral therapy & factors associated with it: a community based cross-sectional study from West Bengal, India. *Indian J Med Res*. 2015 Sep;142(3):301–10. PMID:26458346
12. Dutta A, Wirtz AL, Baral S, Beyrer C, Cleghorn FR. Key harm reduction interventions and their impact on the reduction of risky behavior and HIV incidence among people who inject drugs in low-income and middle-income countries. *Curr Opin HIV AIDS*. 2012 Jul;7(4):362–8. PMID:22647588
13. Protopopescu C, Raffi F, Roux P, Reynes J, Dellamonica P, Spire B, et al. Factors associated with non-adherence to long-term highly active antiretroviral therapy: a 10 year follow-up analysis with correction for the bias induced by missing data. *J Antimicrob Chemother*. 2009 Sep;64(3):599–606. PMID:19602563
14. Malta M, Magnanini MM, Strathdee SA, Bastos FI. Adherence to antiretroviral therapy among HIV-infected drug users: a meta-analysis. *AIDS Behav*. 2010 Aug;14(4):731–47. PMID:19020970
15. Jolley E, Rhodes T, Platt L, Hope V, Latypov A, Donoghoe M, et al. HIV among people who inject drugs in Central and Eastern Europe and Central Asia: a systematic review with implications for policy. *BMJ Open*. 2012 Oct 18;2(5):e001465. PMID:23087014
16. AIDS Clinical Trial Group (ACTG). Adherence baseline questionnaire. (<http://caps.ucsf.edu/uploads/tools/surveys/pdf/2098.4186.pdf>, accessed 30 October 2017).
17. Au JT, Kayitenkore K, Shutes E, Karita E, Peters PJ, Tichacek A, et al. Access to adequate nutrition is a major potential obstacle to antiretroviral adherence among HIV-infected individuals in Rwanda. *AIDS*. 2006 Oct 24;20(16):2116–8. PMID:17053359
18. Izenberg JM, Bachireddy C, Soule M, Kiriazova T, Dvoryak S, Altice FL. High rates of police detention among recently released HIV-infected prisoners in Ukraine: implications for health outcomes. *Drug Alcohol Depend*. 2013 Nov 1;133(1):154–60. PMID:23769160
19. Mhaskar R, Alandikar V, Emmanuel P, Djulbegovic B, Patel S, Patel A, et al. Adherence to antiretroviral therapy in India: a systematic review and meta-analysis. *Indian J Community Med*. 2013 Apr;38(2):74–82. PMID:23878418

20. Li L, Lee S-J, Wen Y, Lin C, Wan D, Jiraphongsa C. Antiretroviral therapy adherence among patients living with HIV/AIDS in Thailand. *Nurs Health Sci.* 2010 Jun;12(2):212–20. PMID:20602694
21. Chesney MA, Ickovics JR, Chambers DB, Gifford AL, Neidig J, Zwickl B, et al. Self-reported adherence to antiretroviral medications among participants in HIV clinical trials: the AACTG adherence instruments. *AIDS Care.* 2000 Jun;12(3):255–66. PMID:10928201
22. Günthard HF, Aberg JA, Eron JJ, Hoy JF, Teienti A, Benson CA, et al. Antiretroviral treatment of adult HIV infection: 2014 recommendations of the International Antiviral Society-USA Panel. *JAMA.* 2014 Jul 23-30;312(4):410–25. PMID:25038359
23. Joseph B, Wood E, Hayashi K, Kerr T, Barrios R, Parashar S, et al. Factors associated with initiation of antiretroviral therapy among HIV-positive people who use injection drugs in a Canadian setting. *AIDS.* 2016 Mar 27;30(6):925–32. PMID:26636927
24. Wasti SP, van Teijlingen E, Simkhada P, Randall J, Baxter S, Kirkpatrick P, et al. Factors influencing adherence to antiretroviral treatment in Asian developing countries: a systematic review. *Trop Med Int Health.* 2012 Jan;17(1):71–81. PMID:21967241
25. Roux P, Kouanfack C, Cohen J, Marcellin F, Boyer S, Delaporte E, et al. Adherence to antiretroviral treatment in HIV-positive patients in the Cameroon context: promoting the use of medication reminder methods. *J Acquir Immune Defic Syndr.* 2011 Jul 1;57(1) Suppl 1:S40–3. PMID:21857285
26. Yen Y-F, Yen M-Y, Lin T, Li L-H, Jiang X-R, Chou P, et al. Prevalence and factors associated with HIV infection among injection drug users at methadone clinics in Taipei, Taiwan. *BMC Public Health.* 2014 Jul 4;14:682–5. PMID:24996558
27. Gonzalez A, Mimiaga MJ, Israel J, Andres Bedoya C, Safren SA. Substance use predictors of poor medication adherence: the role of substance use coping among HIV-infected patients in opioid dependence treatment. *AIDS Behav.* 2013 Jan;17(1):168–73. PMID:23008124
28. Cohn SE, Jiang H, McCutchan JA, Koletar SL, Murphy RL, Robertson KR, et al. Association of ongoing drug and alcohol use with non-adherence to antiretroviral therapy and higher risk of AIDS and death: results from ACTG 362. *AIDS Care.* 2011 Jun;23(6):775–85. PMID:21293986
29. Shah B, Walshe L, Saple DG, Mehta SH, Ramnani JP, Kharkar RD, et al. Adherence to antiretroviral therapy and virologic suppression among HIV-infected persons receiving care in private clinics in Mumbai, India. *Clin Infect Dis.* 2007 May 1;44(9):1235–44. PMID:17407045
30. Anuradha S, Joshi A, Negi M, Nischal N, Rajeshwari K, Dewan R. Factors influencing adherence to ART: new insights from a center providing free ART under the national program in Delhi, India. *J Int Assoc Provid AIDS Care.* 2013 May-Jun;12(3):195–201. PMID:22247335
31. Amico KR, Konkle-Parker DJ, Cornman DH, Barta WD, Ferrer R, Norton WE, et al. Reasons for ART non-adherence in the Deep South: adherence needs of a sample of HIV-positive patients in Mississippi. *AIDS Care.* 2007 Nov;19(10):1210–8. PMID:18071964
32. Shumba C, Atuhaire L, Imakit R, Atukunda R, Memiah P. Missed doses and missed appointments: adherence to ART among adult patients in Uganda. *ISRN AIDS.* 2013 Jan 14;2013:270914. PMID:24052886
33. Kamarulzaman A, Altice FL. Challenges in managing HIV in people who use drugs. *Curr Opin Infect Dis.* 2015 Feb;28(1):10–6. PMID:25490106
34. Tomori C, Kennedy CE, Brahmhatt H, Wagman JA, Mbwambo JK, Likindikoki S, et al. Barriers and facilitators of retention in HIV care and treatment services in Iringa, Tanzania: the importance of socioeconomic and sociocultural factors. *AIDS Care.* 2014;26(7):907–13. PMID:24279762

# Health needs and priorities of Syrian refugees in camps and urban settings in Jordan: perspectives of refugees and health care providers

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## Abstract

**Background:** The United Nations has declared the Syrian refugee crisis to be the biggest humanitarian emergency of our era. Neighbouring countries, such as Jordan, strain to meet the health needs of Syrian refugees in addition to their own citizens given limited resources.

**Objectives:** This study aimed to determine the perspectives of Syrian refugees in Jordan, Jordanian health care providers and other stakeholders in addressing the public health issues of the refugee crisis.

**Methods:** Qualitative and quantitative methodologies were used to explore Syrian refugee health needs and services in camp and urban settings in Jordan. Focus group discussions and key informant interviews were used to identify needs, challenges and potential solutions to providing quality health care to refugees. By-person factor analysis divided refugee participants into 4 unique respondent types and compared priorities for interventions.

**Results:** Focus group discussions and key informant interviews revealed a many different problems. Cost, limited resources, changing policies, livelihoods and poor health literacy impeded delivery of public and clinical health services. Respondent Type 1 emphasized the importance of policy changes to improve Syrian refugee health. Type 2 highlighted access to fresh foods and recreational activities for children. For Type 3, poor quality drinking-water was the primary concern, and Type 4 believed the lack of good, free education for Syrian children exacerbated their mental health problems.

**Conclusions:** Syrian refugees identified cost as the main barrier to health care access. Both refugees and health care providers emphasized the importance of directing more resources to chronic diseases and mental health.

Keywords: Refugee Health, Health Care Services, Syria, Jordan, Syrian Refugees

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## Introduction

The United Nations has declared the Syrian crisis to be the worst refugee crisis since the Second World War (1). The vast majority of displaced Syrians, some 5 million people, live in Jordan, Lebanon, and Turkey, whose economies and social safety nets strain to serve a growing refugee population, in addition to their own citizens.

According to the Jordanian government, Jordan currently hosts 1 million Syrian refugees, the vast majority of whom live on less than US\$ 2 a day (2). Jordan offers free universal health coverage to its citizens, which was available to Syrian refugees until 2014. Between 2012 and 2013, the number of physicians per 10 000 people in Jordan declined from 27.1 to 20.2, due to the influx of 600 000 Syrian refugees (3). Citing untenable health care costs, the Jordanian Ministry of Health ended full coverage of health care for Syrian refugees in September 2014 (4). The United Nations High Commissioner for Refugees (UNHCR) now covers 100% of the cost of primary and secondary health services for refugees who are referred from camps. However, 80% of Syrian refugees live in

urban areas of Jordan (5) and must now pay foreigner's fee at government clinics (6). According to UNHCR, mean monthly household out-of-pocket health care spending for Syrian refugees was approximately US\$ 80 in 2014, a large sum for an average Syrian family with a monthly household income of US\$ 322 (7). Refugees living outside of camps are more vulnerable to these costs, as only a few hospitals and clinics offer subsidized services for Syrian refugees in urban settings.

Research has focused on isolated issues that have affected the health of Syrian refugees in neighbouring countries, such as health service access and utilization (8,9), the prevalence of chronic conditions among certain refugee age groups (10), the prevalence of infectious diseases among refugees, and the psychosocial and mental health care shortcomings. However, research on how refugees prioritize these issues that affect their health is scarce.

Little is known about the perspectives of Syrian refugees themselves, Jordanian health care providers and other important stakeholders, such as policy-makers and aid workers, when it comes to addressing the

growing clinical and public health burden. This will be critical in refining programmes to serve the displaced Syrian population now and in years to come. This study introduces the unheard voices of both refugees and the host population to delineate health needs and prioritize allocation of health care spending 5 years after the start of the Syrian conflict.

## Methods

This study used a mixed-methods approach to identify the needs of Syrian refugees living in camp and community settings in Jordan. A total of 230 Syrian refugees participated in the study. Convenience sampling was used to recruit Syrian refugees and Jordanian health care workers. Key informants and health care providers were recruited from the Jordanian Ministry of Health and UNHCR.

Community development centres in Irbid and Kafrein were used to recruit participants in urban settings because they are located in the areas with the largest concentration of Syrian refugees and serve as gathering places which offer recreational, psychosocial and public health services. Al Zaatari participants were recruited through the public health office at the UNHCR. Data were collected from October to December 2015.

Triangulation of the data was sought by using different data sources (multiple stakeholders) and mixed methodologies. Large focus group discussions were used to identify the leading themes on the topic, followed up with one-on-one key informant interviews to verify that the themes identified matched. The Q-method brought in an additional group of participants to help in the interpretation and prioritization of the qualitative data gathered in the initial interviews.

Focus group discussion were organized and conducted until thematic saturation was reached.

### Key informant interviews and focus group discussions

A total of 8 key informant interviews and 17 focus group discussions were conducted to explore the health needs of Syrian refugees and the barriers facing them in obtaining health care, and to collect a variety of opinions and perceptions for subsequent by-person factor analysis. The average length of interviews was about 45 minutes. Key informant interviews involved key officials in the Jordanian Ministry of Health, the UNHCR main and camp-based offices, Jordan University for Science and Technology School of Medicine and Public Health, and international organizations such as the International Medical Corps.

Focus group participants included: 1) local Jordanian health care providers caring for Syrian refugees in Mafraq and Ramtha, 2) Syrian refugees in camps and 3) Syrian refugees in urban settings. Focus groups with Syrian refugees were stratified by gender, while groups with health care providers were mixed gender.

Interviews and focus groups were led by the primary investigator (TA) and conducted in Arabic (and audio recorded with permission) by the trained study authors using a semi-structured questionnaire (Box 1). Audio recordings were then transcribed into English, and the immersion/crystallization method was used (11). This involved 2 authors who independently read each transcript, while taking notes on emerging themes. Next, the authors met several times as a group to discuss data interpretation, potential biases and application of the findings to refugee health needs.

### By-person factor analysis

By-person factor analysis was used to identify, evaluate and prioritize the views of Syrian refugees living outside refugee camps (12). This method has been successfully used to study perceptions of refugees on health issues in other parts of the world (13). Qualitative and quantitative methods are combined to identify groups called “respondent types” within a study population, to evaluate the degree of agreement among participants and identify conflicting opinions.

We first developed a collection of perceptions regarding the health of Syrian refugees through literature review and using our focus group discussions and key informant interviews. From this, we developed 45 statements representing the spectrum of ideas on the study topic. After refining and reducing these statements through processes of piloting, the final number of Q set statements was 23. Nine participants from Irbid and Kafrein were recruited for the pilot study to confirm

#### Box 1 Guide for focus group discussions (n = 8 interviews)

- What are the main health problems that Syrian refugees suffer from? What are the needs that are not addressed well?
- What are the sources of health care provided to Syrian refugees?
- What do you think of health care provided to Syrian refugees?
- Can you describe the health care provided to Syrian refugees in comparison to care provided for Jordanians?
- What are the strengths of the current Jordanian health care system in responding to the Syrian refugee crisis?
- What are the obstacles to providing health care to Syrian patients?
- What do you think are the solutions to alleviate the impact of the Syrian refugee crisis?
- What are the priorities in the improvement of health care services provided for Syrian refugees?
- What do you think would be the reaction of the health care community (physicians, nurses, administrators) to health care development? And the response of the public and the government?
- What types of training could be offered for the development of the refugee health care system?
- What can the global community do better to help with the Syrian refugee crisis?
- What strategies do you think are working well and what are not?

the accurate representation of the 23 statements. These statements were representative of the original perceptions and views about health needs provided by the members of the key informants interviews and focus groups discussions.

Respondents from community-dwelling Syrian refugees living in Irbid and Kafrein (2 governorates in Jordan with the largest Syrian refugee concentration) were recruited through a community-based organization that offers social activities (skills training, rehabilitation and recreational activities) for Syrian refugees living in the north of Jordan. Informed written consent was obtained from each participant. They were given the list of the 23 statements and asked to sort them into a semi-Gaussian, Q-sort grid, with the instruction, "Please sort these statements with respect to your opinion of the current health situation of Syrian refugees in Jordan." Each respondent ranked each of the 23 statements from -3 (strong disagreement) to +3 (strong agreement) and wrote each statement's corresponding number in an empty box in the grid.

Factor analysis was then done by the investigators on all completed grids, followed by automatic factor rotation using *PQMethod* 2.35 (14). To define and characterize the respondent types, all respondents who loaded heavily on a respondent type (> 50% concordance) were selected as respondent "loaders." The respondents who loaded heavily and specifically on a single respondent type (i.e. > 50% concordance on only a distinguishing position in a given factor) were designated respondent "definers" and examined carefully to characterize each respondent type. Individuals of the same respondent type expressed similar ideas that most of the data were converged around.

### Ethical considerations

The study was approved by the Institutional Review Board of Partners HealthCare (Massachusetts General Hospital, Boston, USA) and the Jordanian Ministry of Health. In addition, UNHCR granted approval for qualitative studies conducted in the refugee camps.

Confidentiality was protected through using study codes, encryption of identifiable data, limiting access to data to only the study team and securely storing data.

## Results

### Discussions with health care providers and key informants

Four focus group discussions, 2 in Irbid/Ramtha ( $n = 40$ ) and 2 in Marfaq ( $n = 40$ ), and 4 key-informant interviews were conducted with health care providers, including physicians, nurses, and clinical social workers. The results from the focus group discussions with health care providers are presented in Table 1.

According to the health care providers and key informants, Syrian refugees primarily seek health care for acute conditions, including respiratory illness, fever, diarrhoea and injuries. Providers noted that the

primary reason for reduced access to perinatal care was the lack of female physicians. Chronic conditions were common among older adults, including hypertension, cardiovascular disease, diabetes, chronic respiratory disease, arthritis and cataracts. Both key informants and health care providers identified cardiovascular disease as the main cause of mortality, and high rates of smoking were noted.

Jordanian health care providers caring for Syrian refugees reported feeling overworked, and were struggling to care for the growing numbers of Syrian refugee patients in understaffed and under-resourced clinics. These challenges contributed to staff burn-out. Providers also indicated that Syrian refugees preferred injections to oral medications and often questioned the quality of care received if a physician did not prescribe an injection.

### Syrian refugees living in established refugee camps

Four focus group discussions were conducted with Syrian refugees in the largest refugee camps in Jordan: Zaatari Camp (2 focus groups,  $n = 60$ ) and Azraq Camp (2 focus groups,  $n = 15$ ). Table 2 shows the demographics of the participants. The results from the focus group discussions with Syrian refugees in refugee camps are presented in Table 1.

Participants identified the following obstacles to health and health care access: increased prevalence of smoking, unaffordable basic foods at unregulated local stores in the camps and lack of transportation from the camp to nearby clinics. Exacerbation of respiratory illness was attributed to living conditions in the desert. Early marriage and sexual abuse were also cited as concerns and as consequences of poverty and insecurity in the camps.

Recreational services for children, mental health clinics, vaccination awareness campaigns, and home visits by field officers to promote continuity of care for chronic diseases were described as health system strengths. Refugees in both camps noted that essential medicines for chronic diseases were unavailable in camp clinics and complained of long waiting times. Participants also perceived discrimination and inhumane attitudes among health care providers and suggested that Syrian physicians should be employed in the camps.

### Syrian refugees living outside established refugee camps

A total of 13 focus group discussions with community-based Syrian refugees were conducted in Amman ( $n = 25$ ), Ramtha ( $n = 22$ ), Irbid ( $n = 45$ ) and Marfaq ( $n = 18$ ). Their demographics are presented in Table 2. The results from the focus group discussions with Syrian refugees living in the community are presented in Table 1.

Syrian refugee participants highlighted chronic conditions such as cardiovascular disease, diabetes, hypertension, cancer and kidney disease as important causes of illness, which they believed to be more prevalent since displacement. Poor housing conditions and poor

**Table 1 Summary of qualitative findings (n = 185)**

Themes	Concerns of health care providers and key informants	Concerns of Syrian refugees in camps	Concerns of Syrian refugees in urban areas
<b>Health problems</b>	<ul style="list-style-type: none"> <li>• Syrian refugees primarily seek care for acute conditions (respiratory illness, fever, diarrhoea and injuries)</li> <li>• High prevalence of chronic conditions: e.g., hypertension, cardiovascular disease, diabetes, chronic respiratory disease, arthritis and cataracts.</li> <li>• High smoking prevalence</li> <li>• Lack of health literacy</li> <li>• Stigma around receiving mental health care</li> <li>• Lack of necessary documentation such as marriage and birth certificates</li> </ul>	<ul style="list-style-type: none"> <li>• Poor living conditions exacerbate respiratory illness</li> <li>• High costs of basic foods and unregulated stores in camps</li> <li>• Lack of transportation to health clinics inside the camp</li> <li>• Insecurity in the camps</li> <li>• Sexual abuse</li> <li>• Child marriage as a response to poverty and lack of security</li> </ul>	<ul style="list-style-type: none"> <li>• Limited health care access, especially secondary and tertiary care due to high costs and location</li> <li>• Chronic conditions perceived to be more prevalent since displacement, especially cardiovascular disease, diabetes, hypertension, cancer and kidney diseases</li> <li>• Mental illness, such as post-traumatic stress disorder and depression, are increasing in young adults</li> <li>• Lack of legal work opportunities and high costs of living and health care contribute to psychological distress and domestic violence</li> <li>• Poor housing conditions and poor water quality cause illness</li> </ul>
Representative quotes	<p><i>We do not see many differences in the prevalence of chronic conditions between Syrian refugees and Jordanians. However, we see lower levels of health literacy, bad health behaviours, lack of trust and vulnerability for mental distress. There is a huge need for large-scale epidemiological studies.</i></p> <p>– Jordanian physician</p>	<p><i>Some grocery shop owners know that baby formula is not always available so they make sure to increase its price. I cannot afford it, and there is nobody to complain to. If you complain, they would return you to Syria.</i></p> <p>– 35-year-old female refugee, Zaatar Camp</p> <p><i>All my kids have asthma. All of them were born in Zaatar Camp which is located in the middle of the desert. When a sandstorm hits, they cannot breathe, and I see almost all kids of Zaatar in the emergency rooms of the 5 hospitals of the camp during sandstorm days.</i></p> <p>– 42-year-old male refugee, Zaatar Camp</p> <p><i>I have to marry off my daughters once they hit puberty. How can I pay for their food if I keep them in the same home with us?</i></p> <p>– 46-year-old female refugee, Azraq Camp</p>	<p><i>I do not know a single Syrian refugee in Jordan who does not have someone in the family with a chronic condition and is struggling to see doctors and buy medications. How can we afford all of this when we cannot work or do anything?</i></p> <p>– 42-year-old male engineer and refugee, Irbid</p> <p><i>We know that many Syrians have mental illness due to what they have witnessed during the war but who would marry a daughter of someone who sees a mental health doctor or takes medications to stay sane?</i></p> <p>– 33-year-old male, jobless ex-teacher and refugee, Kafrein</p>
<b>Strengths and weaknesses of the Jordanian health care system</b>	<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• Providing free/subsidized care to Syrian refugees</li> <li>• Hospitality towards Syrian refugees</li> <li>• Dedication to providing quality health care to Syrian refugees and Jordanian citizens</li> </ul> <p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>• Lack of electronic health information systems, especially in primary care</li> <li>• Limited mental health care services</li> <li>• Insufficient health education programmes targeting chronic disease prevention, smoking, domestic violence and mental health stigma</li> <li>• Provider burn-out due to long work hours and staffing shortages</li> <li>• Lack of community health outreach programmes</li> </ul>	<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• Availability of primary health care facilities and small hospitals inside the camp</li> <li>• Recreational activities for children, such as after-school sports and art programmes</li> <li>• Mental health clinics run by International Medical Corps and other international organizations; vaccination awareness campaigns</li> <li>• Home visits by field officers for chronic diseases</li> </ul> <p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>• Periodic lack of essential medicines for chronic diseases, such as high blood pressure and diabetes</li> <li>• Long waiting times due to limited staffing in camp clinics</li> <li>• Discrimination and inhumane attitude of health care providers</li> </ul>	<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• Iris scan technology is a convenient way to access cash assistance</li> </ul> <p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Cost is the primary barrier to health care access</li> <li>• High health care costs drive refugees to seek care in pharmacies instead of clinics</li> <li>• Discrimination in the health care setting and inhumane treatment from health care providers</li> <li>• Physicians perform insufficient physical examinations and do not spend enough time with patients</li> <li>• Legal status makes access to health services a challenge</li> <li>• Lack of birth certificates and changing UNHCR policies complicate health care access</li> <li>• Lack of access to dental care</li> <li>• Lack of female antenatal care providers</li> <li>• Hospitals that provide 24/7 emergency care are located far away</li> <li>• Current policies do not allow donation of blood among Syrians; thalassemia patients cannot access blood transfusions</li> <li>• Current policies do not allow Syrian health care providers to work while in Jordan</li> </ul>



**Table 1 Summary of qualitative findings (n = 185) (concluded)**

Themes	Concerns of health care providers and key informants	Concerns of Syrian refugees in camps	Concerns of Syrian refugees in urban areas
Representative quotes	<i>We do not discriminate against Syrian refugees. In fact, we treat them better since they are our guests and that is part of our traditions and culture. They are more vulnerable and sensitive, and we are overworked.</i> – Jordanian physician, Zaatari Camp	<i>I wish they had more Syrian doctors to look after us instead of these Jordanian health care providers that threaten to kick us out of the country. My neighbour in the caravan next door is a talented Syrian surgeon, and I have gone to him when I cut my finger. He sewed my skin with a regular needle and thread.</i> – 55-year-old male refugee, Zaatari Camp	<i>I have a bad type of cancer in my thyroid gland. The hospital in Irbid covered the first session of my radiotherapy then they said I had to pay for the rest. I could not afford the rest of the treatment. My brother has asked friends and philanthropists on social media to donate money for my treatment.</i> – 59-year-old male refugee, Ramtha
<b>Priorities and suggestions for change</b>	<ul style="list-style-type: none"> <li>• Increase health education programmes to address chronic disease prevention and smoking</li> <li>• Increase programmes to target mental health and mitigate stigma</li> <li>• Increase health programmes to address domestic violence</li> <li>• Increase the number of female antenatal providers to encourage use by Syrian refugees</li> </ul>	<ul style="list-style-type: none"> <li>• Syrian physicians should be employed in the camps</li> <li>• Provide transportation to hospitals and health clinics inside the camp</li> <li>• Regulate food and grocery stores inside the camp</li> </ul>	<ul style="list-style-type: none"> <li>• Increase the quantity and quality of food coupons and ensure that they are accepted at stores accessible to refugees</li> <li>• Revisit cash assistance criteria</li> <li>• Train health care providers to care for the vulnerable refugee population</li> <li>• Provide adequate care and health education for chronic conditions</li> <li>• Increase numbers of female physicians caring for Syrian refugee women</li> <li>• Increase legal work opportunities, and facilitate registration of marriage and births in order to improve quality of life and health care access for Syrian refugees</li> </ul>

**Table 2 Demographic information on refugee focus group participants (n = 185)**

Area	Amman	Ramtha	Irbid	Mafraq	Zaatari Camp	Azraq Camp
No. of participants	25	22	45	18	60	15
Mean age (SD) (years)	42 (4)	36 (2)	27 (9)	25 (7)	38 (9)	21 (8)
Sex: No. (%)						
Female	15 (60)	19 (86)	20 (44)	11 (61)	28 (47)	6 (40)
Male	10 (40)	3 (14)	25 (56)	7 (39)	32 (53)	9 (60)
Mean no. of years since displacement	3.5	3.0	3.5	2.5	3.0	1.0

SD = standard deviation.

water quality were described as sources of illness. A lack of legal work opportunities and high costs of living and health care were intertwined with health problems and identified as a cause of psychological distress, which reportedly contributed to domestic violence.

UNHCR cash assistance programmes were the most frequently raised topic in focus group discussions with Syrian refugees. Refugees approved of iris scan technology, which enables refugees to access cash without a card or PIN. However, they questioned the UNHCR beneficiary selection criteria for cash assistance, arguing that recipients were better off than the destitute majority who were denied it.

Cost was the primary barrier to health care identified by Syrian refugees living outside refugee camps. This drove them to seek care in pharmacies and to ask pharmacists to diagnose diseases and prescribe medications, making pharmacies their primary source of health care. Medical facilities with 24-hour emergency

services were far away from refugee homes. Refugees complained of discrimination in the health care setting and inhumane treatment from health care providers, and they perceived that physicians performed insufficient physical examinations. Legal status and livelihoods were also described as barriers to health care, including a lack of birth certificates and changing UNHCR policies.

**By-person factor analysis results**

Of the 44 Syrian refugees invited to participate in the factor analysis exercises, 34 completed them correctly (77.3% response rate). Respondents were all community-dwelling Syrian refugees living in Irbid and Kafrein areas. The mean age was 29.2 (standard deviation 9) years (range: 18–65), and 52.9% of the participants were females.

Table 3 shows the Syrian respondents’ perceptions of their health situation in Jordan in the by-person factor analysis. The average level of agreement for all participants and the agreement levels by respondent type are given. In some cases, notable agreements or

**Table 3 Syrian refugees' perceptions of their health situation in Jordan (n = 34)<sup>a</sup>**

Statements for by-person factor analysis (listed from greatest consensus to least consensus)	Averaged level of agreement for all participants	Agreement levels by respondent type			
		Type 1 (32% of participants)	Type 2 (14% of participants)	Type 3 (14% of participants)	Type 4 (9% of participants)
Syrian refugees are open to the idea of receiving mental health services	-0.05	-1	-1	-1	-2
Not having female doctors is a reason why many female Syrian refugees refuse to seek care	0.82	1	0	1	1
Health care would not improve if the ministry of health had better trained and qualified doctors	0.09	0	-1	0	1
Cardiovascular disease is a major cause of death in Syrian refugees	-0.50	-1	0	1	1
I do not feel discrimination or inhumane attitude from the health care providers	-1.27	-1	0	1	0
Health would improve if refugees had more food	0.46	1	2	0	2
Training Jordanian doctors on humanitarian crises will not improve health care services offered to refugees	0.18	0	-1	-2	0
Patients are adequately prescribed the medicine they need	-0.09	0	1	-1	-1
The UNHCR needs to develop better standards for who gets the iris scan <sup>b</sup> and this will improve health care access	2.41	3	1	3	3
Chronic diseases are well cared for at the governmental hospitals	-0.68	-2	0	0	0
Local pharmacies often have the medicines that doctors prescribe	-0.59	-2	1	0	0
Allowing Syrian doctors to practise medicine will not improve the health status of Syrians	0.23	2	1	2	-1
If I have an emergency at night I can see the doctor quickly	-1.78	-2	0	-1	-3
Giving injections is an important indicator of a good health care centre and good doctors	-1.05	-3	-3	0	-1
Patients with complicated conditions do not have to travel long distances to find the appropriate doctors	0.64	1	-2	1	0
Smoking is very common among Syrian refugees, males and females	-0.68	0	-2	2	-2
Offering children fun programmes is important for their mental wellbeing	0.64	2	2	-2	2
If Syrians were allowed to work legally, the health status of most of them would improve significantly	1.73	3	3	3	-1
Free medical days offer great services	-0.82	-3	2	-1	1
Domestic violence is a phenomenon that could benefit from community awareness programmes	-0.41	-1	-3	-2	2
The poor quality of the water causes many health problems	-0.05	1	-1	2	-3
Quality school education is lacking and causes mental health problems	0.14	0	-2	-3	3
Allowing Syrian refugees living in Jordan to visit their families in Syria and return will significantly improve their mental health	0.91	2	3	-3	-2

<sup>a</sup>Participants were invited to sort 23 statements by level of agreement. Agreement levels were given from "I strongly disagree" (-3), "I feel ambivalent/neutral" (0), or "I strongly agree" (+3). The responses were averaged and also analysed with by-person factor analysis to reveal 4 respondent types. Not all the participants matched sufficiently any of the 4 respondent types (they were composites across the respondent types), and were therefore not classified.

<sup>b</sup>The iris scan is a UNHCR needs-based cash assistance programme offered to only the most vulnerable refugees. It uses iris scan technology at certain banks in Jordan to enable refugees to access their UNHCR funds without the need for a bank card or PIN code.

disagreements were found among the 4 respondent types. Table 4 shows the distinguishing statements for each of the 4 respondent types.

All respondent types agreed to some extent that UNHCR should revisit beneficiary selection criteria for cash assistance (the iris scan cash programme). Almost

**Table 4 Distinguishing statements for each of the 4 respondent types and the differing levels of agreement of each respondent type (n = 34)**

Statement	Level of agreement							
	Type 1	Z-score	Type 2	Z-score	Type 3	Z-score	Type 4	Z-score
<b>Respondent type 1</b>								
Quality school education is lacking and causes mental health problems	0	0.31*	2	-1.14	-3	-1.71	3	-1.71
Local pharmacies often have the medicines that doctors prescribe	-2	-1.03	1	0.57	0	0	0	0
Chronic diseases are well cared for at the governmental hospital	-2	-1.27*	0	0	0	0	0	0
Free medical days offer great services	-3	-1.43*	2	1.14	-1	-0.57	1	0.57
<b>Respondent type 2</b>								
The UNHCR needs to develop better standards for who gets the iris scan and this will improve health care access	3	1.98	1	0.57	3	1.71	3	1.71
The poor quality of the water causes many health problems	1	0.67	-1	-0.57	2	1.14	-3	-1.71
Patients with complicated conditions do not have to travel long distances to find the appropriate doctors	1	0.64	-2	-1.14	1	0.57	0	0.00
<b>Respondent type 3</b>								
Smoking is very common among Syrian refugees, males and females	0	-0.32	-2	-1.14	2	1.14*	-2	-1.14
Free medical days offer great services	-3	-1.43	2	1.14	-1	-0.57	1	0.57
Offering children fun programmes is important for their mental wellbeing	2	1.01	2	1.14	-2	-1.14*	2	1.14
<b>Respondent type 4</b>								
Quality school education is lacking and causes mental health problems	0	-0.31	-2	-1.14	-3	-1.71	3	1.17*
Domestic violence is a phenomenon that could benefit from community awareness programmes	-1	-0.94	-3	-1.71	-2	-1.14	2	1.14*
If Syrians were allowed to work legally, the health status of most of them would improve significantly	3	1.61	3	1.71	3	1.17	-1	-0.57*
Allowing Syrian doctors to practise medicine will not improve the health status of Syrians	2	0.90	1	0.57	2	1.14	-1	-0.57
The poor quality of the water causes many health problems	1	0.67	-1	-0.57	2	1.14	-3	-1.71

\*Significant at  $P < 0.01$ .

all the participants also agreed that increasing legal work opportunities for Syrian refugees would improve their health. Participants tended to believe that stigma was a barrier to access of mental health resources. Most participants also complained that 24-hour emergency services were difficult to access.

Respondent type 1 was heavily loaded by 21 respondents (61.8% of participants) and defined by 11 (32.4%), while each of the remaining 3 types included 2 loaders (5.9%) and 1 definer (2.9%). Respondent type 1 generally emphasized the importance of policy changes to improve Syrian refugee health, including increasing work opportunities, permitting refugees to visit family members in Syria, and increasing recreational programmes for children. Although according to this respondent type most of these needs were not met, they were ambivalent about the need to train local doctors

on refugee health issues, prescribing adequate drugs to patients, smoking cessation efforts and providing good quality school education.

Individuals in respondent type 2 emphasized the importance of access to fresh foods and recreational activities for children. They also supported policies to increase legal work opportunities for Syrians and to permit Syrians to visit family in Syria and return to Jordan. This respondent type believed that Jordanian health care providers were qualified and felt that medicines were available and patients were prescribed the medicines they needed.

The poor quality drinking water that reportedly causes health problems was the primary concern that characterized respondent type 3. The fourth respondent type believed that high quality, free education was lacking

for Syrian children and this exacerbated their mental health problems. They supported expanding recreational programmes for youth and social interventions to address domestic and sexual abuse.

## Discussion

Health care providers and Syrian refugees highlighted the high burden of chronic disease in this population, which is consistent with the World Health Organization data from Syria (15) and studies regarding Syrian refugees (16–20). Participants also identified the high smoking prevalence among Syrian refugees as a major contributor to the increase in chronic conditions. These findings suggest relief efforts should increase emphasis on the prevention and management of chronic diseases in order to tailor the response to the burden of disease in this population (21,22).

Many of the Syrian refugee participants expressed that the lack of transportation was an issue when trying to access care, especially for after-hour emergencies. Also, the changing policies about which clinics and hospitals offer subsidized care for Syrian refugees affected access to care.

### Livelihoods

Financial problems emerged as a central theme in focus groups with refugees. Refugee participants questioned the UNHCR beneficiary selection criteria through which only 23 000 Syrian families, a small percentage of the Syrian population in Jordan, receive aid (23,24). As seen in this study, access to food, medicines and free education was a concern of the majority of the participating Syrian refugees in Jordan. As the Syrian crisis persists, displaced Syrian families are exhausting their savings and becoming even more vulnerable (25). Employment for Syrian refugees in Jordan and across the region would help them meet their own needs, as well as restore their dignity and mitigate some of the social tensions with host populations (25).

As reported in the focus group discussions, cost was the primary barrier to accessing care. This situation is similar to other neighbouring countries hosting Syrian refugees such as Lebanon and Turkey (22,26). According to refugees in both camp and urban settings, it is particularly difficult to access secondary or tertiary care, as previously described in the literature (27). The limited ability to work legally – due to the restricted number and high cost of work permits – is a great threat to livelihoods. Migrant families reported coping with this situation by working illegally, such as women cooking at home and selling food or men working in construction. While limited resources necessitate prioritization, the policy to only cover hospitalization or tertiary care for life-threatening illnesses may ultimately lead to increased future health costs. High costs also prompt Syrian refugees to seek care from pharmacists, which may leave chronic conditions uncontrolled and even promote antimicrobial resistance (28). All discussions with health care providers, key informants and refugees revolved around the need to

facilitate and allow for a larger number of refugees to work legally in Jordan.

### Differences between refugees living inside versus outside refugee camps

Refugees living outside of camps emphasized financial constraints to health care access, attributing their limited financial resources to their inability to work legally. This is consistent with findings from other studies in Jordan (27) and among refugees worldwide (29), as urban refugees must often make difficult decisions between housing, health care and basic necessities. Meanwhile, camp-based refugees emphasized living and security conditions in the camps as major concerns and mentioned domestic and sexual violence more than their counterparts living in urban areas. Security concerns and poverty in the camps were cited as reasons for increased rates of early marriage. Employment of Syrian doctors to care for patients in the camps may simultaneously ease the burden on Jordanian physicians while providing employment opportunities for this specific group of Syrians (30).

During the focus group discussions, many Syrian refugee participants welcomed mental health services and emphasized financial concerns as a primary source of stress. Psychological stress was also identified as a driver of domestic violence. Participants emphasized recreational activities for children were important for their mental health. Health care providers and participants in the Q-method felt that community education programmes were needed to combat mental health stigma and develop more effective and acceptable interventions.

### Jordanian health care providers

Discussions with health care providers and key informants from UNHCR, the Jordanian Ministry of Health and nongovernmental organizations underscored the need for health education services targeting smoking cessation, chronic disease risk prevention and management, and mitigating mental health care stigma. In contrast to Syrian refugees who described experiences of discrimination or inhumane treatment even at times in health care settings, Jordanian health care providers emphasized the hospitality with which Syrian refugees were received in the health care system. A growing body of quality improvement literature demonstrates that patients are more likely to comply with treatment if their interaction with a health care provider is positive (31). Thus, patient perceptions of clinician attitudes will likely have concrete public health consequences and should be prioritized.

### Study limitations

All the participants were recruited by convenience sampling, which may limit the representativeness of the study sample and the generalizability of our findings. Locating and recruiting Syrian refugees living in urban areas is a complex and lengthy process as they frequently migrate throughout the country searching for work.

Individuals with strong opinions about health care and with health needs may have been more likely to participate. Nevertheless, our study sampled groups in diverse geographical areas with the highest concentration of Syrian refugees in Jordan.

## Conclusion

This study integrated qualitative and quantitative methodologies to present the priorities of Syrian refugees, key stakeholders and Jordanian health care providers related to the health of refugees in Jordan. All parties emphasized chronic disease and mental health as the main problems facing this population. Syrian refugees

identified cost as the most significant barrier to health care access, seeing increased livelihood opportunities as a potential solution to this problem. Perceived unfair aid distribution, discrimination and tensions with host communities were common complaints of Syrian refugees that reportedly adversely affected their health.

Local and international policies concerned with refugee health could benefit from these findings and from this multilayered approach to prioritizing needs. Future research exploring refugee coping mechanisms could be conducted. This study may also lay the foundation for further research on approaches to most effectively address refugee social, clinical and public health needs.

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## Besoins et priorités sanitaires des réfugiés syriens dans les camps et en milieu urbain en Jordanie : perspectives des réfugiés et des prestataires de soins de santé

### Résumé

**Contexte :** Les Nations Unies ont déclaré la crise des réfugiés syriens comme étant la plus importante situation d'urgence humanitaire de notre ère. Les pays voisins, comme la Jordanie, s'efforcent péniblement de répondre aux besoins sanitaires des réfugiés en plus de leurs propres citoyens, du fait des ressources limitées.

**Objectifs :** La présente étude visait à déterminer les perspectives des réfugiés syriens en Jordanie, des prestataires de soins de santé jordaniens et d'autres parties prenantes en prenant en compte les questions de santé publique liées à la crise des réfugiés.

**Méthodes :** Des méthodologies qualitatives et quantitatives ont été utilisées pour explorer les besoins sanitaires des réfugiés syriens et les services de santé qui leur sont destinés dans les camps et en milieu urbain en Jordanie. Des groupes de discussion et des entretiens auprès des principaux informateurs ont été utilisés pour identifier les besoins, les défis et les solutions potentielles afin de fournir des soins de santé de qualité aux réfugiés. L'analyse factorielle par individu a divisé les participants réfugiés en quatre types uniques de répondants et a comparé les priorités pour les interventions.

**Résultats :** Les discussions de groupes et les entretiens avec les principaux informateurs ont mis en évidence de nombreux problèmes différents. Le coût, les ressources limitées, les changements de politiques, les moyens de subsistance et les faibles connaissances en matière de santé venaient entraver la prestation de services de santé publique et clinique. Les répondants de type 1 soulignaient l'importance des changements de politiques pour améliorer la santé des réfugiés syriens. Ceux du type 2 ont mis en évidence l'accès à des aliments frais et aux activités récréatives pour les enfants. Pour le type 3, la mauvaise qualité de l'eau de boisson était la principale préoccupation, et le type 4 pensait que l'absence de bonne éducation, gratuite, pour les enfants syriens exacerbait leurs problèmes de santé mentale.

**Conclusions :** Les réfugiés syriens ont identifié le coût comme obstacle principal à l'accès aux soins de santé. Les réfugiés tout comme les prestataires de soins de santé ont souligné l'importance d'attribuer davantage de ressources aux maladies chroniques et à la santé mentale.

## الاحتياجات والأولويات الصحية للاجئين السوريين في المخيمات والمناطق الحضرية في الأردن: وجهات نظر اللاجئين ومقدمي الرعاية الصحية

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### الخلاصة

الخلفية: أعلنت الأمم المتحدة أن أزمة اللاجئين السوريين تشكل أكبر حالة طوارئ إنسانية في العصر الحالي. وتتحمل البلدان المجاورة، مثل الأردن، ضغطاً من أجل تلبية الاحتياجات الصحية للاجئين السوريين فضلاً عن مواطنيها في ظل شح مواردها.

الأهداف: تمثل الهدف من هذه الدراسة في تحديد وجهات نظر اللاجئين السوريين في الأردن، ومقدمي الرعاية الصحية الأردنيين، وسائر أصحاب المصلحة في التصدي لقضايا الصحة العامة المرتبطة بأزمة اللاجئين.

طرق البحث: استخدمت منهجيات بحث كمية وكيفية لاستكشاف الاحتياجات الصحية للاجئين السوريين والخدمات الصحية المتاحة في المخيمات والمناطق الحضرية في الأردن. وأجريت مناقشات جماعية مركزة ومقابلات مع مستجيبين رئيسيين لتحديد الاحتياجات والتحديات والحلول المحتملة لتوفير رعاية صحية ذات جودة للاجئين. وأجري تحليل عوامل شخصي أدى إلى تقسيم المشاركين للاجئين إلى 4 أنواع فريدة من المستجيبين ومقارنة أولويات التدخل.

النتائج: كشفت المناقشات الجماعية المركزة والمقابلات التي أجريت مع المستجيبين الرئيسيين عن مشكلات كثيرة ومختلفة. وتبين أن ارتفاع التكلفة ونقص الموارد وتغير السياسات وسبل العيش وضعف الإلمام بأساسيات المعرفة الصحية تعوق توفير الخدمات الصحية العامة والسريية. وأكد النوع الأول من المستجيبين أهمية تغيير السياسات لتحسين صحة اللاجئين السوريين. وأبرز النوع الثاني أهمية الوصول إلى الأغذية الطازجة والأنشطة الترفيهية للأطفال. في حين أشار النوع الثالث إلى أن الشاغل الأساسي هو ضعف جودة مياه الشرب، ورأى النوع الرابع أن الافتقار إلى التعليم الجيد والمجاني للأطفال السوريين يؤدي إلى تفاقم مشكلات الصحة النفسية لديهم.

الاستنتاجات: حدد اللاجئون السوريون التكلفة باعتبارها العائق الرئيسي الذي يحول دون الوصول إلى الرعاية الصحية. وأكد اللاجئون ومقدمو الرعاية الصحية على حد سواء أهمية توجيه مزيد من الموارد لعلاج الأمراض المزمنة ومشكلات الصحة النفسية.

## References

- Murphy A, Woodman M, Roberts B, McKee M. The neglected refugee crisis. *BMJ*. 2016 02 1;352:i484. <http://dx.doi.org/10.1136/bmj.i484> PMID:26830145
- Verme P, Gigliarano C, Wieser C, Hedlund K, Petzoldt M, Santacrose M. The welfare of Syrian refugees. Washington (DC): World Bank Publications; 2016.
- Abu-Slaih A. Impact of Syrian refugees on Jordan's health sector. Amman: Jordanian Ministry of Health; 2013.
- Sherlock R. Jordan repeals free medical aid for Syrian refugees. *The Telegraph*. 28 November 2014 (<http://www.telegraph.co.uk/news/worldnews/middleeast/syria/11261468/Jordan-repeals-free-medical-aid-for-Syrian-refugees.html>, accessed 6 November 2017).
- United Nations High Commissioner for Refugees. Syria Regional Refugee Response Inter-agency Information Sharing Portal. 2016 (<http://data.unhcr.org/syrianrefugees/country.php?id=107>, accessed 6 April 2016).
- Arnaout M. Caring for children with cancer in a country conflicted with massive refugee migration: Jordan as an example. *Cancer Care in Countries and Societies in Transition*. Switzerland: Springer; 2016:105–16.
- United Nations High Commissioner for Refugees, Johns Hopkins Bloomberg School of Public Health, Jordanian University of Science and Technology, World Health Organization. Syrian refugee health access survey in Jordan. December 2014 (file:///C:/Users/Fiona/Downloads/JordanHealthAccessSurveyReport(FINAL).pdf, accessed 6 November 2017).
- Doocy S, Lyles E, Akhu-Zaheya L, Burton A, Burnham G. Health service access and utilization among Syrian refugees in Jordan. *Int J Equity Health*. 2016 07 14;15(1):108. <http://dx.doi.org/10.1186/s12939-016-0399-4> PMID:27418336
- Doocy S, Lyles E, Akhu-Zaheya L, Oweis A, Al Ward N, Burton A. Health service utilization among Syrian refugees with chronic health conditions in Jordan. *PLoS One*. 2016 04 13;11(4):e0150088. <http://dx.doi.org/10.1371/journal.pone.0150088> PMID:27073930
- Al-Ammouri I, Ayoub F. Heart disease in Syrian refugee children: experience at Jordan University Hospital. *Ann Glob Health*. 2016 Mar-Apr;82(2):300–6. <http://dx.doi.org/10.1016/j.aogh.2015.02.517> PMID:27372533
- Crabtree BF, Miller WL. Doing qualitative research. 2nd ed. Thousand Oaks (Calif.): Sage Publications; 1999.
- Watts S, Stenner P. Doing Q methodological research: Theory, method & interpretation. Sage; 2012.
- Nelson BD, Getchell M, Rosborough S, Atwine B, Okeyo E, Wall E, et al. A participatory approach to assessing refugee perceptions of health services. *World Health Popul*. 2010;11(4):13–22. <http://dx.doi.org/10.12927/whp.2010.21720> PMID:20739836
- Q-methodology analysis software (<http://schmolck.userweb.mwn.de/qmethod/>, accessed 20 March, 2016).
- Noncommunicable Diseases (NCD) country profile Syria, 2014. Geneva: World Health Organization; 2014.
- Doocy S, Lyles E, Robertson T, Akhu-Zaheya L, Oweis A, Burnham G. Prevalence and care-seeking for chronic diseases among Syrian refugees in Jordan. *BMC Public Health*. 2015 10 31;15(1):1097. <http://dx.doi.org/10.1186/s12889-015-2429-3> PMID:26521231
- Gammouh OS, Al-Smadi AM, Tawalbeh LI, Khoury LS. Chronic diseases, lack of medications, and depression among Syrian refugees in Jordan, 2013-2014. *Prev Chronic Dis*. 2015 01 29;12:E10. <http://dx.doi.org/10.5888/pcd12.140424> PMID:25633485
- Holmes D. Chronic disease care crisis for Lebanon's Syrian refugees. *Lancet Diabetes Endocrinol*. 2015 Feb;3(2):102. [http://dx.doi.org/10.1016/S2213-8587\(14\)70196-2](http://dx.doi.org/10.1016/S2213-8587(14)70196-2) PMID:25466522
- Strong J, Varady C, Chahda N, Doocy S, Burnham G. Health status and health needs of older refugees from Syria in Lebanon. *Confl Health*. 2015 04 9;9(1):12. <http://dx.doi.org/10.1186/s13031-014-0029-y> PMID:26056531
- Cousins S. Experts sound alarm as Syrian crisis fuels spread of tuberculosis. *BMJ*. 2014 12 3;349 dec03 5:g7397. <http://dx.doi.org/10.1136/bmj.g7397> PMID:25471893

21. Krause S, Williams H, Onyango M, Sami S, Doedens W, Giga N, et al. Reproductive health services for Syrian refugees in Zaatri Camp and Irbid City, Hashemite Kingdom of Jordan: an evaluation of the Minimum Initial Services Package. *Confl Health*. 2015 Feb 2;9(Suppl 1 Taking Stock of Reproductive Health in Humanitarian):S4. doi: 10.1186/1752-1505-9-S1-S4 PMID: 25798190
22. Cousins S. Syrian crisis: health experts say more can be done. *Lancet*. 2015 Mar 14;385(9972):931–4. [http://dx.doi.org/10.1016/S0140-6736\(15\)60515-3](http://dx.doi.org/10.1016/S0140-6736(15)60515-3) PMID:25784334
23. Balsari S, Abisaab J, Hamill K, Leaning J. Syrian refugee crisis: when aid is not enough. *Lancet*. 2015 Mar 14;385(9972):942–3. [http://dx.doi.org/10.1016/S0140-6736\(15\)60168-4](http://dx.doi.org/10.1016/S0140-6736(15)60168-4) PMID:25748614
24. Sundelin G. Iris-scanning technology streamlines refugee registration process—UNHCR. *Jordan Times*. 21 July 2013.:21.
25. United Nations High Commissioner for Refugees, United Nations Development Program, United Nations Development Group. 3RP regional refugee and resilience plan in response to the Syria crisis. Regional Strategic Overview. 2015-2016 (<http://www.3rp-syriacrisis.org/wp-content/uploads/2015/01/3RP-Report-Overview.pdf>, accessed 6 November 2017). .
26. Gornall J. Healthcare for Syrian refugees. *BMJ*. 2015 08 4;351:h4150. <http://dx.doi.org/10.1136/bmj.h4150> PMID:26243793
27. Ay M, Arcos González P, Castro Delgado R. The Perceived Barriers of Access to Health Care Among a Group of Non-camp Syrian Refugees in Jordan. *Int J Health Serv*. 2016 07;46(3):566–89. <http://dx.doi.org/10.1177/0020731416636831> PMID:26962004
28. Byarugaba DK. A view on antimicrobial resistance in developing countries and responsible risk factors. *Int J Antimicrob Agents*. 2004 Aug;24(2):105–10. <http://dx.doi.org/10.1016/j.ijantimicag.2004.02.015> PMID:15288307
29. Hynie M. Life on the edge. *Science*. 2016;351(6272):444–5. <http://dx.doi.org/10.1126/science.aad8525>
30. Arie S. Syrian doctors risk arrest and deportation for treating fellow refugees in Lebanon and Jordan. *BMJ*. 2015 03 23;350(8001):h1552–1552. <http://dx.doi.org/10.1136/bmj.h1552> PMID:25801194
31. Bowling A. *Research methods in health: investigating health and health services*. UK: McGraw-Hill Education; 2014.

# Screening for dysglycaemia using anthropometric indices in an adult population in Oman

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## Abstract

**Background:** A previous community-based cross-sectional survey conducted in a semi-urban community revealed that 44% of people aged 18+ years manifest dysglycaemia, which appears to echo the national trend. There is lack of studies examining the role of anthropometric indices in people with dysglycaemia.

**Aim:** We explored the screening ability of anthropometric indices, body mass index (BMI), waist circumference (WC), waist-to-hip ratio (WHR), and waist-to-height ratio (WHtR) to detect dysglycaemia in the adult Omani population based on a community-based survey conducted in 2005. The potential of anthropometric indices to detect the presence of glycaemic disorder could aid in detection, prevention and health education.

**Methods:** A total of 480 male and 795 female subjects aged 18+ years were included in this study. The prevalence of dysglycaemia was analysed using the American Diabetic Association criteria. Logistic regression approach and Receiver-Operating Characteristic (ROC) curve analysis was performed.

**Results:** The analysis revealed that mean values of age, BMI, WC, WHR and WHtR increased significantly from normoglycemic to pre-diabetic and further to diabetic in both sexes ( $P < 0.0001$ ). Dysglycemia showed an increasing prevalence with age. WHtR showed the highest sensitivity for detecting dysglycemia in all age groups compared to other anthropometric indices with sensitivity rate of 94.4% in  $\geq 45$  years, 88.6% in (25-44) years and 45.6% in age group  $< 25$  years.

**Conclusion:** Among the anthropometric indices we investigated, WHtR was the best predictor of dysglycaemia among Omani adults aged  $> 25$  years.

Key words: Anthropometric measurements, Dysglycemia, Diabetes, ROC Curve

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## Introduction

Oman has been internationally praised for the fulfilment of most of the Millennium Development Goals 2015 (1), however, along with the challenge of communicable diseases, there is an increasing challenge from noncommunicable diseases, and diabetes appears to be prominent, precipitated by rapid urbanisation and rising standards of living (2,3). According to 2000 data from the Ministry of Health, the prevalence of diabetes was 11.6%, rising to 12.3% in 2010 (4,5). Approximately 29% of the Omani population was classed as overweight and 9% as obese (6). In a population-based national survey 22% of those surveyed were overweight or obese (7). Obesity and overweight are recognised as independent risk factors for the development of diabetes and dysglycaemia (8,9). In a 2010 community-based cross-sectional study, 35% of the Omani men were prediabetic; advanced age and being overweight were identified as strong contributing factors (10).

Within the emerging epidemic of dysglycaemia, more studies are needed to identify anthropometric characteristic that would have a direct bearing on

dysglycaemia. In the available literature, various phenotypical indicators have been linked to the presence of dysglycaemia. In Western population, body mass index (BMI) has been associated with the presence of dysglycaemia (11). The World Health Organization has provided guidelines for using BMI to assess dysglycaemia with a cut off value of 25 kg/m<sup>2</sup> (12). It is not clear whether this is applicable to the Omani population. Waist circumference (WC) and waist-to-hip ratio (WHR) have also been suggested as indicators of intra-abdominal fat. Some studies have suggested that WC and WHR are better predictors of dysglycaemia than BMI (13–15). There is also a dissenting view suggesting the relationship between WHR and dysglycaemia is poor. Some preliminary data suggest that WHR correlates more weakly with glucose tolerance; sex is also a significant confounding factor (16). A few studies have reported that waist-to-height-ratio (WHtR) is a better screening tool than other anthropometric indices, with a cut off value of 0.5 (17,18). Against such a conflicting background, more studies are needed to determine the correlation between anthropometric measures and dysglycaemia. This would help to detect dysglycaemia cases early among apparently



healthy people, and, in turn, mitigate morbidity and mortality. This study aims to explore the screening capacity of anthropometric indices to adequately detect dysglycaemia in adult Omani population.

## Methods

### Survey

In this study, we used the data from a cross-sectional, community-based survey carried out on 1275 Omani adults, aged  $\geq 18$  years, residing in a semi-urban satellite town of Bidbid, which is situated 30 km west of the capital, Muscat, during September 2004 to February 2005.

The following exclusion criteria were used: participants with diabetics who were taking medication or insulin for the disease; pregnant women or mothers within 3 months postpartum; and people with conditions that were likely to interfere with research procedures, e.g. inability to communicate with staff or having a persistent and intransigent illnesses.

### Sample design and participants

A sample size of 1500 subjects was determined based on the estimated prevalence of prediabetes (36%) (10) and diabetes (12.3%) (4), a nonresponse rate of 10%, an error margin of 5% with 95% confidence interval. We adopted a 2-stage random cluster sampling design. The first stage was the random selection of census enumeration areas, where each area comprised 100 households as defined by the Ministry of National Economy. Out of 100 census enumeration areas, 20 were randomly selected using a random number allocation method. A sampling frame of 6150 subjects was developed by conducting a census among the 20 randomly selected areas. The name, family name, sex, age, household and locality of all eligible subjects was recorded on field maps. In the second stage, 1500 subjects were randomly selected from the sampling frame using computer generated random numbers. All persons aged  $\geq 18$  years in the selected households were invited to participate in the study. Of these, 1275 completed the structured pre-tested questionnaire, an overall response rate of 85%.

### Anthropometric and laboratory measurements

Blood glucose (both fasting and post-prandial, 2 hours following ingestion of 75 g glucose) was collected from the venous blood at sodium fluoride potassium oxalate tubes and tested at the laboratory after separating plasma on the same day, using Hitachi 911 automated clinical chemistry analysers (Boehringer–Mannheim). The reagents used were supplied by the same manufacturer. Glycaemic status according to the American Diabetes Association (ADA) criteria was used:  $< 5.6$  mmol/L fasting normal, 5.6–6.9 mmol/L impaired fasting glucose and  $\geq 7.0$  mmol/L diabetes mellitus (19,20). Dysglycaemia was defined as a subject having fasting plasma glucose  $\geq 5.6$  mmol/L (100 mg/dL) and/or impaired glucose tolerance of  $\geq 7.8$  mmol/L (140 mg/dL) including prediabetes and diabetes. The fasting plasma glucose and oral glucose tolerance levels were estimated from venous blood at

the laboratory of Sultan Qaboos University Hospital according to the standard protocol. Height and weight were measured using a stature meter and high precision digital weighing machine with regular accuracy checks. Weight/height was taken in a standing posture, wearing light clothing and without shoes. The BMI was calculated as weight/height<sup>2</sup> (kg/m<sup>2</sup>) and individuals with BMI  $\geq 25$  kg/m<sup>2</sup> were considered overweight. Waist circumference was measured using a steel measuring tape with measurements made half way between the lower border of the ribs and the iliac crest in a horizontal plane. A value of  $\geq 94.0$  cm for males and  $\geq 80.0$  cm for females (the cut-off values recommended for Eastern Mediterranean and Middle Eastern Arab populations) was considered overweight (abnormal) (21). Similarly, hip circumference was measured at the widest point over the buttocks and the waist-to-hip ratio (WHR) was calculated; WHR  $\geq 0.95$  cm for males and  $\geq 0.85$  cm for females was considered abnormal (22,23). Waist-to-height ratio (WHtR) was also calculated for each individual and if the ratio was  $\geq 0.5$ , then the individual was considered as having abnormal central obesity (24).

Dysglycaemia or glycaemic disorder is an age-dependent phenomenon and magnitude of problem usually remains low in young adult, medium in middle aged and high in older age group as observed in several studies (25,26). On the other hand, sensitivity of a screening test is influenced by the prevalence of disease under investigation in a community (27). Considering the above, age-related prevalence of dysglycaemia was analysed. Following this, sensitivity analysis of dysglycaemia using various anthropometric indices (BMI, WC, WHR and WHtR) was done for each age group to obtain the sensitivity status. This was also done to understand whether the anthropometric tool could be uniformly applicable to all age groups so far as sensitivity was concerned. If not, a possible cut-off value was expected to be explored based on sensitivity status. Finally, the receiver operating characteristic curve was developed for the indices based on the findings of age group sensitivity to obtain the test accuracy in subjects with values below and above the cut-off (28). Receiver operating characteristic curves were used to determine the predictive power of various anthropometric indices for glycaemic status by comparing areas under the curve.

The Medical Research and Ethics Committee of the College of Medicine and Health Sciences, Sultan Qaboos University, approved the study. All participants gave their written informed consents prior to participating in the study.

### Statistical analysis

Descriptive analysis for continuous variables was used to calculate mean values and standard deviation. Prevalence and frequencies were expressed as percentages. The differences in means of the anthropometric indices and age between the 3 glycaemic categories were assessed using 1-way analysis of variance (ANOVA). Where there was a lack of homogeneity of variance, the Kruskal–Wallis

test was used to compare the distributions between the 3 glycaemic categories. When ANOVA provided evidence of significant difference between the groups, a post-hoc test, Dunnett's T3 test was used for pair-wise comparison of the means.

To establish the relationship between anthropometric indices of obesity and glycaemic status, odds ratios and their 95% confidence intervals were estimated using logistic regression models, after adjusting for age (29). The chi-squared trend test was used for trend analysis for percentages of sensitivity and specificity across the age groups. *P*-value (2-tailed) < 0.05 was considered statistically significant. All data were analysed using SPSS, version 23.

## Results

A total of 480 males and 795 females aged  $\geq 18$  years consented to participate in this study. Table 1 shows mean values for various anthropometric indices according to glycaemic status. The mean age for both normoglycaemic males and females was similar, around 29 years, but mean age of females was slightly older for both types of dysglycaemia, impaired fasting glucose and

diabetes mellitus. An average male appears to have had a gap of 5 years prior to development of diabetes from the prediabetic status, while females took about 7 years to reach full-blown symptoms. A similar observation was noted for developing impaired fasting glucose from normoglycaemic status: for males the average gap was 4 years but for females it was about 7 years. This indicates that diabetes progresses more slowly and at an older age in females. These differences were statistically significant ( $P < 0.05$ ). Mean values of BMI, WC, WHR and WHtR differed significantly from normoglycaemic to impaired fasting glucose and further to diabetes in both sexes (Table 1).

Overall prevalence of dysglycaemia was 44.1% (combining all ages and both sexes) (Table 2). It is evident that the prevalence of dysglycaemia increased in both sexes with age. Prevalence in males was 49.4% and in females 40.9%; prevalence was slightly lower in females in each age group compared to their male counterparts except for the  $\geq 45$  years group. This indicates that diabetes is an age-dependent condition for both sexes.

It is evident that older age, BMI  $\geq 25$  kg/m<sup>2</sup>, WC  $\geq 94.0$  (male)/ $\geq 80.0$  (female), WHR  $\geq 0.95$  (male)/ $\geq 0.85$

**Table 1. Anthropometric indices in relation to glycaemic status for male and female adults in Oman, 2004-2005**

Index	Normoglycaemic		Dysglycaemic			
	Mean (SD)	95% CI	IFG	IFG	DM	DM
			Mean (SD)	95% CI	Mean (SD)	95% CI
Males (No.)	258	–	195	–	27	–
Age (years)	29.20 (10.94)	27.86–30.55	33.84 (12.99) <sup>a</sup>	32.00–35.67	38.63 (11.25) <sup>b</sup>	34.18–43.08
BMI (kg/m <sup>2</sup> )	24.67 (4.50)	24.12–25.23	26.22 (4.74) <sup>a</sup>	25.55–26.88	28.77 (4.85) <sup>b</sup>	26.76–30.77
WC (cm)	85.33 (11.39)	83.92–86.73	90.14 (11.42) <sup>a</sup>	88.54–91.75	94.88 (10.95) <sup>b</sup>	90.46–99.31
WHR	0.88 (0.06)	0.87–0.89	0.91 (0.07) <sup>a</sup>	0.89–0.92	0.94 (0.05) <sup>bc</sup>	0.92–0.96
WHtR	0.51 (0.07)	0.50–0.52	0.54 (0.07) <sup>a</sup>	0.53–0.55	0.58 (0.06) <sup>bc</sup>	0.55–0.60
Females (No.)	504	–	258	–	33	–
Age (years)	29.17 (9.69)	28.32–30.02	36.26 (11.84) <sup>a</sup>	34.79–37.73	43.81 (13.01) <sup>bc</sup>	39.12–48.50
BMI (kg/m <sup>2</sup> )	24.65 (5.20)	24.19–25.10	27.99 (6.16) <sup>a</sup>	27.23–28.74	29.98 (6.41) <sup>b</sup>	27.70–32.25
WC (cm)	78.80 (12.67)	77.70–79.91	88.58 (13.99) <sup>a</sup>	86.86–90.29	97.24 (13.89) <sup>bc</sup>	92.32–102.17
WHR	0.82 (0.09)	0.81–0.82	0.88 (0.09) <sup>a</sup>	0.87–0.89	0.96 (0.08) <sup>bc</sup>	0.93–0.99
WHtR	0.51 (0.08)	0.05–0.52	0.58 (0.09) <sup>a</sup>	0.57–0.59	0.64 (0.09) <sup>bc</sup>	0.61–0.67

*P*-value (ANOVA) < 0.001 for all.

CI = confidence interval; IFG = impaired fasting glucose; DM = diabetes mellitus; SD = standard deviation; BMI = body mass index; WC = waist circumference; WHR = waist-to-hip-ratio; WHtR = waist-to-height-ratio.

<sup>a</sup>*P* < 0.01 for normoglycaemic versus IFG.

<sup>b</sup>*P* < 0.01 for normoglycaemic versus DM.

<sup>c</sup>*P* < 0.05 for IFG versus DM.

**Table 2. Age and sex distribution of Omani adults with dysglycaemia, 2004-2005**

Age (years)	No. of males screened	Dysglycaemia No. (%)	No. of females screened	Dysglycaemia No. (%)	Total screened	Dysglycaemia No. (%)
< 25	164	58 (35.4)	245	59 (24.1)	409	117 (28.6)
25–44.9	250	135 (54)	461	202 (43.8)	711	337 (47.4)
$\geq 45$	66	44 (66.7)	89	64 (71.9)	155	108 (69.7)
Total	480	237 (49.4)	795	325 (40.9)	1275	562 (44.1)

(female) and WHtR  $\geq 0.5$  are significantly associated with dysglycaemia ( $P < 0.001$ ) (Table 3). For all 4 anthropometric indices, females were at comparatively greater risk of developing dysglycaemia compared with males.

The sensitivity and specificity for detecting dysglycaemia using each anthropometric measurement

were calculated separately for each age group. Individually WHtR showed the highest sensitivity for detecting dysglycaemia for all age groups: 94.4% in the oldest age group ( $\geq 45$  years), 88.6% in the middle age group (25.0–44.9 years) and 45.6% in the youngest age group ( $< 25$  years) (Table 4). None of the measures

**Table 3. Determinants of dysglycaemia in Omani adults, 2004-2005, based on logistic regression models adjusted for age**

Index	Males			Females		
	OR	95% CI	P-value	OR	95% CI	P-value
<b>Age (years)</b>						
< 25	1			1		
25-44	2.14	1.43-3.21	< 0.0001	2.26	1.74-3.47	< 0.0001
$\geq 45$	3.66	2.00-6.68	< 0.0001	8.07	4.67-13.94	< 0.0001
<b>BMI (kg/m<sup>2</sup>)</b>						
< 25.0	1			1		
$\geq 25.0$	2.11	1.43-3.10	< 0.0001	2.60	1.90-3.55	< 0.0001
<b>WC (cm)</b>						
< 94.0 (M)/ < 80.0 (F)	1			1		
$\geq 94.0$ (M)/ $\geq 80.0$ (F)	2.12	1.40-3.23	< 0.0001	3.11	2.22-4.37	< 0.0001
<b>WHR</b>						
< 0.95 (M)/ < 0.85 (F)	1			1		
$\geq 0.95$ (M)/ $\geq 0.85$ (F)	1.90	1.19-3.02	0.007	3.78	2.68-5.33	< 0.0001
<b>WHtR</b>						
< 0.5	1			1		
$\geq 0.5$	2.43	1.54-3.81	< 0.0001	2.98	2.05-4.33	< 0.0001

M = male; F = female; BMI = body mass index; WC = waist circumference; WHR = waist-to-hip ratio; WHtR = waist-to-height ratio.

**Table 4. Sensitivity and specificity of selected anthropometric indices for detecting dysglycaemia in three age groups in Omani adults**

Index (cut-off)	Age < 25 years (n = 409)		Age 25-44 years (n = 711)		Age $\geq 45$ years (n = 155)	
	TP/ TP+FN	Sensitivity %	TP/ TP+FN	Sensitivity %	TP/ TP+FN	Sensitivity %
<b>Sensitivity</b>						
BMI ( $\geq 25.0$ )	44/117	37.6	249/335	74.3	64/108	59.3
WC (cm) (M $\geq 94$ / F $\geq 80$ )	30/117	25.6	234/335	69.8	75/108	69.4
WHR (M $\geq 0.95$ / F $\geq 0.85$ )	18/117	15.4	194/335	57.9	86/108	79.6
WHtR ( $\geq 0.5$ )	52/114	45.6	288/325	88.6	101/107	94.4
BMI ( $\geq 25.0$ ) and/or WHtR ( $\geq 0.5$ )	54/114	47.5	291/324	89.8	101/107	94.4
<b>Specificity</b>						
	TN/ TN+FP*	Specificity	TN/ TN+FP	Specificity	TN/ TN+FP*	Specificity
BMI ( $\geq 25.0$ )	207/289	71.6	189/373	50.6	30/47	63.8
WC (cm) (M $\geq 94$ / F $\geq 80$ )	230/289	79.6	194/373	52.0	27/47	57.4
WHR (M $\geq 0.95$ / F $\geq 0.85$ )	261/289	90.3	239/373	64.1	23/47	48.9
WHtR ( $\geq 0.5$ )	196/284	69.0	110/355	30.9	10/45	22.2
BMI ( $\geq 25.0$ ) and/or WHtR ( $\geq 0.5$ )	185/284	65.1	104/355	29.3	10/45	22.2

P-value < 0.001 for all.

TP = true positive; FN = false negative; M = male; F = female; BMI = body mass index; WC = waist circumference; WHR = waist-to-hip ratio; WHtR = waist-to-height ratio; TN = true negative; FP = false positive.

showed sensitivity  $\geq 50\%$  for detecting dysglycaemia in the age group  $< 25$  years. Combining 2 sequential tests with BMI and WHtR to obtain a net gain in sensitivity in the youngest age group, sensitivity increased to 47.5%, 1.9% above WHtR alone.

Our analysis indicates that if dysglycaemia is screened for using WHtR, it would have a detecting ability of around 90% among those aged  $\geq 25$  years, but less than 50% among those aged  $< 25$  years. Specificity in the youngest age group was highest with WHR (90%), followed by WC (79.6%) and BMI (71.6%). Specificity was lower for all indices in the older age groups (Table 4).

The areas under the receiver operating characteristic curves for the 4 anthropometric indices at their respective cut-off values, i.e. are most likely to identify dysglycaemia, are shown in Table 5. The receiver operating characteristic area in those aged  $< 25$  years are: BMI 0.551; WC 0.605; WHR 0.640; WHtR 0.598 (Table 5). The area under the ROC curve for each of the 4 anthropometric indices is greater for the age group  $\geq 25$  years compared with  $< 25$  years, indicating that the predictive power of each of the 4 anthropometric indices to detect dysglycaemia is greater for the older age group.

### Discussion

Since noncommunicable diseases are on rise in almost all countries in the region, including Oman, initiatives were taken to identify some suitable anthropometric marker/s that would help in identifying the susceptible population at risk of developing dysglycaemia. Several studies have been conducted to explore the possible role of anthropometric marker/s for dysglycaemia. Some indicated WHtR as a strong predictor compared to WC, WHR and BMI (9,24,30,31).

As in other studies (25,26), we found the prevalence of dysglycaemia to be significantly associated with the older age in both sexes. We attempted to highlight the screening ability of 4 anthropometric indices, BMI, WC, WHR and WHtR, in detecting dysglycaemia among 3 age groups. The study showed an association between anthropometric measurements (BMI, WC, WHR, WHtR) with their cut off values and dysglycaemia. Similar

observations have been reported in other studies (32,33).

It was observed that WHtR had the highest sensitivity in all 3 age groups; BMI showed the second highest sensitivity in the youngest age group and the lowest sensitivity rate in the oldest age group as observed in a similar study (34). In a study among Jordanian adult population, the comparison between the 4 anthropometric indices was carried out for detecting metabolic abnormalities (35). The study revealed that the WHtR had a strong association and performed better for the detection of high fasting blood glucose. The estimated values of areas under the curve and odds ratios corresponding to WHtR were very close to the estimated values in our study.

Sensitivity was 90% for WHtR in this study population, when the 2 older age groups were combined (i.e. age  $\geq 25$  years.). This means WHtR would detect 90% of the dysglycaemia cases with a cut-off value of  $\geq 0.5$ , if used for community-based screening programmes for dysglycaemia (the cut off value for WHtR is the same for all age groups). This means WHtR may be used as a screening tool for dysglycaemia in community-based screening among people aged  $\geq 25$  years. Other advantages of this tool are: this test is cheap and easy to perform by health care workers once they are trained. Disadvantage include: lowering of sensitivity to  $< 50\%$  when applied to the subjects aged  $< 25$  years. This age-related change in sensitivity may be primarily due to the effect of increasing accumulation of visceral or intra-abdominal fat with older age. In an individual, height remains fixed but ratio between waist circumference and height changes. On the other hand, WC and WHR did not show a comparable sensitivity to WHtR. Thus, in our study WHtR appears to be a better anthropometric predictor, which could be used for community-based screening of dysglycaemia.

As indicated by the analysis of data, younger age group ( $< 25$  years) needs special attention as no anthropometric indicator showed a sensitivity  $\geq 50\%$ . In principle, if 2 sequential screening tests are applied simultaneously, there is usually a net gain of sensitivity (36). Considering this principle, and since BMI showed the second highest sensitivity in the youngest age group, BMI was combined with WHtR, resulting in a slight increase in sensitivity. This indicates that even if both tests are combined, this would not be able to detect even 50% of the individuals in that age group with dysglycaemia. Consequently, finding a suitable screening tool for younger population poses a public health challenge and efforts must be continued to find a suitable predictor.

**Table 5. Area under the receiver operating characteristic curves illustrating the power of the anthropometric indices in predicting dysglycaemia for Omani adults in two age groups**

Index	Age (years)			
	$< 25$ (n = 409)		$\geq 25$ (n = 866)	
	Area under the curve	95% CI	Area under the curve	95% CI
BMI	0.551	0.488–0.613	0.655*	0.618–0.691
WC	0.605*	0.544–0.666	0.685*	0.650–0.720
WHR	0.640*	0.580–0.701	0.694*	0.659–0.729
WHtR	0.598*	0.537–0.659	0.686*	0.651–0.721

\*P < 0.01.

CI = confidence interval; BMI = body mass index; WC = waist circumference; WHR = waist-to-hip ratio; WHtR = waist-to-height ratio.

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**Competing interests:** None declared.

## Dépistage de la dysglycémie au moyen d'indices anthropométriques dans une population d'adultes à Oman

### Résumé

**Contexte :** Une enquête transversale communautaire précédemment réalisée dans une communauté semi-urbaine a révélé que 44 % des personnes de plus de 18 ans présentaient une dysglycémie, ce qui semble correspondre à la tendance nationale. Il n'existe pas d'études permettant d'examiner le rôle des indices anthropométriques chez les sujets atteints de dysglycémie.

**Objectif :** Nous avons exploré la capacité diagnostique des indices anthropométriques, de l'indice de masse corporelle (IMC), du tour de taille, du rapport tour de taille/tour de hanches, et du rapport tour de taille/taille pour détecter la dysglycémie dans la population d'adultes à Oman sur la base d'une enquête communautaire réalisée en 2005. Le potentiel des indices anthropométriques afin de détecter la présence de troubles de la glycémie pourrait contribuer au dépistage, à la prévention et l'éducation sanitaire.

**Méthodes :** Au total, 480 sujets masculins et 795 sujets féminins de plus de 18 ans ont été inclus dans cette étude. La prévalence de la dysglycémie a été analysée à l'aide des critères de l'Association américaine du diabète. On a recouru à l'approche de régression logistique et à l'analyse de la courbe ROC (caractéristique du fonctionnement du récepteur).

**Conclusion :** Parmi les indices anthropométriques que nous avons étudiés, le rapport tour de taille/taille était le meilleur prédicteur de la dysglycémie parmi les Omanais adultes âgés de plus de 25 ans.

## فحص خلل سكر الدم لدى السكان البالغين في عُمان باستخدام مؤشرات أنثروبومترية

شيام جانجولي، كاماليش ساركار، سمير العدوي، عبد العزيز المحرزي

### الخلاصة

الخلفية: كشف استقصاء مقطعي مجتمعي أجري في وقت سابق في مجتمع شبه حضري أن ٤٤٪ من السكان في الفئة العمرية ١٨ فيها أكثر، يعانون من خلل في سكر الدم، وهو ما يعكس فيما يبدو المستوى الوطني. ولا توجد دراسات كافية لفحص دور المؤشرات الأنثروبومترية في الأشخاص المصابين بخلل سكر الدم.

الهدف: قمنا باستكشاف القدرة على التحري لكل من المؤشرات الأنثروبومترية ومؤشر كتلة الجسم ومحيط الخصر و"نسبة الخصر إلى الورك" و"نسبة الخصر إلى الطول" للكشف عن خلل سكر الدم لدى السكان العمانيين استناداً إلى استقصاء مجتمعي أجري في عام ٢٠٠٥. ومن شأن ما تنطوي عليه المؤشرات الأنثروبومترية من قدرات للكشف عن وجود اضطراب في سكر الدم أن تساعد في عملية الكشف عنه والوقاية منه والتثقيف الصحي بشأنه.

طرق البحث: أُدرج في هذه الدراسة ما مجموعه ٤٨٠ مشاركاً و٧٩٥ مشاركة فوق سن ١٨. وتم تحليل انتشار خلل سكر الدم باستخدام معايير جمعية داء السكري الأمريكية. واستُخدم نهج الانحدار اللوجستي وتحليل منحنى خصائص التشغيل للمتلقى.

النتائج: كشف التحليل أن متوسط قيم العمر، ومؤشر كتلة الجسم، ومحيط الخصر، ونسبة الخصر إلى الورك، ونسبة الخصر إلى الطول قد زادت زيادة كبيرة من التركيز الطبيعي للجلوكوز في الدم إلى مرحلة ما قبل السكري وإلى مزيد من المصابين بالسكري في كلا الجنسين ( $P > 0.001$ ). وظهر ازدياد في انتشار اضطراب مستوى الجلوكوز في الدم مع تقدم العمر. وأظهرت نسبة الخصر إلى الطول حساسية أعلى في الكشف عن اضطرابات مستوى الجلوكوز في الدم في جميع الفئات العمرية مقارنة بمؤشرات القياسات الأنثروبومترية الأخرى، بمعدل حساسية بلغ ٩٤٪ في من هم في عمر ٤٥ سنة أو أقل، و٨٨٪ في الفئة العمرية ٤٤-٢٥ سنة، و٦٠، ٤٥٪ في الفئة العمرية دون عمر ٢٥ سنة.

الاستنتاج: من بين المؤشرات الأنثروبومترية التي استقصيناها، شكّل مؤشر "نسبة الخصر إلى الورك" أفضل منبئ لخلل سكر الدم لدى البالغين العمانيين في الفئة العمرية ٢٥ عاماً وما أكثر.

## References

1. Al-Lamki L. UN Millennium Development Goals and Oman: kudoks to Oman on its 40th National Day. *Sultan Qaboos Univ Med J*. 2010 Dec;10(3):301–5.
2. Al-Riyami A, Abdelaty MA, Jaju S, Morsi M, Al-Kharusi H, Al-Shekaili W. *World Health Survey 2008*. Muscat, Oman: Ministry of Health; 2012.
3. Al-Lawati JA, Panduranga P, Al-Shaikh HA, Morsi M, Nohsin N, Khandekar RB, et al. Epidemiology of diabetes mellitus in Oman - results from two decades of research. *Sultan Qaboos Univ Med J*. 2015;15(2):210–7.
4. Al-Riyami et al., eds. *National health survey 2000, vol. 1. Study of life style risk factors*. Muscat: Ministry of Health, UNICEF and UNFPA; 2000.
5. Al-Riyami A, Elaty MA, Morsi M, Al-Kharusi H, Al-Shukaili W, Jaju S. Oman world health survey: part 1 - methodology, sociodemographic profile and epidemiology of non-communicable diseases in Oman. *Oman Med J*. 2012 Sep;27(5):425–43.
6. El-Aty MA, Mabry R, Morsi M, Al-Lawati J, Al-Riyami A, El-Sayed M. Metabolic syndrome and its components: secondary analysis of the World Health Survey, Oman. *Sultan Qaboos Univ Med J*. 2014 Nov;14(4):e460–7. Epub 2014 Oct 14.
7. Rahim HF, Sibai A, Khader Y, Hwalla N, Fadhil I, Alsiyabi H, et al. Non-communicable diseases in the Arab world. *Lancet*. 2014 Jan;383(9914):356–67. PMID:24452044
8. Kelly T, Yang W, Chen CS, Reynolds K, He J. Global burden of obesity in 2005 and projections to 2030. *Int J Obesity*. 2008;32:1431–7. PMID:18607383
9. Bener AI, Yousafzai MT, Darwish S, Al-Hamaq AO, Nasralla EA, Abdul-Ghani M. Obesity index that better predict metabolic syndrome: body mass index, waist circumference, waist hip ratio, or waist height ratio. *J Obes*. 2013;269038. doi: 10.1155/2013/269038.
10. Al-Shafee MA, Bhargava K, Al-Farsi Y, Mcilvenny S, Al-Mandhari A, Al-Adawi S, et al. Prevalence of pre-diabetes and associated risk factors in an adult Omani population. *Int J Diabetes Dev Ctries*. 2011;31(3):166–73.
11. Kahn HS, Bullard KM. Beyond body mass index: advantages of abdominal measurements for recognizing cardiometabolic disorders. *Am J Med*. 2016 Jan;129(1):74–81.e2. PMID:26302146
12. The problem of overweight and obesity. *Obesity: preventing and managing the global epidemic*. Report of a WHO Consultation. Geneva: World Health Organization; 2000:5–37 (WHO Technical Report Series 894).
13. Janiszewski PM, Janssen I, Ross R. Does waist circumference predict diabetes and cardiovascular disease beyond commonly evaluated cardiometabolic risk factors? *Diabetes Care*. 2007;30(12):3105–9. PMID:17712026
14. Qiao Q, Nyandorj R. Is the association of type II diabetes with waist circumference or waist-to-hip ratio stronger than that with body mass index? *Eur J Clin Nutr*. 2010;46(1):30–4. PMID:19724291
15. Cheng CH, HO CC, Yang CF, Yang YC, Huang YC, Lai CH. Waist to hip ratio is a better anthropometric index than Body Mass Index for predicting the risk of Type 2 diabetes in Taiwanese population. *Nutr Res*. 2010;30(9):585–93.
16. Jia Z, Zhou Y, Liu X, Wang Y, Zaho X, Wang Y, et al. Comparison of different anthropometric measures as predictors of diabetes incidence in a Chinese population. *Diabetes Res Clin Practice*. 2011;92:265–71.
17. Hsieh SD, Yoshinaga H, Muto T. Waist-to-height ratio, a simple and practical index for assessing central fat distribution and metabolic risk in Japanese men and women. *Int J Obesity*. 2003;27:610–6.
18. Qihan ZHU, Feixia SHEN, Tingting YE, Qi ZHOU, Huihui DENG, Xuejiang GU. Waist-to-height ratio is an appropriate index for identifying cardiometabolic risk in Chinese individuals with normal body mass index and waist circumference. *J Diabetes*. 2014;6:527–34.
19. The Expert Committee on the diagnosis and classification of diabetes mellitus: Follow-up report on the diagnosis of diabetes mellitus. *Diabetes Care*, 2003;26(11):3160–7.
20. American Diabetes Association. *Diagnosis and classification of diabetes mellitus*. *Diabetes Care*. 2013;36(Suppl. 1):S67–S74.
21. IDF consensus worldwide definition of the metabolic syndrome. Brussels: International Diabetes Federation Belgium, 2006:1–23 (<https://www.idf.org/e-library/consensus-statements/>, accessed 3 January 2018).
22. Al-Riyami AA, Afifi N. Distribution and correlates of total impaired fasting glucose in Oman. *East Mediterr Health J*. 2003;9:377–89.
23. Al-Shafee MA, Ganguly SS, Bhargava K, Duttagupta KK. Prevalence of metabolic syndrome among prediabetic Omani adults: a preliminary study. *Metab Syndr Relat Disord*. 2008;6:275–9. PMID:19067531
24. Browning LM, Hsieh SD, Ashwell M. A systematic review of waist-to-height ratio as a screening tool for the prediction of cardiovascular disease and diabetes: 0.5 could be a suitable global boundary value. *Nutr Res Rev*. 2010;23:247–69. PMID:20819243
25. Walia R, Bhansali A, Ravikiran M, Ravikumar P, Bhadada SK, Shanmugasundar G, et al. High prevalence of cardiovascular risk factors in Asian Indians: a community survey - Chandigarh Urban Diabetes Study (CUDS). *Indian J Med Res*. 2014;139(2):252–9. PMID:24718400
26. Ayah R, Joshi MD, Wanjiru R, Njau EK, C Otieno F, Njeru EK, et al. A population-based survey of prevalence of diabetes and correlates in an urban slum community in Nairobi, Kenya. *BMC Public Health*. 2013;13:371. PMID:23601475

27. Mausner JS, Kramer S, Mausner B. *Epidemiology: an introductory text*. Philadelphia: WB Saunders; 1985:221.
28. Hanley JA, McNeil BJ. A method of comparing the areas under receiver operating characteristic curves derived from the same cases. *Radiology*. 1983;148(3):839–43. PMID:6878708
29. Hosmer DW, Lemeshow S. *Applied regression*. New York: John Wiley & Sons, 1989.
30. Ashwell M, Gunn P, Gibson S. Waist-to-height ratio is a better screening tool than waist circumference and BMI for adult cardio-metabolic risk factors: systematic review and meta-analysis. *Obes Rev*. 2012;13:275–86. PMID:22106927
31. Al Safar HS, Jamieson SE, Cordell HJ, Blackwell JM, Tay GK. Heritability of quantitative traits associated with type 2 diabetes in an extended family from the United Arab Emirates. *Int J Diabetes Metab*. 2011;19:59–62.
32. Bhaktha G, Nayak S, D'Souza NDR, Shantaram M. Microalbuminuria (MAU) and its relationship with anthropometric variables in Type 2 diabetic and non diabetic females of Dakshina Kannada district in Indian population. *Int J Pharmacy Biol Sci*. 2011;1(3):341–6.
33. Jayawardana R, Ranasinghe P, Sheriff MHR, Matthews DR, Katulanda P. Waist to height ratio: A better anthropometric marker of diabetes and cardio-metabolic risks in South Asian adults. *Diabetes Res Clin Pract*. 2013;99(3):292–9.
34. Morison KM, Xu L, Tranopolosky M, Yusuf Z, Atkinson SA, Yusuf S. Screening for dysglycemia in overweight youth presenting for weight management. *Diabetes Care*. 2012;35(4):711–6. PMID:22271926
35. Khader YS, Batieha A, Jaddou H, Batieha Z, El-Khateeb M, Ajlouni K. Anthropometric cutoff values for detecting metabolic abnormalities in Jordanian adults. *Diabetes Metab Syndr Obes*. 2010;18(3):395–402. PMID:21437109
36. Gordis Leon. *Epidemiology*, 3rd ed. Philadelphia: Elsevier Saunders; 2004:79.

# Burnout among primary school teachers in Iraq: prevalence and risk factors

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## Abstract

**Background:** Studies from various parts of the world have shown that teachers are likely to suffer from burnout. So far, there has been no research on burnout among primary school teachers in Basrah, Iraq.

**Aim:** We aimed to determine the prevalence and predisposing factors of self-reported burnout among primary school teachers in Basrah.

**Methods:** This was a cross-sectional study in 32 governmental primary schools during November 2014–February 2015. A self-administered questionnaire was used to collect sociodemographic and work-related data using the Oldenburg Burnout Inventory.

**Results:** Of 800 questionnaires distributed, 706 (88.3%) were completed; 58.4% were from women. The prevalence of burnout was 24.5% (95% CI: 21.5–27.8). A statistically significant association was found between burnout and age, sex and marital status. Work-related factors that showed significant association with burnout were: work overload, problems related to career advancement, high number of students per class and student misbehaviour.

**Conclusion:** Burnout is an important health problem among primary school teachers in Basrah. A number of risk factors, particularly those related to work, are amenable to modification since they are related to the education policy.

Keywords: Basrah, burnout, prevalence, teachers

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## Introduction

The concept of professional burnout was first described in the mid-1970s, referring to “emotions of depletion and loss of motivation and commitment that social workers experience after prolonged and extensive stress conditions” (1,2). Shortly afterwards, it was characterized in detail by Maslach and Jackson (3) as a syndrome of excessive emotional load, or burnout, comprising a set of emotional and physical responses to chronic work stress.

Teaching stress is a prevalent and well confirmed problem (4). Job dissatisfaction and burnout among teachers can have personal implications such as absenteeism and decline in performance and productivity, and a negative effect on students’ outcome (5).

Risk factors for burnout among teachers may be organizational, such as work pressure, student misbehaviour (6), role stress (7), lack of support from peers and supervisors (8), school rules and type (private or governmental), school location (9) and financial considerations (10), or personal factors such as age, sex, marital status, years of service and self efficacy (11,12).

Survey data have indicated that both in the Western countries and in some Eastern European countries, about 10–40% of teachers suffer from burnout (13,14), while in Asian countries it may reach 50–70% (11).

Therefore, it becomes extremely important to investigate not only the sources or predictors of burnout but also their relationships. A considerable amount of information can be found on burnout and its related factors among school teachers in many countries, however, there is no known research on burnout among primary school teachers in Basrah, Iraq. In this study, we aimed to determine the level of self-reported burnout and the main sources of burnout among primary school teachers in Basrah.

## Methods

### Study design

This was a cross-sectional study carried out in Basrah City during the period November 2014–February 2015. The study was approved by the Research and Ethics Committee of the College of Medicine, Basrah University.

### Participants

The study population included governmental primary school teachers of both sexes.

### Sampling and sample size

The sample size was calculated assuming a prevalence rate of 50%, with a precision degree of 0.05 at the 95% confidence level, and a design effect of 1.8 (15). Taking into



consideration a nonresponse rate of 15%, the sample size was calculated as 795. Eight hundred teachers (15.2% out of 5250 primary school teachers in Basrah City) received questionnaires.

Participation in the study was voluntary and participants were assured of the confidentiality and anonymity of the survey.

### Data collection

A self-administered questionnaire especially designed for the purposes of the study was used to collect data including sociodemographic and occupational information. The survey form also included questions about student misbehaviour, in-service training, career advancement, salaries, distance from school to residence, professional relationship, years of service, workload and job satisfaction. Student misbehaviour was defined as “those behaviours involving rule-breaking, violating implicit norms or expectations, being inappropriate in the classroom settings and upsetting teaching and learning (talking out of turn, disrespecting teachers, habitual failure in submitting assignments, copying homework, lateness to class, etc.” (16). Training was defined as activities to increase the knowledge, skills and positive beliefs of teachers.

Work overload has been defined as employees' perception that they have more work than they can complete within a given time (17). Job satisfaction has been defined as a perceived relationship between what one wants from one's job and what one perceives it as offering (18). The teachers were asked to indicate how satisfied they felt with their job. The scale of answers ranged from “very satisfied” to “not at all satisfied” (19). For statistical purposes, job satisfaction was dichotomized into satisfied and unsatisfied.

The Oldenburg Burnout Inventory (20) has been found to be valid in different populations and can be applied to any occupational group (21). An English version translated into Arabic was used to measure burnout in this study. Two independent bilingual reviewers checked the Arabic translation to ensure consistency.

The Oldenburg Burnout Inventory includes 2 subscales: exhaustion and disengagement. It exhibits good test-retest reliability and internal reliability ( $\alpha > 0.80$ ) for both subscales (20). Each subscale includes 4 positively worded and 4 negatively worded items that are scored on a 4-point Likert scale from 1 “strongly agree” to 4 “strongly disagree”. After reverse scoring of the negatively worded items, the average was calculated for each subscale, with higher scores indicating higher level of burnout. The cut-off score above the 75th percentile on both subscales was considered as burnout.

### Statistical analysis

The statistical analysis was made using SPSS, version 19. Frequencies and percentages were calculated for the categorical variables. Chi-squared test or Fisher's exact test were used to assess the differences between these variables. Continuous numerical data were summarized

as mean and standard deviation (SD). Logistic regression analysis was used to determine the independent predictors of burnout. Pearson's correlation coefficient ( $r$ ) was calculated to determine the relationship between job satisfaction and burnout;  $P < 0.05$  was considered statistically significant.

## Results

A total of 800 questionnaires were distributed; 706 completed questionnaires were returned, a response rate of 88.3%.

The mean age of respondents was 36.6 (SD 8.9; range 20–63) years, 58.4% of them were women. The majority (89.8%) were classroom teachers, and 36.7% had teaching experience of > 15 years (Table 1).

The mean of the total burnout scores was 38.9 (SD 5.6), while the means for the exhaustion and disengagement subscales scores were 23.3 (SD 4.4) and 15.6 (SD 4.2) respectively. Males showed significantly higher mean burnout scores than women for the total and both subscales. The prevalence of burnout among the teachers was 24.5% (95% confidence interval: 21.5–27.8).

**Table 1. Sociodemographic and work-related characteristics of primary school teachers (n = 706) in Basrah, 2014/2015**

Variable	No.	%
<b>Age (years)</b>		
20–34	326	46.2
35–49	298	42.2
≥ 50	82	11.6
<b>Sex</b>		
Male	294	41.6
Female	412	58.4
<b>Marital status</b>		
Married	474	76.1
Unmarried	127	18.0
Divorced/widowed	105	14.9
<b>No. of children</b>		
0	139	19.7
1–3	276	39.1
> 3	291	41.2
<b>Job responsibility</b>		
Classroom teacher	634	89.8
Administration	72	10.2
<b>Years of service</b>		
1–5	186	26.3
6–10	170	24.1
11–15	91	12.9
> 15	259	36.7
<b>Training courses</b>		
Yes	366	51.8
No	340	48.2

Burnout was found to be negatively related to age. It decreased with advancing age and the difference was highly significant ( $P < 0.001$ ). Sex was also significantly associated with burnout: men showed a higher prevalence of burnout than women. Married teachers showed a significantly lower level of burnout compared with their unmarried, widowed or divorced counterparts. No significant association was detected between number of children and burnout. Number of years of service was inversely and significantly related to burnout. Teachers who had received training courses showed a significantly lower level of burnout compared with those who had no training courses (Table 2).

Table 3 shows the association between work-related factors and burnout. Work overload ( $P = 0.001$ ), students' misbehaviour ( $P = 0.002$ ), high number of students per class ( $P = 0.024$ ), and problems related to career advancement ( $P = 0.021$ ) were found to be significantly associated with burnout.

The logistic regression analysis showed that age, marital status and sex were the only sociodemographic independent risk factors for burnout; work overload,

problems related to career advancement, high number of students per class and student misbehaviour were the work-related independent risk factors (Table 4).

Only 13.5% of the teachers in our sample were dissatisfied with their job. Burnout was negatively and significantly correlated with job satisfaction ( $r = -0.131$ ,  $P < 0.001$ ).

## Discussion

This study, which is the first to examine burnout among teachers in Basrah, showed a high rate of burnout (24.5%) among the participants. Although comparing our results with those of others is not straightforward due to variations in sociocultural factors, occupational settings or using different measures of assessment, our findings are in line with those of a number of other studies. A similar prevalence of burnout among teachers was reported in studies from a number of countries, e.g. 26% in Taiwan (22), 11.6% in Sri Lanka (23) and 21% in Tunisia (24). Quality of education in Iraq is declining now due to poor preparation and weak training of teachers, lack of minimum standards of teaching materials, and

**Table 2. Association of burnout with selected risk factors among primary school teachers (n = 706) in Basrah, 2014/2015**

Variable	Burnout		No burnout		$\chi^2$	P-value
	No.	%	No.	%		
<b>Age (years)</b>					15.995	< 0.001
20–34	102	31.3	224	68.3		
35–49	59	19.8	239	80.2		
≥ 50	12	14.6	70	85.4		
<b>Sex</b>					16.605	< 0.001
Male	95	32.3	199	67.7		
Female	78	18.9	334	81.1		
<b>Marital status</b>					13.364	0.001
Married	97	20.5	377	79.5		
Unmarried	39	30.7	88	69.3		
Divorced/Widowed	37	35.2	68	64.8		
<b>No. of children</b>					4.534	0.104
0	42	30.2	97	69.8		
1–3	70	25.4	206	74.6		
> 3	61	21.0	230	79.0		
<b>Job responsibility</b>					0.011	0.918
Classroom teacher	155	24.4	479	75.6		
Administrative	18	25.0	54	75.0		
<b>Years of service</b>						
1–5	62	33.3	124	66.7	15.410	0.001
6–10	45	26.5	125	73.5		
11–15	21	23.1	70	76.9		
> 15	45	17.4	214	82.6		
<b>Training courses</b>					4.435	0.026
Yes	77	21.0	289	79.0		
No	96	28.2	244	71.8		
<b>Total</b>	<b>173</b>	<b>24.5</b>	<b>533</b>	<b>75.5</b>		

**Table 3. Association of burnout with work-related factors among primary school teachers (n = 706) in Basrah, 2014/2015**

Variable	Burnout		No burnout		$\chi^2$	P-value
	No.	%	No.	%		
<b>Work overload</b>					14.589	0.001
Absent	108	21.1	405	78.9		
Present	65	33.7	128	66.3		
<b>Low salary</b>					0.860	0.354
No	49	23.3	171	77.7		
Yes	124	25.5	362	74.5		
<b>Students' misbehaviour</b>					9.563	0.002
Absent	75	19.8	303	80.2		
Present	98	29.9	230	70.1		
<b>Distance from residence to school (Km)</b>					0.081	0.770
< 10	124	24.8	376	75.2		
≥ 10	49	23.8	157	76.2		
<b>High no. of students per class</b>					5.081	0.024
No	26	17.4	123	82.6		
Yes	147	26.4	410	73.6		
<b>Problems related to career advancement</b>					5.358	0.021
Absent	95	21.6	345	78.4		
Present	78	29.3	188	70.7		
<b>Problems with colleagues</b>					0.809	0.368
Absent	131	25.4	385	74.6		
Present	42	22.1	148	77.9		
<b>Total</b>	<b>173</b>	<b>24.5</b>	<b>533</b>	<b>75.5</b>		

**Table 4. Logistic regression analysis of independent predictors of burnout among primary school teachers (n = 706) in Basrah, 2014/2015**

Variable	B	P	OR	95% CI
Age	-0.030	0.006	0.97	0.95-0.91
Marital status	0.322	0.005	1.38	1.10-1.73
Sex (male)	0.544	0.003	1.72	1.20-2.47
Work overload	0.500	0.009	1.85	1.14-2.40
Problems related to career advancement	0.376	0.045	1.46	1.01-2.10
High no. of students/class	0.252	0.032	1.29	1.15-2.12
Students' misbehaviour	0.299	0.035	1.49	1.03-2.16

OR = odds ratio.

CI = confidence interval.

deteriorating infrastructure. Furthermore, teachers are demoralized and unmotivated (25), these factors together with that studied in this study could be the reasons for such high prevalence rate of burnout among primary school teachers in Basrah.

We found that younger teachers and those with fewer years of service showed a significantly higher rate of burnout than their older and more experienced counterparts; this has also been reported in other studies (26-28). Younger teachers may be more idealistic and may feel inadequate and undervalued if they fail to reach their students (29,30).

Studies on the role of sex in prevalence of burnout have shown inconsistent results. Some studies have found that male teachers were more subject to burnout than females (31,32) and this is in accordance with our own findings. However, other studies have reported that female teachers experienced burnout more than males (27,33) or that there was no difference in burnout rates (34). In a 1992 study, it was reported that men and women suffered burnout in similar ways but they differed in what they experienced as stressors (35). Some researchers have attributed sex differences in burnout to the different career expectations resulting from differences in sex role socialization or to differences in the ways men and women cope with stress (36). It has also been suggested that women may have a wider range of social relationship and support than men that can help them in coping with burnout (37).

We found that married teachers showed a lower rate of burnout than single teachers. The findings of previous research on this aspect are not clear-cut: some studies found that single people were more susceptible to burnout (26,38) while others found no significant association (39,40).

In agreement with many studies, we found that work-related factors played a significant role in burnout development. Work pressure or overload was significantly related to burnout, a finding that has been reported by others (41,42). In line with the findings of a

French study (43), high number of students per class was significantly associated with burnout.

Other significant sources of burnout were student misbehaviour and problems related to career advancement. Similarly, Hastings et al. found that difficulties experienced with student behaviour were associated with burnout (44) and according to a study in Kenya, lack of promotion opportunities or slow progress in career advancement were found to be risk factors for burnout (45).

In univariate analysis, we found that number of years of service was negatively and significantly associated with burnout, but the association disappeared in multivariate analysis, possibly due to the confounding effect of age: older teachers were found to be less burnt out than younger teachers.

In accordance with the results of a study in Namibia (46), we found a significant negative correlation between job satisfaction and burnout in teachers.

This study had some limitations. It was a cross-sectional study, and consequently this may preclude

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inferences of causality among variables. Nonresponse is a particular problem affecting cross-sectional studies and can result in bias of the measures of outcome. This is a particular problem when the characteristics of nonrespondents differ from those of respondents. In our study, the response rate was good and there is no reason to believe that those who declined to participate were systematically different from those included in the study in terms of their career characteristics. Despite the limitations, the results of our study are comparable to published findings.

In conclusion, burnout is an important health problem among primary school teachers in Basrah, and many risk factors, particularly those related to work, are amenable to modification since they are related to the national education policy. Therefore, there is a need for periodic psychological assessment of teachers to early detect burnout and for the introduction of an intervention policy to prevent its effects on job performance.

## Épuisement professionnel chez les professeurs des écoles primaires en Iraq : prévalence et facteurs de risque

### Résumé

**Contexte :** Des études issues de différentes parties du monde ont révélé que les professeurs sont exposés au risque d'épuisement professionnel (burnout). À ce jour, aucune recherche n'a été réalisée sur l'épuisement professionnel parmi les professeurs des écoles primaires à Bassora, en Iraq.

**Objectif :** La présente étude avait pour objectif de déterminer la prévalence et les facteurs prédisposant à l'épuisement professionnel perçu par les professeurs des écoles primaires à Bassora.

**Méthodes :** Une étude transversale a été conduite dans 32 écoles primaires gouvernementales entre novembre 2014 et février 2015. Un questionnaire auto-administré a été utilisé afin de recueillir des données sociodémographiques et des informations directement liées à la profession à l'aide de l'Inventaire du burnout d'Oldenberg (OLBI).

**Résultats :** Sur 800 questionnaires distribués, 706 (88,3 %) ont été remplis, dont 58,4 % par des femmes. La prévalence de l'épuisement professionnel était de 24,5 % (IC à 95 % : 21,5-27,8). Une association statistiquement significative a été trouvée entre l'épuisement professionnel et l'âge, le sexe, et le statut marital. Les facteurs directement liés à l'activité professionnelle ont montré une association significative avec l'épuisement professionnel quand il y avait une surcharge de travail, des problèmes liés à l'avancement de carrière, un grand nombre d'élèves par classe et des problèmes de comportement chez ces derniers.

**Conclusion :** L'épuisement professionnel constitue un problème de santé important parmi les professeurs des écoles primaires à Bassora. Un nombre de facteurs de risque, notamment ceux directement liés à l'activité professionnelle, sont sujets à modification étant donné qu'ils sont inhérents à la politique d'éducation.

### الإرهاك في أوساط معلمي المدارس الابتدائية في العراق: معدل الانتشار وعوامل الخطر

جاسم الأسدي، شكرية خلف، عقيل الوائلي، علاء عبد، صباح شامي

#### الخلاصة

الخلفية: أظهرت دراسات أجريت في أنحاء مختلفة من العالم أن المعلمين معرضون للإصابة بالإرهاك. وحتى الآن، لم يجر أي بحث بشأن الإرهاك بين معلمي المدارس الابتدائية في البصرة بالعراق.

الهدف: تمثل هدفنا من هذه الدراسة في تحديد مستوى انتشار الإنهاك حسب الإفادات الذاتية والعوامل المؤدية إليه بين معلمي المدارس الابتدائية في البصرة.

طرق البحث: أجريت دراسة مقطعية في ٣٢ مدرسة ابتدائية حكومية خلال الفترة من نوفمبر/ تشرين الثاني ٢٠١٤ حتى فبراير/ شباط ٢٠١٥. واستخدم استبيان يجاب عليه ذاتياً لجمع بيانات اجتماعية-سكانية وبيانات متعلقة بالعمل باستخدام قائمة أولدنبرج للإنهاك.

النتائج: من أصل ٨٠٠ استبيان تم توزيعه، استكمل ٧٠٦ (٨٨,٣٪) منها؛ ٤,٥٨٪ من نساء. وبلغ مستوى انتشار الإنهاك ٢٤,٥٪ (٩٥٪ CI: ٢١,٥ - ٢٧,٨). وتبين وجود ارتباط ذي دلالة إحصائية بين الإنهاك والعمر والنوع والحالة الاجتماعية. وجاء من بين العوامل المرتبطة بالعمل والتي أظهرت ارتباطاً كبيراً بالإنهاك: فرط عبء العمل، والمشكلات المتصلة بالارتقاء الوظيفي، وارتفاع عدد الأطفال في الفصل الدراسي، وسوء سلوك الطلاب.

الاستنتاج: يشكّل الإنهاك مشكلة صحية مهمة بين معلمي المدارس الابتدائية في البصرة. وثمة عدد من عوامل الخطر، لا سيما تلك المرتبطة بالعمل، يمكن تعديلها نظراً لارتباطها بالسياسة التعليمية.

## References

1. Freudenberger HJ. Staff burnout. *J Soc Issues*. 1974;30:159-65.
2. Freudenberger HJ. The staff burnout syndrome in alternative institutions. *Psychother Res*. 1975;12:72-83.
3. Maslach C, Jackson SE. Maslach burnout inventory-human services survey (MBI-HSS). In: Maslach C, Jackson SE, Leiter MP, eds. *Maslach burnout inventory manual*, 3rd ed. Palo Alto, California: Consulting Psychologists Press; 1996.
4. Kokkinos CM. Job stressors, personality and burnout in primary school teachers. *Br J Educ Psychol*. 2007;77:229-43. PMID:17411497
5. Chenoufi L, Ellouze F, Cherif W, Mersni M, M'rad MF. [Stress and burnout among Tunisian teachers]. *Encephale*. 2012;38(6):480-7 (in French). PMID:23200614
6. Klassen RM. Teacher stress: the mediating role of collective efficacy beliefs. *J Educ Res*. 2010;103 (5):342-50.
7. Conley S, Woosley SR. Teacher role stress, higher order needs and work outcomes. *J Educational Admin*. 2000;38:179-201.
8. Wang Y, Ramos A, Wu H, Liu L, Yang X, Wang J, et al. Relationship between occupational stress and burnout among Chinese teachers: a cross-sectional survey in Liaoning, China. *Int Arch Occup Environ Health*. 2015;88(5):589-97. PMID:25256806
9. Santana Â, De Marchi D, Junior LC, Gironoli YM, Chiappeta A. Burnout syndrome, working conditions, and health: a reality among public high school teachers in Brazil. *Work*. 2012;41(Suppl. 1):3709-17. PMID:22317286
10. Tye BB, O'Brien L. Why are experienced teachers leaving the profession? *Phi Delta Kappan*. 2002;84:24-32.
11. Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol*. 2001;52:397-422. PMID:11148311
12. Ventura M, Salanova M, Llorens S. Professional self-efficacy as a predictor of burnout and engagement: the role of challenge and hindrance demands. *J Psychol*. 2015;149(3-4):277-302. PMID:25590343
13. Quattrin R, Ciano R, Saveri E, Balestrieri M, Biasin E, Calligaris L, et al. Burnout in teachers: an Italian survey. *Ann Ig*. 2010;22(4):311-8. PMID:21417167
14. Kristensen TS, Borritz M, Villadsen E, Christensen KB. The Copenhagen Burnout Inventory: a new tool for the assessment of burnout. *Work & Stress*. 2005;19(3):192-207.
15. Gorstein J, Sullivan KM, Parvanta I, Begin F: Indicators and methods for cross-sectional surveys of vitamin and mineral status of populations. The Micronutrient Initiative (Ottawa) and the Centers for Disease Control and Prevention (Atlanta) 2007 (<http://www.who.int/vmnis/toolkit/mcn-micronutrient-surveys.pdf>, accessed 25 November 2017).
16. Sun RCF, Shek DT. Student classroom misbehavior: an exploratory study based on teachers' perceptions. *Scientific World Journal*. 2012;2012:208907. PMID:22919297
17. Jex SM. *Stress and job performance: Theory, research and implications for managerial practice*. Thousand Oaks, California: Sage; 1998.
18. Lund DB. Organizational culture and job satisfaction. *J Bus Ind Market*. 2003;18:219-236.
19. Darmody M, Smyth E. Job satisfaction and occupational stress among primary school teachers and school principals in Ireland. Maynooth, Ireland: The Teaching Council; 2010 (<http://www.teachingcouncil.ie/en/Publications/Research/Documents/Job-Satisfaction-and-Occupational-Stress-among-Primary-School-Teachers-and-School-Principals-in-Ireland.pdf>, accessed 7 November 2017).
20. Demerouti E, Bakker AB, Vardakou I, Kantas A. The convergent validity of two burnout instruments: a Greek study. *Eur J Psychol Assess*. 2003;19(1):12-23.
21. Halbesleben J, Demerouti E. The construct validity of an alternative measure of burnout: Investigating the English translation of the Oldenburg Burnout Inventory. *Work & Stress*. 2005;19(3):208-20.
22. Kyriacou C, Chien P. Teachers stress in Taiwanese primary schools. *J Educational Enquiry*. 2004;5:2-5.

23. De Silva PV, Hewage CG, Fonseka P. Prevalence of burnout and its correlates among female primary school teachers in the southern province of Sri Lanka. *Eur J Preventive Medicine*. 2015;3(2-1):9-14.
24. Chennoufi L, Ellouze F, Cherif W, Mersni M, M'rad MF. [Stress and burnout among Tunisian teachers]. *Encephale*. 2012;38(6):480-87 (in French). PMID:23200614
25. Issa JH, Jamil H. Overview of the Education System in Contemporary Iraq. *European Journal of Social Sciences* 2010;14(3):360-8.
26. Luk AL, Chan BPS, Cheong SW, Ko SKK. An exploration of the burnout situation on teachers in two schools in Macau. *Soc Indic Res*. 2010;93(3):489-502. PMID:20062816
27. Lau PSY, Yuen MT, Chan RMC. Do demographic characteristics make a difference to burnout among Hong Kong secondary school teachers? *Soc Indic Res*. 2005; 71:491-516. PMID:20062816
28. Singh P, Aulak DS, Mangat SS, Aulak MS. Systematic review: factors contributing to burnout in dentistry. *Occup Med (Lond)*. 2016;66(1):27-31. PMID:26443193
29. Gibbs B. Novice but great. *Talking About Teaching*. 2010;4:47-53.
30. Daniel J, Sarmany-Schuller I. Burnout in teacher's profession: age, year of practice and some disorders. *Studia Psychologica*. 2000;42(1-2):33-41.
31. Bauer J, Unterbrink T, Hack A, Pfeifer R, Buhl-Griesshaber V, Muller U, et al. Burnout and effort-reward-imbalance in a sample of 949 German teachers. *Int Arch Occup Environ Health*. 2007;80(5):433-41. PMID:17294239
32. Correa-Correa Z, Muñoz-Zambrano I, Chaparro AF. [Burnout syndrome in teachers from two universities in Popayán, Colombia.] *Rev Salud Publica (Bogota)*. 2010;12(4):589-98 (in Spanish). PMID:21340124
33. Zhang L, Zhao J, Xiao H, Zheng H, Xiao Y, Chen M, et al. Mental health and burnout in primary and secondary school teachers in the remote mountain areas of Guangdong Province in the People's Republic of China. *Neuropsychiatr Dis Treat*. 2014;10:123-30. PMID:24465129
34. Jamshidirad M, Mukundan J, Nimehchisalem V. Language teachers' burnout and gender. *Int J Applied Linguistics and Eng Lit*. 2012;1(4):46-52.
35. Beer J, Beer J. Burnout and stress, depression and self-esteem of teachers. *Psychol Rep* 1992;71(3 Pt 2):1331-36. PMID:1480718
36. Purvanova RK, Muros JP. Gender differences in burnout: a meta-analysis. *J Vocat Behav*. 2010;77:168-85.
37. Ahola K, Toppinen-Tanner S, Huuhtanen P, Koskinen A, Väänänen A. Occupational burnout and chronic work disability: An eight-year cohort study on pensioning among Finnish forest industry workers. *J Affect Disord*. 2009;115(1-2):150-9. PMID:18945493
38. Cui G, Wang F, Xu Y. [Job burnout among physicians in ten areas of China.] *Zhonghua Yi Xue Za Zhi*. 2013;93(47):3773-5 (in Chinese). PMID:24548396
39. Aguwa EN, Nduka I, Arinze-Onyia SU. Assessment of burnout among health workers and bankers in Aba south local government area, Abia state, South East Nigeria. *Niger J Clin Pract*. 2014;17(3):296-302. PMID:24714006
40. Popa F, Arafat R, Purcarea VL, Lala A, Popa-Velea O, Bobimac G. Occupational burnout levels in emergency medicine - a stage 2 nationwide study and analysis. *J Med Life*. 2010;3:449-53. PMID:21254747
41. Sonnentag S, Kuttler I, Fritz C. Job stressors, emotional exhaustion, and need for recovery: A multi-source study on the benefits of psychological detachment. *J Vocat Behav*. 2010;76(3):355-65.
42. Mukundan J, Khandehroo K. Burnout among English language teachers in Malaysia. *Contemp Issues Educ Res* 2010;3(1):71-6.
43. Vercambre MN, Brosselin P, Gilbert F, Nerrière E, Kovess-Masféty V. Individual and contextual covariates of burnout: a cross-sectional nationwide study of French teachers. *BMC Public Health* 2009;9:333. PMID:19744328.
44. Hastings RP, Bham MS. The relationship between student behavior patterns and teacher burnout. *School Psychol Int*. 2003;24:115-27.
45. Ng'eno G. Causes of Burnout among primary school teachers within Kericho municipality, Kenya. *Journal of Technology and Education in Nigeria*. 2007;12(2):9-18.
46. George E, Louw D, Badenhorst G. Job satisfaction among urban secondary-school teachers in Namibia. *S Afr J Educ* 2008;28(2):135-54.

# Relationship between lean practices, soft total quality management and innovation skills in Lebanese hospitals

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## Abstract

**Background:** Lean practices are critical to eliminate waste and enhance the quality of healthcare services through different improvement approaches of total quality management (TQM). In particular, the soft side of TQM is used to develop the innovation skills of employees that are essential for the continuous improvement strategies of hospitals.

**Aim:** The main objective was to study the relationship between lean practices, soft TQM and innovation skills in Lebanese hospitals.

**Methods:** A quantitative methodology was applied by surveying 352 employees from private and public hospitals in Lebanon. The primary collected data were valid and reliable when analysed by SPSS and AMOS software as a part of structural equation modelling.

**Results:** Lean practices significantly influenced the innovation skills; however, soft TQM did not mediate this relationship because it was not well implemented, especially at the level of people-based management and continuous improvement.

**Conclusion:** This study has implications for healthcare practitioners to make greater efforts to implement lean practices and soft TQM. Future studies are suggested to highlight different challenges facing quality improvement in the Region.

Keywords: Quality management, Lebanon, hospitals, innovation

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## Introduction

In response to the technological revolution in the healthcare industry and to meet the quality standards of accreditation systems, healthcare organizations have been struggling to find innovative ways to compete, decrease costs and enhance the quality of their services. Hospitals are complex organizations with many different departments and they are subject to work shifts and high employee turnover. This leads to shortage of skilled human resources and limited employee participation, especially when only a few people at the front line are engaged in the innovation process (1,2). Employees must possess the necessary skills to help with the creation of innovative methods to meet the needs of the healthcare sector (3,4). Therefore, hospitals have to focus more on enhancing the innovation skills of their employees and invest appropriately to innovate successfully through adopting and implementing different improvement strategies such as lean practices and soft total quality management (TQM).

The main purpose of lean practices is to eliminate waste and ensure the most advantageous utilization of existing resources in the organization (1,5). Some of the lean practices that best fit the hospital environment are kaizen, quick changeover, poka-yoke, just in time (JIT), jidoka, andon, kanban and hoshin kanri. JIT is the technique of supplying the right quantity at the right

time and correct location, while jidoka is a series of cultural and technical issues that combines machine and manpower together. Poka-yoke is a Japanese term for error proofing and kanban is related to inventory and material management. Andon or line stop is a notification method used to show that a problem is detected in the process line. Hoshin kanri is a method by which strategic goals are derived from staff inputs and it relies on policy development and benchmarking. In addition, 5S workplace discipline is a major lean practice initiative for standardization of work within an organization. It is defined as the system of rules and standards for organizing, cleaning, developing and sustaining a productive work environment (6–8).

Soft TQM focuses on human resource management that is based on leadership, teamwork, training and employee involvement principles (9). However, these soft quality factors are intangible and difficult to be measured, such as top management commitment and involvement, empowerment, effective communication, teamwork and training education (10). Therefore, these soft skills can be discussed in the context of 2 major headings: people-based management and continuous improvement.

For the present study, it was important to propose a theoretical framework that filled the gaps that could not be adequately covered in previous studies. This study was based on 2 theories that have attracted wide

academic and managerial attention in recent years: the theory of constraints and the resource-based view theory. The former has been defined as “a thinking process that enables people to invent simple solutions to seemingly complex problems” (11). The latter emphasizes the significant role of resources, especially human, in the improvement strategies at any organization. The theoretical framework of the study is presented in Figure 1.

## Methods

### Research objectives

The foremost objective of this study was to determine the mediating effect of soft TQM on the relationship between lean practices and innovation skills of employees in hospitals in Lebanon. The concept of this study was developed upon detecting a gap in the literature regarding the enhancement of innovation skills of employees in the healthcare sector. It seems to be difficult for employees integrated in an ordinary culture of standards to innovate in solving problems and reducing waste in the workplace, especially when there is lack of staff empowerment and teamwork. Therefore, the aim of this research was to determine the ability of employees to enhance their innovation skills through the implementation of lean practices as an effective means for elimination of waste, while maintaining a culture of quality through practicing soft TQM.

Ten hypotheses were developed based on the proposed theoretical research framework: (1) lean practices positively and significantly affect innovation skills; (2) lean strategies positively and significantly affect innovation skills; (3) standardization positively and significantly affects innovation skills; (4) soft TQM positively and significantly affects innovation skills; (5) lean practices positively and significantly affect soft TQM; (6) lean strategies positively and significantly affect soft TQM; (7) standardization positively and significantly affects soft TQM; (8) soft TQM has a significant and positive mediating influence between lean practices and innovation skills; (9) soft TQM has a positive and significant mediating influence between lean strategies

and innovation skills; and (10) soft TQM has a positive and significant mediating influence between standardization and innovation skills.

### Study design

This was a quantitative and cross-sectional study. The sample included 162 hospitals with contracts with the Lebanese Ministry of Public Health. The target population was hospital employees, who were estimated to number 25 571 (12). The unit of analysis used was the individual, including nursing, medical, administrative and technical staff of hospitals. The sample size was 400 (13,14).

### Data collection

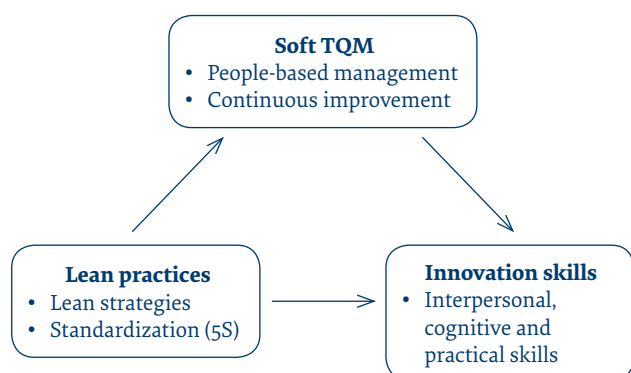
The survey was conducted using a self-administered questionnaire. The measurement items were retrieved from the literature review and the content validity was approved through pretesting. A multistage sampling technique was used. First, clusters of hospitals were chosen based on distribution by type, province and level of accreditation. Then, each hospital allowed us to survey a specific number of employees based on their own policies. Finally, 400 questionnaires were distributed randomly among the number of employees that was recommended by the administration of each hospital. The 6-point Likert rating scale was adopted (15) to measure the research variables. Thus, the respondents' answers ranged between 1, strongly disagree to 6, strongly agree. The survey was limited to 11 private and 2 public hospitals. Most of the surveyed hospitals had a high accreditation level that was appropriate for conducting the survey and achieving the research objectives.

### Statistical analysis

Survey data were analysed by SPSS and AMOS software. Data were screened for missing values and outliers were checked through a simple linear regression test based on comparing the Mahalanobis output with the  $\chi^2$  test (16,17). In addition, the assumptions of linearity and homoscedasticity were approved using the normal P-P and scatter plots of the standardized residuals. Assumptions of normality were also approved through transformation of items using z scores. Goodness of measure was achieved through testing the reliability and validity of the items. Data were analysed through structural equation modelling (SEM). The measurement model was assessed by checking the construct validity through testing the convergent validity using confirmatory factor analysis, and construct validity through discriminant validity, in addition to measuring the composite reliability among the set of items representing each construct. To test the research hypotheses, the bias-corrected bootstrap method was applied as it provides unbiased estimates of mediation effects and produces more accurate confidence intervals (18).

## Results

The usable response rate for this study was 95% and no missing values were detected. In addition, 28 outliers



**Figure 1** Research theoretical framework. TQM = total quality management.



among the respondents were checked and assumptions of linearity, homoscedasticity and normality were also approved.

Two hundred and fifty-seven (67.6%) respondents were female and 197 (51.8%) were aged 20–30 years. For education level, 113 (29.7%) respondents had a Baccalaureate Technique or Superior Technician qualification. For work experience, 142 (37.4%) respondents had an average of 5–10 years. Moreover, 169 (44.5%) respondents had worked at the surveyed hospital for < 5 years and 225 (59.2%) respondents were nurses.

Based on the descriptive statistics of research variables, the average mean values of all variables ranged between 4.36 and 5.11, indicating that employees had a high level of agreement regarding the measured items of the study: innovation skills (INS) 4.92; lean strategies (LS) 4.36; standardization (S) 4.99; people-based management (PBM) 4.93; and continuous improvement (CI) 5.11). Moreover, the results of the correlation matrix indicated that there was no multicollinearity between the latent variables of this study since all the correlations were significant at the 0.01 level and the Pearson correlation coefficients were < 0.8.

For goodness of measure and based on the reliability test, all the items showed a good level of internal consistency with Cronbach's  $\alpha > 0.7$  ( $0.748 < \alpha < 0.909$ ).

Exploratory factor analysis confirmed the significance of the validity where Kaiser–Meyer–Olkin measure of sampling adequacy values of all three constructs were > 0.5 and Bartlett's test of sphericity was significant with  $P < 0.05$  (16).

The first- and second-order structural models obtained by SEM analysis are presented in Figures 2 and 3, respectively. These models were obtained after deleting items with low standardized factor loadings (< 0.5) and high modification indices. Also, as suggested by Hair et al. (17), the goodness of fit indices achieved the threshold measures, including comparative fit index ( $\geq 0.90$ ), goodness of fit index ( $\geq 0.90$ ), adjusted goodness of fit index ( $\geq 0.90$ ), root mean square error of approximation ( $\geq 0.08$ ) and Tucker Lewis index ( $\geq 0.90$ ). All the constructs showed an acceptable level of composite reliability with values ranging between 0.709 and 0.895 (Table 1), indicating a high level of consistency among the items of each latent construct.

Finally, the hypotheses testing results showed that 6 hypotheses were accepted with significant  $P$  values at 0.001 and 0.05 levels, while 4 hypotheses were rejected with nonsignificant  $P$  values (Table 2).

### Discussion

We showed that lean practices, including lean strategies and standardization, had a significant and positive influence on the innovation skills of the employees. These results are in line with previous studies (19,20). In contrast to the traditional perception that states that standardization limits innovation, this study proved the opposite, as also illustrated by Kovachevam (21). He found that standards promote innovation when the openness of the standardization process is considered.

The application of lean practices has been criticized for its lack of human integration or limited applicability

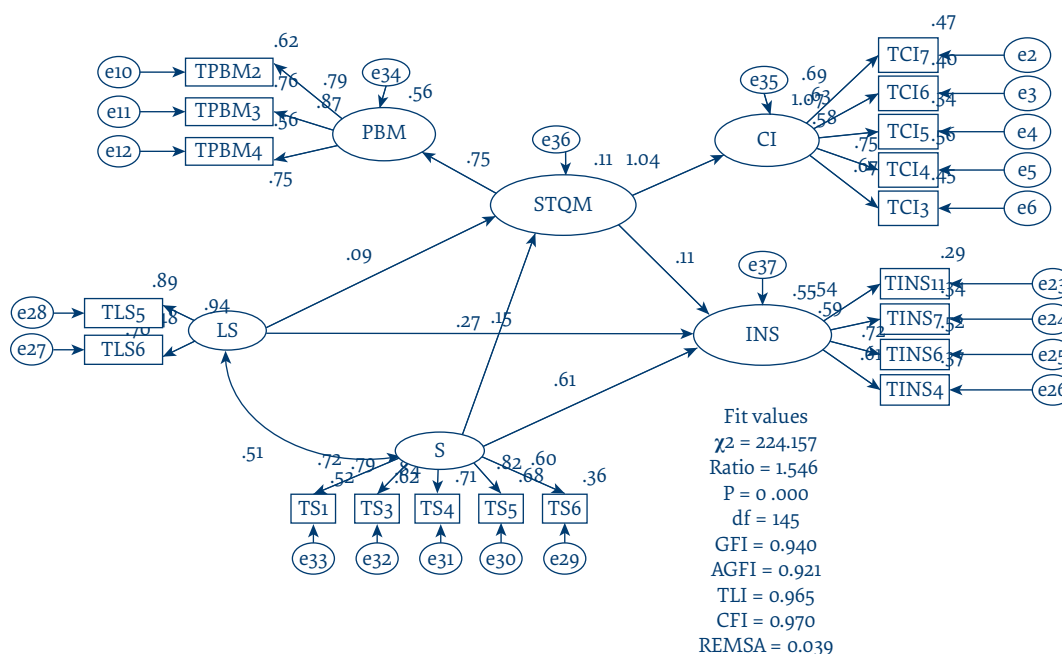


Figure 2 First-order structural model.

AGFI = Adjusted Goodness of Fit Index; CFI = Comparative Fit Index; GFI = Goodness of Fit Index; RMSEA = root mean square error of approximation; TLI = Tucker Lewis Index; STQM = soft total quality management; INS = innovation skills; S = standardization; CI = continuous improvement; LS = lean strategies; PBM = people-based management; Transformed Items Using Z-Scores (TLS, TPBM, TS, TCI, TINS and TS)

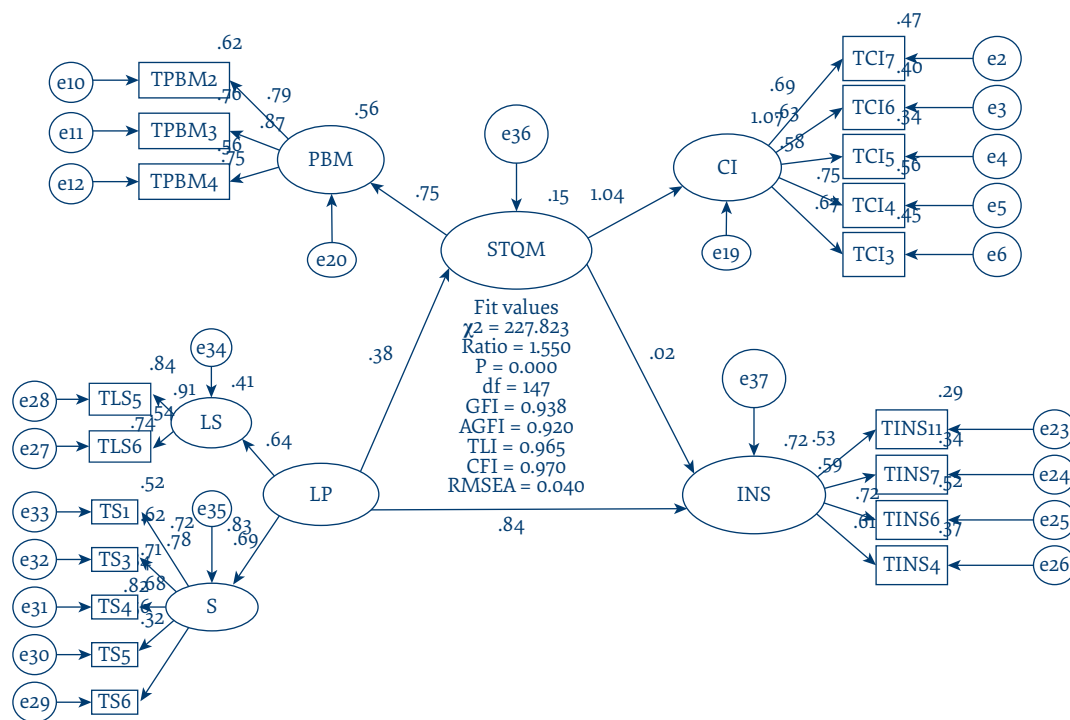


Figure 3 Second-order structural model.

AGFI = Adjusted Goodness of Fit Index; CFI = Comparative Fit Index; GFI = Goodness of Fit Index; RMSEA = root mean square error of approximation; TLI = Tucker Lewis Index; STQM = soft total quality management; INS = innovation skills; S = standardization; CI = continuous improvement; LS = lean strategies; PBM = people-based management; Transformed Items Using Z-Scores (TLS, TPBM, TS, TCI, TINS and TS).

Table 1 Average variance extracted and composite reliability of constructs

Constructs	Items	L	L <sub>2</sub>	VE	AVE	AVE SQRT	A	CR
Innovation skills	TINS4	0.609	0.370	0.629	0.381	0.617	0.704	0.709
	TINS6	0.722	0.521	0.478				
	TINS7	0.586	0.343	0.656				
	TINS11	0.537	0.288	0.711				
STQM	TPBM2	0.786	0.617	0.382	0.519	0.720	0.867	0.895
	TPBM3	0.871	0.758	0.241				
	TPBM4	0.746	0.556	0.443				
	TCI3	0.668	0.446	0.553				
	TCI4	0.751	0.564	0.435				
	TCI5	0.58	0.336	0.663				
	TCI6	0.631	0.398	0.601				
TCI7	0.689	0.474	0.525					
Lean strategies	TLS5	0.943	0.889	0.110	0.686	0.828	0.791	0.810
	TLS6	0.695	0.483	0.516				
Standardization	TS1	0.723	0.522	0.477	0.578	0.760	0.867	0.871
	TS3	0.787	0.619	0.380				
	TS4	0.842	0.708	0.291				
	TS5	0.824	0.678	0.321				
	TS6	0.6	0.36	0.64				

A = Cronbach's  $\alpha$ ; AVE; Average variance extracted; AVE SQRT = square root of every AVE value; CR = composite reliability; L = loading; STQM = soft total quality management; TCI = transformed items for continuous improvement; TINS = transformed items for innovations skills; TLS = transformed items for lean strategies; TPBM = transformed items for people-based management; TS = transformed items for S; VE = variance error.

in certain environments. Critics have suggested that problems arise when organizations try to apply lean practice strategies to areas in which creativity and

innovation are required (22). The main criticism is at the human level, where lean production is considered to dehumanize and exploit the work force (23). It was

**Table 2 All hypotheses testing results**

	Research hypotheses	Result	P
H1	Lean practices positively and significant affect innovation skills	Accepted	**
H2	Lean strategies positively and significantly affect innovation skills	Accepted	0.023*
H3	Standardization positively and significantly affects innovation skills	Accepted	**
H4	Soft TQM positively and significantly affects innovation skills	Rejected	0.796
H5	Lean practices positively and significantly affect soft TQM	Accepted	**
H6	Lean strategies positively and significantly affect soft TQM	Rejected	0.193
H7	Standardization positively and significantly affects soft TQM	Accepted	**
H8	Soft TQM has a significant and positive mediating influence between lean practices and innovation skills	Rejected	0.812
H9	Soft TQM has a positive and significant mediating influence between lean strategies and innovation skills	Rejected	0.200
H10	Soft TQM has a positive and significant mediating influence between standardization and innovation skills	Accepted	0.029*

\*Significant at level of 0.05; \*\*significant at level of 0.001.

claimed by Hines et al. (24) that the key aspects of this criticism are the “lack of contingency and ability to cope with variability, the lack of consideration of human aspects and the narrow operational focus on the shop-floor”. Similarly, Seddon et al. (25) criticized lean practice programmes and standardization of work as demeaning and demoralizing, where workers have to do more repetitive work.

Hence, healthcare organizations in Lebanon are on the right track in promoting the innovation skills of their employees as they are implementing the quality standards and lean practices such as the 5S programme. This tool helps organizations to eliminate inappropriate actions and sustain a productive work environment (7).

Although lean practice principles are often associated with technical tools related to problem-solving methods, there is a soft side as well. Basically, this is the ability of leadership to build a collaborative work environment that encourages other soft skills among employees, such as communication skills and the ability to motivate and foster teamwork (3). These features are consistent with soft TQM methods that focus on training administrators, managers and supervisors to be lean practice leaders. Such improvements are achieved through implementing rapid improvement teams of employees, applying a 5S programme, standardizing work and maintaining continuous improvement.

The present study showed a significant direct correlation between lean practices and soft TQM, but in particular, lean strategies had a weak correlation

with the dimensions of soft TQM compared to that of standardization. Furthermore, the results of hypotheses testing indicated that in general, lean practices had a positive and significant influence on soft TQM, but in particular, this influence was achieved through standardization and not through the lean strategies. This is consistent with the culture of accreditation and assessment at hospitals that forces employees to be more concerned and restricted to the standards and discipline of work to maintain high quality of services. However, lean strategies are more dependent on employees’ voluntary actions such as being involved in teamwork activities or their speed in detecting problems in the workplace and taking decisions to resolve them.

Previous studies have shown similar findings regarding the positive relationship between lean practices and soft TQM (26–28). However, lean practices are generally weaker on the human behaviour side. There is still a concept that considers lean practices as an inhibitor of improvement, especially when related to reducing costs and setting limits, which can lead organizations to be narrow-minded and hinder the creativity of their employees (28).

In contrast to previous studies (7,29), we did not find a direct impact of soft TQM on innovation skills. Although TQM practices have been considered essential to develop the innovation skills of employees, they do not appear to be an effective tool for improving the necessary skills in healthcare organizations. Several studies have shown that TQM inhibits innovation in cases with poor implementation (30,31); however, others have found that TQM has a positive impact on innovation capabilities (28,32). However, criticism has been raised that effective TQM transformation is difficult because of weak change management culture that is related to the employees’ resistance to change and innovation (33).

Our results indicate that soft TQM mediates the relationship between standardization and innovation skills. This is in line with previous studies (34) that have shown that standardization can drive innovation and lead to transformation, especially at the level of employees’ skills. However, soft TQM did not mediate the relationship between lean practice strategies and the innovation skills of employees. The lack of skilled employees limits hospitals from generating and sustaining competitive advantages and consequently leads to failure of the lean practice strategies. Such challenges result from limited employee participation and a shortage of skilled human resources (1,2).

By developing the theoretical framework and testing the relationships among lean practices, soft TQM and innovation skills, our research has made contributions to the academic and practical fields. It has several implications for healthcare practitioners and management to take into consideration as a part of the improvement strategies at hospitals in Lebanon. In addition, it can serve as a theoretical background for further research in the field of lean practice healthcare and innovation at the hospital level.

Although our research was conducted to fill in the gaps that were identified in the literature and previous empirical studies, there were still some limitations that could not be avoided, mainly at the methodological and geographical levels. Despite the wide participation of respondents to this survey, poor cooperation from most of the Lebanese hospitals was noted. Only 11 private and 2 public hospitals participated. The majority of hospitals refused to participate because of their own policies and considerations, while others were geographically unreachable because of the insecure situation in some regions. Therefore, future studies may have better opportunities to extend their sample geographically and have a mix of more private and public hospitals to achieve more reliable results. Another limitation faced while preparing this research was the lack of conceptual and empirical studies related to lean healthcare and soft TQM implementation in the Lebanese context. This was also observed empirically while conducting the survey where lean healthcare was considered as a new concept for the Lebanese healthcare sector and still not as widespread as other quality improvement tools. Therefore, efforts should be made to introduce lean healthcare principles and study their implementation in hospitals in order to use them as a database for future studies of quality and lean practices.

The research methods of this study were based on a quantitative approach through conducting a survey. Therefore, future studies should extend the research and use both quantitative and qualitative methods, mainly case studies, to obtain more accurate and practical results, especially since lean healthcare, innovation and quality are wide concepts that bear in-depth discussion and interpretation. Moreover, different SEM-specific software can be used to test the research hypotheses such as partial least squares.

In conclusion, this study achieved its objectives and illustrated the effect of lean practices and soft TQM on the innovation skills of employees in Lebanese hospitals. The

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survey among different Lebanese hospitals using a self-administered questionnaire resulted in valid and reliable data that were analysed through SEM that ensured that the results could be generalized. Testing the research hypotheses has theoretically and practically added to the previous literature. Some of our findings support previous studies in which adoption of lean practices had a significant influence on innovation skills. However, other results contrasted with previous studies in the positive relationship between soft TQM and lean practices and innovation skills. Our results showed that soft TQM is not well implemented, especially at the level of people-based management and continuous improvement. This does not support the successful application of lean practices because it is not able to enhance the innovation skills of hospital employees.

The main focus should be always at the level of human resources. Whatever efforts are made by management, if the employees are not convinced by the concept of lean practices and they are not developing their own skills to be in line with the up-to-date quality and technological tools, any improvement strategy will not be successful. Policy makers and top management at Lebanese hospitals must form priorities in their development strategies, especially at the level of employees because they are the dynamic resource for the implementation and development of any strategy at the organization. It was clear from our survey that employees are interested in lean practice tools and implementing quality standards that tend to eliminate waste and reduce the rate of errors in the workplace. Still, the lack of engagement and weak empowerment of employees lessened motivation towards the innovation process, which negatively affected the innovation skills of employees. Therefore, further studies are suggested to focus more on the means and approaches that would develop the soft skills and enhance the implementation of lean healthcare within a culture of innovation and quality of services.

## Relation entre le lean management, la gestion totale de la qualité dite souple et les capacités d'innovation dans les hôpitaux libanais

### Résumé

**Contexte :** Le lean management est crucial pour éliminer le gaspillage et renforcer la qualité des services de soins de santé au moyen de différentes approches améliorées de gestion totale de la qualité. La gestion totale de la qualité dite souple est notamment utilisée pour développer les capacités d'innovation des employés qui sont considérées comme essentielles aux stratégies d'amélioration continue des hôpitaux.

**Objectif :** La présente étude avait pour objectif principal d'étudier la relation entre le lean management, la gestion totale de la qualité dite souple et les capacités d'innovation dans les hôpitaux libanais.

**Méthodes :** Une méthode quantitative a été appliquée en interrogeant 352 employés travaillant dans des hôpitaux privés et publics au Liban. Les données primaires recueillies étaient valables et fiables à l'analyse réalisée à l'aide des logiciels SPSS et AMOS dans le cadre d'une modélisation par équation structurelle.

**Résultats :** Le lean management avait une influence considérable sur les capacités d'innovation. En revanche, la gestion totale de la qualité dite souple n'intervenait pas dans cette relation du fait d'une mauvaise mise en œuvre, notamment au niveau de la gestion du personnel et de l'amélioration continue.

**Conclusion :** Les résultats de cette étude doivent pousser les praticiens à déployer davantage d'efforts pour mettre en œuvre le lean management et la gestion totale de la qualité dite souple. Enfin, les futures études devraient se concentrer sur les différents défis s'opposant à l'amélioration de la qualité dans la région.

## العلاقة بين الممارسات المبسطة وإدارة الجودة الكاملة الناعمة ومهارات الابتكار في المستشفيات اللبنانية

ملاك عون، نورلينا حسنان، حسن الأعرج

### الخلاصة

الخلفية: تمثل الممارسات المبسطة عنصراً حيوياً للتخلص من النفايات وتحسين جودة خدمات الرعاية الصحية من خلال اعتماد نهج تحسين مختلفة إزاء إدارة الجودة الكاملة. وعلى وجه التحديد، يستخدم الجانب الناعم من إدارة الجودة الكاملة في تنمية المهارات الابتكارية للموظفين الضرورية لاستراتيجيات التحسين المستمر للمستشفيات.

الهدف: تمثل الهدف الرئيسي من هذا البحث في دراسة العلاقة بين الممارسات المبسطة، وإدارة الجودة الكاملة الناعمة ومهارات الابتكار في لبنان.

طرق البحث: استخدمت منهجية كمية بإجراء مسح لـ ٣٥٣ موظفاً يعملون في المستشفيات الخاصة والحكومية اللبنانية. وجاءت كل البيانات الأولية التي تم تجميعها صحيحة وموثوقة عندما تم تحليلها بواسطة برمجية الحزمة الإحصائية للعلوم الاجتماعية (SPSS) وبرمجية (AMOS) في إطار النمذجة بالمعادلات البنائية.

النتائج: تبين أن الممارسات المبسطة أثرت تأثيراً كبيراً على مهارات الابتكار؛ في حين لم تتوسط إدارة الجودة الكاملة الناعمة هذه العلاقة نظراً لعدم تنفيذها بشكل مناسب، لا سيما على مستوى الإدارة المتمحورة حول البشر والتحسين المستمر.

الاستنتاج: تنطوي هذه الدراسة على اعتبارات للممارسين في مجال الرعاية الصحية من أجل بذل مزيد من الجهود لتنفيذ الممارسات المبسطة وإدارة الجودة الكاملة الناعمة. وتقترح في النهاية إجراء دراسات لتسليط الضوء على مختلف التحديات التي تواجه تحسين الجودة في الإقليم.

## References

1. Jekiel C. Lean human resources: redesigning HR processes for a culture of continuous improvement. New York: Taylor and Francis Group, Productivity Press; 2011.
2. Diab, S. Management of hospitals and healthcare centers. Amman: AL-Feker Publishers; 2009.
3. Evershed G. Innovation from Lean Six Sigma – Soft Skills. TRIZ Journal (<http://www.triz-journal.com/content/c101018a.asp>, accessed 27 November 2017).
4. Putkonen A, Kairisto L, Penttilä T. Enhancing engineering students' innovation skills through innovation pedagogy – Experiences in Turku University of Applied Sciences. International Conference on Engineering Education, Gliwice, Poland; 2010.
5. Pettersen J. Defining lean production: some conceptual and practical issues. TQM J. 2009;21(2):127–42. <http://dx.doi.org/10.1108/17542730910938137>
6. Seven advantages of Kanban over par for hospital material management (<https://bradfordsystems.com/blog/seven-advantages-kanban-par-hospital-material-management/>, accessed 27 November 2017).
7. Ortiz C. The psychology of lean improvements: why organizations must overcome resistance and change the culture. Boca Raton: CRC Press; 2012.
8. Aikens C. Quality inspired management: the key to sustainability. New Jersey: Pearson Education; 2011.
9. Lewis WG, Pun KF, Lalla TRM. Empirical investigation of the hard and soft criteria of TQM in ISO 9001 certified small and medium-sized enterprises. Int J Qual Reliab Manage. 2006;23(8):964–85. <http://dx.doi.org/10.1108/02656710610688167>
10. Ya'acob Z. A structural relationship between total quality management, strategic control systems and performance of Malaysian local governments. [thesis] Sintok, Kedah, Universiti Utara Malaysia; 2008
11. Bates S. Theory of constraints (PowerPoint slides). Department of Technology, College of Engineering; 2013 (<https://www.scribd.com/document/50450054/Theory-of-Constraints>, accessed 5 December 2017)
12. National News Agency. [Presentation of the reality of hospitals: a database prepared by the union. Press conference by Suliman Harounon on 23 June 2013] (in Arabic) (<http://www.nna-leb.gov.lb/ar/show-news/45997/>, accessed 5 December 2017).
13. Vaske J, Needham M. Survey implementation, sampling, and weighting data. In: Survey research and analysis: applications in parks, recreation, and human dimensions. 2008:173–222.
14. Dillman D. Mail and internet surveys: the tailored design. 2nd ed. New York: John Wiley and Sons; 2000.
15. Gwinner C. Infosurf White Paper. 5-point vs. 6-point Likert Scales. Atlanta: Infosurf; 2011 ([http://www.infosurf.com/wp-content/uploads/2011/01/Likert\\_Scale\\_Debate.pdf](http://www.infosurf.com/wp-content/uploads/2011/01/Likert_Scale_Debate.pdf), accessed 27 November 2017).

16. Sekaran U, Bougie R. *Research methods for business: a skill building approach*. 5th ed. London: Wiley; 2011.
17. Hair J, Black W, Babin B, Anderson R. *Multivariate data analysis: a global analysis*. New Jersey: Pearson; 2010.
18. Danielsson J, de Haan L, Peng L, de Vries CG. Using a bootstrap method to choose the sample fraction in tail index estimation. *J Multivar Anal*. 2001 Feb 1;76(2):226–48. <http://dx.doi.org/10.1006/jmva.2000.1903>
19. Rousek J. *The application of lean and human factors engineering techniques to improve quality in healthcare delivery*. [thesis]. Lincoln: University of Nebraska; 2012.
20. Papadopoulos T. Continuous improvement and dynamic actor associations: a study of lean thinking implementation in the UK National Health Service. *Leadersh Health Serv*. 2011;24(3):207–27. <http://dx.doi.org/10.1108/1751187111151117>
21. Blind K. *The impact of standardization and standards on innovation*. TU Berlin, Rotterdam School of Management and Fraunhofer; November, 2013 (Nesta Working Paper 13/15; [https://www.nesta.org.uk/sites/default/files/the\\_impact\\_of\\_standardization\\_and\\_standards\\_on\\_innovation.pdf](https://www.nesta.org.uk/sites/default/files/the_impact_of_standardization_and_standards_on_innovation.pdf), accessed 27 November 2017).
22. Kovachevam A. *Challenges in lean implementation; successful transformation towards lean enterprise*. [thesis]. University of Aarhus; 2010 (<https://pdfs.semanticscholar.org/b2f1/ed95cd3b328a963d9ab3f3ebb9e688287062.pdf>).
23. Mcgrath W. *Impact analysis of large-scale lean manufacturing initiatives upon manufacturing process innovation Irish companies*. [thesis]. Waterford Institute of Technology; 2007 ([http://repository.wit.ie/974/1/Impact\\_Analysis\\_of\\_Large-Scale\\_Lean\\_Manufacturing\\_Initiatives\\_upon\\_Manufacturing\\_process\\_innovation\\_in\\_Irish\\_Companies.pdf](http://repository.wit.ie/974/1/Impact_Analysis_of_Large-Scale_Lean_Manufacturing_Initiatives_upon_Manufacturing_process_innovation_in_Irish_Companies.pdf)).
24. Hines P, Holweg M, Rich N. Learning to evolve: a review of contemporary lean thinking. *Int J Oper Prod Manage*. 2004;24(10):994–1011. <http://dx.doi.org/10.1108/01443570410558049>
25. Seddon J, O'Donovan B, Zokaei K. Rethinking lean practices. In: Macintyre M, Parry G, Angelis J, editors. *Service design and delivery*. New York, Springer; 2011:41–60.
26. Hunter J. Deming and lean: the disparities and similarities. *The Edwards Deming Institute Blog*. <http://blog.deming.org/2013/07/deming-and-lean-the-disparities-and-similarities/>, accessed 27 November 2017.
27. Anvari A, Ismail Y, Hojjati S. A study on total quality management and lean manufacturing: Through lean thinking approach. *World Appl Sci J*. 2011;12(9):1585–96.
28. Zehir C, Ertosun Ö, Zehir S, Müceldilli B. Total quality management practices' effects on quality performance and innovative performance. *Procedia Soc Behav Sci*. 2012;41:273–80. <http://dx.doi.org/10.1016/j.sbspro.2012.04.031>
29. Raphael, P. *Maximizing innovation using Total Quality Management*. [thesis]. Carson: California State University, Dominguez Hills; 2010.
30. Hung R, Lien BY-H, Yang B, Wu C-M, Kuo Y-M, Lien B et al. Impact of TQM and organizational learning on innovation performance in the high-tech industry. *Int Bus Rev*. 2011;20(2):213–25. <http://dx.doi.org/10.1016/j.ibusrev.2010.07.001>
31. Moreno A. The influence of quality management on orientation to innovation in service firms. *Afr J Bus Manag*. 2011 Sep 4;5(17):8997–9006. [http://www.academicjournals.org/article/article1380637133\\_Moreno%20et%20al.pdf](http://www.academicjournals.org/article/article1380637133_Moreno%20et%20al.pdf)
32. Ooi K, Lin B, Teh P, Chong AY-L. Does TQM support innovation performance in Malaysia's manufacturing industry? *J Bus Econ Manag*. 2012;13(2):366–93. <http://dx.doi.org/10.3846/16111699.2011.620155>
33. Bäckström I, Ingelsson P, Wiklund H. Learning from others to adapt quality management to the future. *Total Qual Manage Bus Excell*. 2011;22(2):187–96. <http://dx.doi.org/10.1080/14783363.2010.530800>
34. King H. 5 ways that standardization can lead to innovation. August 3, 2011 (<http://www.fastcodesign.com/1664682/5-ways-that-standardization-can-lead-to-innovation>, accessed 27 November 2017).

# Prevalence of and attitudes to waterpipe smoking among Saudi Arabian physicians

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## Abstract

**Background:** Tobacco smoking kills more than 5 million people annually and it is the most important cause of preventable death. Waterpipe smoking is common in the Middle East and is prevalent among young people. There is a misconception that it is less harmful than cigarette smoking. Physicians are considered role models in the community and their behaviours and attitudes towards smoking can have direct effects on cessation.

**Aim:** The aim of this study was to estimate current prevalence, attitudes and associated factors in regard to waterpipe smoking among Saudi Arabian physicians.

**Methods:** Using a self-administered questionnaire, we conducted a cross-sectional study among 454 male and female physicians from 3 specialties, and of various levels of training working in 4 hospitals in Riyadh.

**Results:** The prevalence of waterpipe smoking was 45%, greater in men than in women (58% vs 18%;  $P \leq 0.001$ ) and in surgical than in medical specialists (58% vs 38%;  $P \leq 0.001$ ). More non-smokers than smokers believed that physicians should serve as role models (79% vs 60%;  $P \leq 0.001$ ). Physicians who were waterpipe non-smokers had received more formal training about cessation than smokers (50% vs 36%;  $P \leq 0.001$ ).

**Conclusions:** Waterpipe smoking among Saudi Arabian physicians is frequent and is associated with low exposure to information about the hazards and cessation during medical education.

Keywords: Smoking, Water-pipe, Saudi Arabia, Physicians, Medical Education

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## Introduction

Tobacco smoking in all forms kills more than 5 million people per year and it is the most important cause of preventable death (1). According to the World Health Organization, tobacco smoking is the second most common cause of death and the fourth most common risk factor for disease worldwide. If current trends continue, smoking will cause 8 million deaths per year by 2030 (1).

Waterpipe smoking, also known as *shisha*, *hubble-bubble*, *hookah*, *muassel* or *narghile*, is another form of tobacco use which is common in restaurants and coffee shops in Middle East and many parts of the world in which young people commonly use this method of smoking. There is a misconception that waterpipe smoking is less harmful than cigarette smoking because the smoke passes through water and may be filtered by the water before it is inhaled. The World Health Organization issued a report in 2005 about waterpipe tobacco smoking and called for research on methods to evaluate smoker exposure and tobacco-smoking surveys among health professionals (2).

In Saudi Arabia, previous studies have reported the prevalence of waterpipe smoking in male medical students in central Saudi Arabia at 13% (3) and in eastern

Saudi Arabia at 12.6% (4). Physicians are considered role models in the community, and their behaviours and attitudes towards smoking can have direct effects on smoking cessation. Physicians (medical doctors) are responsible for providing advice and education about quitting and preventing smoking. Previous studies on waterpipe smoking among Saudi Arabian healthcare professionals were limited to medical students in a single college or centre, and limited information is available about knowledge and attitudes towards waterpipe smoking in practising physicians. The objective of this study was to investigate the prevalence, attitudes and associated factors of waterpipe smoking among Saudi Arabian physicians working in 4 hospitals in Riyadh, Saudi Arabia.

## Methods

### Sample size

Sample size was calculated using the Raosoft sample size calculator ([www.raosoft.com](http://www.raosoft.com)). The sample size was calculated by anticipating 30% prevalence of waterpipe smoking with  $z = 1.96$  for a 95% confidence level, margin of error of 5%. The minimum sample size required to estimate a population parameters was estimated as 450.

## Survey

We used a specific structured questionnaire modified from the Global Health Professional Survey, an international standardized questionnaire developed by the World Health Organization, the Centers for Disease Control and Prevention and the Canadian Public Health Association to collect information on tobacco use and cessation counselling among health professional students about smoking prevalence, characteristics (including waterpipe smoking), attitudes, perception, and exposure to smoking cessation training (5). The questionnaire had been previously translated and validated for a number of languages, including Arabic.

We carried out the survey during January and February 2015. Physicians were approached by data collectors (medical students) and the objectives of the study were explained. Physicians completed anonymous self-administered questionnaires during working hours in their workplace under the supervision of the medical students. Completing the questionnaire took an average of 15 minutes. The physicians were assured that the information provided would remain confidential and would be used only for the research purposes.

A current waterpipe smoker was defined as a physician who had smoked a waterpipe  $\geq 1$  time in the previous 30 days.

## Participants

A cross-sectional, anonymous, self-administered questionnaire was completed by Saudi Arabian physicians (medical doctors) who worked in 4 hospitals in Riyadh, Saudi Arabia (King Abdulaziz Medical City, King Fahad Medical City, King Khalid University Hospital, and Prince Sultan Military Medical City). We invited all male and female Saudi Arabian physicians from the 4 hospitals, covering 3 different specialties (medicine 52%, surgery

38% and family medicine 10%) and different levels of training and expertise (intern, resident, fellow, assistant consultant and consultant) to complete the questionnaire until we reached the target sample size.

The study protocol was approved by the Ethical Research Committee of King Abdullah International Medical Research Centre and all hospitals involved in the study.

## Data analysis

Data analysis was performed using SPSS statistical software. Sample characteristics were expressed as number (%) or mean and standard deviation. The relations between waterpipe smoking and demographic characteristics such as age, sex, medical profession level, and medical specialty were evaluated with chi-square and *t*-test. Differences in attitudes and health education about waterpipe smoking across smoker status were evaluated using the *t*-test for independent samples.

Multivariate logistic regression analysis was used to test for risk factors associated with waterpipe smoking. Statistical significance was defined as  $P \leq 0.05$ .

## Results

We approached around 600 Saudi Arabian physicians; 454 agreed to participate in the study and completed the questionnaires, a 75% response rate (age range 22–56 years). Characteristics of the participants, including speciality and training, are detailed in Table 1.

We found that 204 physicians (45%) were current waterpipe smokers (95% confidence interval 40–50). A significantly higher prevalence of waterpipe smoking was found among males than females (58% vs 18%,  $P \leq 0.001$ ). Waterpipe smoking was more common among physicians who were surgical specialists 58% compared with 38% among the medical specialists and 35% among

**Table 1. Characteristics of the study population\* and the relationship between waterpipe smoking and study population**

Characteristic	Total (n = 454)		Waterpipe smokers (n = 204)		Waterpipe non-smokers (n = 250)		P-value
	No.	%	No.	%	No.	%	
<b>Sex</b>							
Women	148	33	27	18	121	82	$\leq 0.001$
Men	306	67	177	58	129	42	
<b>Training level</b>							
Intern	110	24	53	48	57	52	NS
Resident	199	44	97	49	102	51	
Fellow, assistant consultant, consultant	145	32	54	37	91	63	
<b>Medical specialty</b>							
Medical	218	52	83	38	135	62	$\leq 0.001$
Surgical	160	38	93	58	67	42	
Family medicine	43	10	15	35	28	65	
<b>Mean (SD) age (years)</b>	<b>31 (7)</b>		<b>30 (6)</b>		<b>31 (8)</b>		<b>NS</b>

NS = not significant ( $P > 0.05$ ).

SD = standard deviation.



family medicine specialists ( $P = 0.001$ ) (Table 1). Most waterpipe smokers smoked at a coffee shop (41%), with some at home (27%) or in a restaurant (13%). Of the 204 physicians who were waterpipe smokers, 157 (77%) started smoking before age 24 years.

There were significant differences in attitudes and training between physicians who smoked and physicians who did not smoke waterpipes ( $P \leq 0.001$ ) (Table 2). Compared with waterpipe smokers, a greater frequency of waterpipe non-smokers agreed that waterpipe sales and advertising should be banned; waterpipes should be banned in restaurants, coffee shops, and all enclosed public places; physicians should have specific training about techniques of cessation of waterpipe smoking; and physicians are role models who should advise and give information to patients about quitting waterpipe smoking (Table 2).

In regard to education during training programmes, waterpipe smokers received less education about the dangers of waterpipe smoking, had less discussion about the reasons that people smoke waterpipe and less teaching about the importance of recording waterpipe

smoking history as a part of a patient's general medical history in comparison to waterpipe non-smokers ( $P \leq 0.001$ ) (Table 2). Half (50%) of the non-smokers received formal training on cessation approaches during their medical school or residency training programmes compared with 36% among waterpipe smokers,  $P \leq 0.003$  (Table 2).

Multivariate analysis showed there was a higher risk of waterpipe smoking in men than women [odds ratio (OR) = 4.6,  $P \leq 0.001$ ]; surgical than medical specialists (OR = 2.0,  $P \leq 0.001$ ); physicians who had negative than positive attitudes about banning waterpipe smoking in restaurants (OR = 3.9,  $P \leq 0.001$ ) and coffee shops (OR = 7.6,  $P \leq 0.001$ ); and those who stated that physicians do not have a role in giving information about smoking cessation to patients (OR = 2.5,  $P \leq 0.001$ ) (Table 3).

## Discussion

Our study provided insight about the prevalence and attitudes in regard to waterpipe smoking in Saudi Arabian physicians from 4 hospitals and different specialties in Riyadh, Saudi Arabia. We identified a high

**Table 2. Waterpipe smoking, attitudes, and training among (N = 454) Saudi physicians**

Response	Positive response				P-value
	Waterpipe smokers (n = 204)		Waterpipe non-smokers (n = 250)		
	No.	%	No.	%	
<b>Attitude</b>					
Waterpipe sales should be banned	109	53	211	85	$\leq 0.001$
Complete ban on the advertising of waterpipe products	141	70	225	90	$\leq 0.001$
Waterpipes should be banned in restaurants	113	55	233	93	$\leq 0.001$
Waterpipes should be banned in coffee shops	87	43	222	89	$\leq 0.001$
Waterpipes should be banned in all enclosed public places	149	73	230	92	$\leq 0.001$
Physicians should get specific training about techniques for cessation of waterpipe smoking	158	78	229	92	$\leq 0.001$
Physicians serve as role models for their patients and the public	123	60	198	79	$\leq 0.001$
Physicians should advise their patients who smoke waterpipes to quit	162	80	227	91	$\leq 0.001$
Physicians have a role in giving advice or information about waterpipe cessation	137	67	211	84	$\leq 0.001$
A patient's chances of quitting waterpipe smoking are increased if physicians advise him or her to quit	155	76	218	87	$\leq 0.003$
<b>Medical school curriculum or residency training</b>					
Were you taught in any of your classes about the dangers of waterpipe smoking?	108	53	173	70	$\leq 0.001$
Did you discuss in any of your classes the reasons why people smoke waterpipes?	84	41	141	57	$\leq 0.001$
Did you learn that it is important to record waterpipe smoking history as a part of the patient's general medical history?	132	65	198	80	$\leq 0.001$
Have you ever received any formal training in waterpipe smoking cessation approaches to use with patients?	73	36	123	50	$\leq 0.003$
Did you learn that it is important to provide educational materials to support waterpipe smoking cessation to patients who want to quit waterpipe smoking?	88	43	156	63	$\leq 0.001$

**Table 3. Multivariate logistic regression analysis for risk factors associated with waterpipe**

Variable	Odds ratio	95% confidence interval
Men vs women	4.6	2.59–8.25
Surgical vs medical specialty	2.0	1.21–3.43
Waterpipes should not be banned in restaurants	3.9	1.61–3.43
Waterpipes should not be banned in coffee shops	7.6	3.28–3.43
Waterpipes should not be banned in all enclosed public places	0.2	0.08–0.64
Physicians do not have a role in giving information about waterpipe smoking cessation to patients	2.5	1.41–4.49

prevalence of waterpipe smoking among the physicians (45%). Predictors of waterpipe smoking in our study were younger age, male sex and surgical specialty. Most of our participants started waterpipe smoking at high school or medical school age.

Although the data on waterpipe smoking in the Saudi Arabian population are limited, a pilot study among secondary school students in Al Hassa region showed a prevalence rate of 37% (6). The reported prevalence of current cigarette smoking among adults in Saudi Arabia ranges from 11.6% to 52.3% (7). Cigarette smoking among physicians and healthcare providers in Saudi Arabia has been studied previously. More recently, in southwestern Saudi Arabia 18.3% physicians were smokers, and the highest prevalence of smoking was seen among hospital residents (25.3%), primary health care physicians (20.5%) and hospital consultants (18.6%) (8). In neighbouring countries, the frequency of tobacco smoking among physicians was 11% in Oman (9), 56% in Jordan (10) and 41% in Turkey (11). Waterpipe smoking is common in other Middle East countries: in a Syrian study, 25% of male students used waterpipes (12). In Lebanon, 21% of university students reported current waterpipe smoking (13). The introduction of flavoured tobacco, the thriving coffee shop culture and the lack of regulations have been cited as the main factors contributing for the spread of waterpipe smoking globally (14). The Global Youth Tobacco Survey Collaborative Group estimated that 10–18% of adolescents aged 13–15 years use tobacco products other than cigarettes, mostly in the Eastern Mediterranean region (15).

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**Competing interests:** None declared.

The high prevalence of waterpipe smoking among Saudi Arabian physicians (45%) is of concern because physicians are considered role models for their patients and the community in fighting tobacco consumption and promoting smoking cessation. There are several potential explanations for the high prevalence, including the high stress of a medical career and the misconception that waterpipe smoking relieves stress. Moreover, there is a belief that waterpipe smoking is less harmful than cigarette smoking (16,17); other factors include curiosity and social trends as main reasons for waterpipe smoking (18). However, the low exposure to education related to waterpipe hazards and cessation in medical school or postgraduate training is probably the main contributing factor for the high frequency of waterpipe smoking among physicians. In our study, most physicians started waterpipe smoking at age under 24 years, and this is consistent with previous findings that most waterpipe smokers start smoking in adolescence (19). Waterpipe smoking is more prevalent in junior physicians (interns and residents) because these physicians are under severe stress and have very busy schedules. Our study showed a significantly higher prevalence of waterpipe smoking among men than women; this may be true, however it may be a result of underreporting by women because there is a social stigma associated with waterpipe smoking in women.

Limitations of the present study included the cross-sectional design, which may have introduced bias from self-reporting. In addition, the study was limited to only one form of tobacco smoking. Nevertheless, the study had certain strengths: it was a multicentre study involving all levels of physicians with varying expertise and specialties.

There is a need to implement strategies to reduce waterpipe smoking among physicians, which should have the additional benefit of reducing waterpipe smoking in the general population. These strategies could include classes, training and educational materials about the health risks and cessation in medical schools and residency training programmes.

In conclusion, waterpipe smoking in Saudi Arabian physicians has high prevalence, especially in men, junior physicians, surgeons and physicians who did not receive formal education about waterpipe smoking in their training. This may result in a negative image of physicians because patients regard their physician as a model for health education and disease prevention.

## Prévalence de la consommation de pipe à eau et attitudes à cet égard parmi les médecins en Arabie saoudite

### Résumé

**Contexte :** Le tabagisme tue plus de 5 millions de personnes par an et constitue la cause la plus importante de décès évitables. La consommation de pipe à eau est courante au Moyen-Orient et elle est prévalente chez les jeunes. Selon une idée reçue, elle serait moins dangereuse que la consommation de cigarettes. Les médecins sont considérés comme des modèles à suivre dans la communauté et leurs comportements et attitudes vis-à-vis du tabagisme peuvent avoir un impact direct sur le sevrage.

**Objectif :** La présente étude vise à estimer la prévalence actuelle, les attitudes et les facteurs associés à la consommation de pipe à eau parmi les médecins en Arabie saoudite.

**Méthodes :** En recourant à un questionnaire auto-administré, nous avons réalisé une étude transversale auprès de 454 médecins hommes et femmes de trois spécialités et de différents niveaux de formation, travaillant dans quatre hôpitaux de Riyadh.

**Résultats :** La prévalence de la pipe à eau s'élevait à 45 % ; elle était supérieure chez les hommes que chez les femmes (58 % contre 18 % ;  $p \leq 0,001$ ) et chez les chirurgiens que chez les médecins (58 % contre 38 % ;  $p \leq 0,001$ ). Davantage de non-fumeurs que de fumeurs pensaient que les médecins devaient jouer un rôle de modèle (79 % contre 60 % ;  $p \leq 0,001$ ). Les médecins qui ne fumaient pas la pipe à eau avaient suivi une formation plus formelle sur le sevrage tabagique que ceux qui la fumaient (50 % contre 36 % ;  $p \leq 0,001$ ).

**Conclusions :** La consommation de pipe à eau chez les médecins saoudiens est fréquente et elle est associée à une faible exposition à l'information sur les risques et le sevrage tabagique durant la formation médicale.

### انتشار تدخين الشيشة في أوساط الأطباء السعوديين ومواقفهم إزاءه

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### الخلاصة

الخلفية: يؤدي تدخين التبغ بحياة أكثر من 5 ملايين شخص سنوياً ويعد أهم سبب للوفاة التي يمكن الوقاية منها. ويشيع تدخين الشيشة في الشرق الأوسط وينتشر في صفوف الشباب. وثمة تصور خاطئ بأن تدخين الشيشة أقل ضرراً من تدخين السجائر. ويعتبر الأطباء قدوة في مجتمعهم ومن شأن سلوكياتهم ومواقفهم من التدخين أن تؤثر تأثيراً مباشراً على الإقلاع عنه.

الهدف: تمثل الهدف من هذه الدراسة في تقدير مستوى الانتشار الحالي لتدخين الشيشة بين أطباء المملكة العربية السعودية والمواقف المتخذة حياله والعوامل المرتبطة به.

طرق البحث: أجرينا دراسة مقطعية، باستخدام استبيان يجب عليه ذاتياً، لـ 454 طبيباً وطبيبة من 3 تخصصات، لديهم مستويات تدريب مختلفة ويعملون في 4 مستشفيات في الرياض.

النتائج: بلغ انتشار تدخين الشيشة 45%، وسجل ارتفاعاً في صفوف الرجال مقارنة بالنساء (58% مقابل 18%؛  $P \geq 0,001$ ) وفي صفوف الأطباء الجراحين أكثر من أطباء الباطنة (58% مقابل 38%؛  $P \geq 0,001$ ). وتبين أن عدداً أكبر من غير المدخنين مقارنة بالمدخنين يرون أن الأطباء ينبغي أن يكونوا قدوة (79% مقابل 60%؛  $P \geq 0,001$ ). كما تبين أن الأطباء غير المدخنين للشيشة سبق أن تلقوا تدريباً رسمياً بشأن الإقلاع عن التدخين مقارنة بالأطباء المدخنين (50% مقابل 36%؛  $P \geq 0,001$ ).

الاستنتاجات: ينتشر تدخين الشيشة في صفوف الأطباء السعوديين ويرتبط بانخفاض مستوى التعرض لمعلومات بشأن مخاطره والإقلاع عنه أثناء التدريب الطبي الذي يتلقونه.

### References

1. Tobacco Free Initiative. Why tobacco is a public health priority. Geneva: World Health Organization; 2011 ([http://www.who.int/tobacco/health\\_priority/en/](http://www.who.int/tobacco/health_priority/en/), accessed 28 November 2014).
2. WHO Study Group on Tobacco Product Regulation. TobReg – advisory note, waterpipe tobacco smoking: health effects, research needs and recommended actions by regulators. Geneva: World Health Organization; 2005.
3. Al-Turki YA. Smoking habits among medical students in Central Saudi Arabia. Saudi Med J. 2006;27:700–3. PMID:16680263
4. Taha AZ, Sabra AA, Al-Mustafa ZZ, Al-Awami HR, Al-Khalaf MA, Al-Momen MM. Water pipe (shisha) smoking among male students of medical colleges in the eastern region of Saudi Arabia. Ann Saudi Med. 2010;30:222–6. PMID:20427939
5. Tobacco Free Initiative. WHO/CDC Global Health Professional Survey. Geneva: World Health Organization; 2004 (<http://www.who.int/tobacco/surveillance/ghps/en/>, accessed 19 November 2017).

6. Amin TT, Amr MA, Zaza BO, Kaliyadan F. Predictors of waterpipe smoking among secondary school adolescents in Al Hassa, Saudi Arabia. *Int J Behav Med.* 2012 Sep;19(3):324–35. PMID:21643931
7. Bassiony MM. Smoking in Saudi Arabia. *Saudi Med J.* 2009;30(7):876–81. PMID:19617999
8. Mahfouz AA, Shatoor AS, Al-Ghamdi BR, Hassanein MA, Nahar S, Farheen A, et al. Tobacco use among health care workers in southwestern Saudi Arabia. *Biomed Res Int.* 2013;2013:960292. PMID:24063018
9. Al-Lawati JA, Nooyi SC, Al-Lawati AM. Knowledge, attitudes and prevalence of tobacco use among physicians and dentists in Oman. *Ann Saudi Med.* 2009;29(2):128–33. PMID:19318747
10. El-Khushman HM, Sharara AM, Al-Laham YM, Hijazi MA. Cigarette smoking among health care workers at King Hussein Medical Center. *J Hosp Med.* 2008;3(3):281–4. PMID:18571808
11. Poyrazoğlu S, Sarli S, Gencer Z, Günay O. Waterpipe (narghile) smoking among medical and non-medical university students in Turkey. *Ups J Med Sci.* 2010;115:210–6. PMID:20636256
12. Maziak W, Fouad FM, Asfar T, Hammal F, Bachir EM, Rastam S, et al. Prevalence and characteristics of narghile smoking among university students in Syria. *Int J Tuberc Lung Dis.* 2004;8:882–9. PMID:15260281
13. Tamim H, Terro A, Kassem H, Ghazi A, Khamis TA, Hay MM, et al. Tobacco use by university students, Lebanon, 2001. *Addiction.* 2003;98:933–9. PMID:12814499
14. Maziak W, Taleb ZB, Bahelah R, Islam F, Jaber R, Auf R, et al. The global epidemiology of waterpipe smoking. *Tob Control.* 2015 Mar;24(Suppl. 1):i3–12. PMID:25298368
15. Global Youth Tobacco Survey Collaborative Group. Tobacco use among youth: a cross-country comparison. *Tob Control.* 2002;11:252–70. PMID:12198280
16. Rezk-Hanna M, Macabasco-O'Connell A, Woo Ml. Hookah smoking among young adults in southern California. *Nurs Res.* 2014 Jul–Aug;63(4):300–6. PMID:24977727
17. Haroon M, Munir A, Mahmud W, Hyder O. Knowledge, attitude, and practice of water-pipe smoking among medical students in Rawalpindi, Pakistan. *J Pak Med Assoc.* 2014 Feb;64(2):155–8. PMID:24640803
18. Alvur MT, Cinar N, Akduran F, Dede C. Fallacies about water pipe use in Turkish university students – what might be the consequences? *Asian Pac J Cancer Prev.* 2014;15(5):1977–80. PMID: 24716921
19. Akl EA, Gunukula SK, Aleem S, Obeid R, Jaoude PA, Honeine R, et al. Prevalence of waterpipe tobacco smoking among the general and specific populations: a systematic review. *BMC Public Health.* 2011;11:244. PMID:21504559

# Sociodemographic predictors of tobacco smoking among expatriate and national adolescents in the United Arab Emirates

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## Abstract

**Background:** Tobacco use among adolescents is an important public health concern as it causes various forms of smoking-related health problems and can create a gateway for other substance abuse.

**Aim:** This study examined the prevalence, profile and predictors of tobacco use among expatriate and national adolescents living in the United Arab Emirates (UAE).

**Methods:** Using a cross-sectional study design (2007–2009), we collected data on the prevalence of tobacco use in 6363 adolescents aged 13–20 years, including current smokers of cigarettes, midwakh, shisha and any other form of tobacco. We also collected demographic, socioeconomic, residential and behavioural data.

**Results:** In the previous 30 days, 505 (8.9%) participants had smoked cigarettes, 355 (6.3%) had smoked midwakh, 421 (7.4%) had smoked shisha and 380 (6.4%) had smoked any other form of tobacco. Overall, 818 (14.0%) adolescents were current smokers, who reported occasional or daily use of at least one form of tobacco in the past 30 days. Results consistently indicated that the prevalence of tobacco use was higher among men than women, regardless of age and tobacco form. Among men, cigarette smoking was the most popular, whereas shisha was the most smoked form of tobacco among women. Being male and ever having used illegal drugs consistently emerged as significant predictors of all forms of tobacco use.

**Conclusion:** There is a need for continued public health strategies and education campaigns to discourage adolescents in the UAE from using tobacco.

Key words: Adolescents, Tobacco-use, Smoking, Gender differences, United Arab Emirates

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## Introduction

Recent research suggests worldwide estimates of > 150 million adolescents who use tobacco (1). Tobacco use among adolescents is an important public health concern as it causes various forms of smoking-related health problems and can create a gateway for other substance abuse (2). The younger an individual starts smoking, the more difficult it is for them to quit later in life (3). Negative health consequences of smoking are a function of the duration (number of years smoking) and intensity (number of cigarettes smoked) of use (4). Thus, there is an increased risk of smoking-related health problems among individuals who begin smoking during adolescence.

In the United Arab Emirates (UAE), tobacco consumption has increased drastically in recent years as the number of cigarette factories has increased, and rapid economic and social changes have led to an increase in the popularity of tobacco (5,6). Despite acknowledgement by the UAE Ministry of Health that tobacco use is a growing problem among adolescents (7), few studies have focused on this public health issue (8–10). In 2002, the UAE participated in the Global Youth Tobacco Survey (GYTS) that focused on adolescents aged 13–15 years (11). The survey showed that 20.9% of participants had ever

smoked cigarettes and 21.9% were current users of any form of tobacco. Overall, 29.7% of men and 12.6% of women were current users of any form of tobacco. A repeat of the GYTS in 2005 indicated that these numbers remained high, with 22.6% of participants reporting having ever smoked cigarettes and 19.5% reporting current use of any form of tobacco – 25.2% for men versus 13.2% for women.

Identification of the profile and potential predictors of tobacco use among adolescents in the UAE is crucial for delivering effective tobacco control measures and health policies. Thus, the present study used the socioecological model of health to: (1) determine the prevalence of tobacco use; (2) examine the profile of tobacco use; and (3) assess demographic, socioeconomic, residential and behavioural predictors of tobacco use among the UAE adolescent population.

## Methods

### Data source and study design

This study utilized data from the *National Study of Population Health in the UAE (2007–2009)* research programme that was undertaken in collaboration with the UAE Ministry of Education. A cross-sectional survey

was developed and administered to 6363 adolescents aged 13–20 years, who attended public and private schools in the 7 Emirates of the Federation. The developed survey consisted of 2 main components: (1) data on smoking behaviour, type and frequency of tobacco use; data related to other determinants of health; and demographic and socioeconomic data (12); and (2) data related to residential mobility and location, and residential characteristics.

### Sampling procedure

A stratified sampling strategy based on school enrolment data from the UAE Ministry of Education identified the need to select 147 private and public schools from 10 educational zones. Schools were selected randomly by lottery using an updated (2005–2006) list of schools provided by the Ministry of Education. For schools that had > 1 class per grade level, the fishbowl lottery method was used to select 1 class from each of Grades 10–12 from each selected school.

### Ethics and administration

Ethical approval was obtained from the UAE Ministry of Education and Ministry of Health. Detailed information letters were sent to the parents or guardians of the participants 2 days prior to survey administration. These letters outlined the research objectives and methodology and requested participants' consent. Social workers were trained to administer the 1st component of the survey to participants from the 3 selected classes from each school, during a spare period, in a classroom setting. The 2nd component was sent home with the participant in order to seek parental assistance with completion.

### Outcome variables

Outcome variables were based on responses to 5 items from the questionnaire. One item asked participants if they had ever smoked cigarettes or any form of tobacco such as shisha (water pipe) or midwakh (dokha, small tobacco pipe) (yes/no/do not know). In a series of 4 items, and in relation to the past 30 days, participants were also asked the following questions. How often did you smoke cigarettes? How often did you smoke midwakh? How often did you smoke shisha? How often did you smoke any other form of tobacco? Participants were provided the following choices: daily/occasionally, in which case they were asked to circle the number of days between 1 and 30; not at all/do not know. In addition, 2 variables were derived. The 1st variable categorized participants as current smokers if they reported occasional or daily use of  $\geq 1$  form of tobacco in the past 30 days (namely cigarettes, shisha, midwakh or other). This categorization is consistent with World Health Organization guidelines (13). The 2nd variable was derived to identify participants who reported occasional or daily use of > 1 tobacco form (including combinations of any 2 of the following: cigarettes, shisha, midwakh, or other form) in the past 30 days.

### Explanatory variables

Data related to the participants' demographic profiles included sex, age, type of school attended, whether the

participant was exposed to tobacco smoke at home or with friends, whether the participant was born in the UAE, parental marital status, and parental education level. Nationality was grouped on the basis of similar cultures, traditions, ancestral linkages or geographical origins: UAE (local), GCC [included participants from GCC (Gulf Cooperation Council) countries or Greater Arab Free Trade Area], Arab/Middle East, Arab/Africa, South East Asia, Western, no nationality, and others.

For socioeconomic profile, data on participants' monthly family income included the following categories:  $\leq 2000$ , 2001–5000, 5001–8000, 8001–10 000, 10 001–12 000, 12 001–15 000, 15 001–20 000 and > 20 000 UAE dirha. Data related to participants' residential profiles included location of residence, number of individuals who resided in the household, number of bedrooms in the residence, and number of previous residences. A residential crowding variable was calculated using the ratio for the number of individuals who resided in the household over the number of bedrooms in the residence.

Items related to behavioural lifestyle asked participants if they had ever used illegal drugs such as marijuana, hashish or cocaine (yes/no/do not know). In relation to unconventional drug use, participants were asked whether they had ever purposely inhaled gasoline fumes, glue, correction fluid, car exhaust or burning Black Ants (yes/no/do not know). These other forms of substance abuse are common knowledge among the UAE adolescent population and have been included in the UAE national health surveys. Recent United States Food and Drug Administration laboratory analysis has confirmed that Black Ants contain sildenafil, which is a current ingredient used for sexual enhancement products (14).

### Data analysis

Data were analysed using SPSS version 20. Descriptive statistics were calculated for outcome and explanatory variables. To create binary outcome variables based on the 4 items regarding different forms of tobacco use, responses were categorized as daily/occasionally versus not at all. The  $\chi^2$  test was used for bivariate analysis. All independent variables that were significant in the bivariate analysis were entered into logistic regression models to predict tobacco-use outcomes. Six logistic regression models were developed for smoking cigarettes, midwakh, shisha, other tobacco forms, current smoking, and smoking > 1 form of tobacco. For each of the modelled outcomes, forward stepwise entry of variables was conducted using  $P \leq 0.05$ . For the independent variables, 1 category was chosen to be the reference category, with each category of the variable then compared to the reference.

## Results

Overall, 52 public and 44 private schools participated in the study. Response rate ranged from 9% (2 private schools in Dubai) to 100% (5 public schools in Fujairah and 5 private and 3 public schools in Western Region), resulting in an overall response rate of 65% (4115 responses) (see 12 for

details regarding response rate from public and private schools in each emirate). Overall, 3101 (49%) participants were of local national origin and 2785 (44%) were male. The mean age of the sample was 16.2 (standard deviation 1.22) years.

Among all participants, 1047 (17.0%) reported ever smoking any form of tobacco, with the majority smoking cigarettes 505 (8.9%) followed by shisha 421 (7.4%), 380 (6.4%) other forms of tobacco, and 355 (6.3%) midwakh. Four hundred and forty (8.2%) reported using > 1 form of tobacco, and 818 (14%) were current smokers. For every age group and tobacco form, the prevalence of tobacco use was higher among men than women (Figure 1). For every age group, cigarette smoking was more popular among men: < 14 years: 6 (5.5%); 15 years: 77 (12.4%); 16 years: 99 (14.3%); 17 years: 139 (19.8%); 18 years: 40 (19.3%); > 19 years: 30 (25.4%). The highest proportion of male current smokers was in the age group > 19 years: 57 (44.2%). In contrast, shisha was the most smoked form of tobacco among women in most age groups: < 14 years: 6 (3.1%); 15 years: 20 (2.3%); 17 years: 24 (3.4%); 18 years: 5 (2.9%), except in the 16 and > 19 years age groups, in which cigarettes were the most smoked form of tobacco: 32 (3.5%) and 3 (3.8%), respectively. The highest proportion of female current smokers was in the age group 18 years: 15 (7.4%).

Results showed that 5.5% of women and 24% of men were current smokers (Table 1). There were significant differences in the proportions of current smokers and nonsmokers in relation to sex, age, type of school attended, exposure to tobacco at home or with friends, nationality, parental marital status, location of residence, residential crowding, and illegal drug use. Overall, the highest prevalence of current smoking was in the age groups 15–17 years for women and 16–17 years for men. Smoking prevalence was higher for men who attended public schools (59.8%) compared to private schools (40.2%), whereas the opposite trend was seen for women (34.5 vs 65.5%). For nationality, the highest proportion of male smokers was from the UAE (246; 42%). The highest proportion of female smokers was from Arab/Middle East group (60; 35.1%). Compared to their respective counterparts, the highest prevalence of current smoking was among those who reported parental marital status of other, those who resided in Ajman, those who were not exposed to residential crowding, and those who reported ever using illegal drugs.

Significant differences in all forms of tobacco use were found in relation to sex, age, exposure to tobacco smoke at home or with friends, and illegal drug use (Table 2). The patterns of significant differences observed for each form of tobacco use in relation to the remaining explanatory variables varied.

Multivariate logistic regression modelling revealed that male sex and ever using illegal drugs were significant predictors of all forms of tobacco use (Table 3). For current smoking, attending private school, nationality and location of residence also emerged as significant predictors. In addition, predictors of cigarette smoking included increasing age, daily or occasional exposure to

tobacco at home or with friends, GCC or Arab/Middle Eastern or Arab/African nationality, parental marital status identified as other, and location of residence. Predictors of midwakh smoking also included daily or occasional exposure to tobacco at home or with friends, while those of shisha smoking included increasing age, daily or occasional exposure to tobacco at home or with friends, and Arab/Middle Eastern or western nationality. For other forms of tobacco smoking, predictors included age, attending public school, daily or occasional exposure to tobacco at home or with friends, parental marital status identified as other, and residential mobility (4 previous residences). In relation to smoking > 1 form of tobacco, significant predictors were male sex, increasing age, daily or occasional exposure to tobacco at home or with friends, Arab/Middle Eastern Arab/African or western nationality, parental marital status identified as other, location of residence, and ever using illegal drugs.

## Discussion

In this study, 1047 (17%) participants indicated that they had ever smoked cigarettes or any form of tobacco, while 818 (14%) were current smokers. The GYTS 2013, administered to adolescents aged 13–15 years, reported higher prevalence rates for ever smoking (29.7%) and lower prevalence rates for current smoking (10.5%) (15). Although this difference suggests a possible decrease in current tobacco use, the prevalence of this health risk behaviour remains high and indicates the need for continuous efforts to discourage UAE adolescents from using tobacco (15,16).

The prevalence of current smoking among men in the present study (24%) was higher than that reported in GYTS 2013 (14.6%) (15). In contrast, the prevalence of current smoking among women in the present study (5.5%) was lower than that reported in GYTS 2013 (6.4%), indicating that tobacco use is gaining popularity among women (15). While the GYTS 2013 focused on adolescents aged 13–15 years, our study included participants from a larger age range and found that the highest prevalence of current smoking was among men aged 19 years (44.2%) and women aged 18 years (7.4%). Furthermore, our findings point to a positive association between age and smoking cigarettes, > 1 form of tobacco and shisha. A recent study among school students aged 10–20 years in Dubai reported prevalence rates of 11.2 and 2.2% for smoking cigarettes and shisha, respectively (10). This suggests higher prevalence rates of cigarette smoking and lower prevalence rates of shisha smoking compared to our study (8.8% and 6.2%, respectively). These differences are likely to become more pronounced with the recent enactment of the Federal Anti-Tobacco law in early 2013 (16), which specifies that shisha may not be served to individuals aged < 18 years.

Recently, several studies have highlighted an alarming increase in the use of unconventional forms of tobacco, including shisha and midwakh, particularly in the Gulf Region (17). Earlier reports from the GYTS suggest that the average rate of shisha smoking among

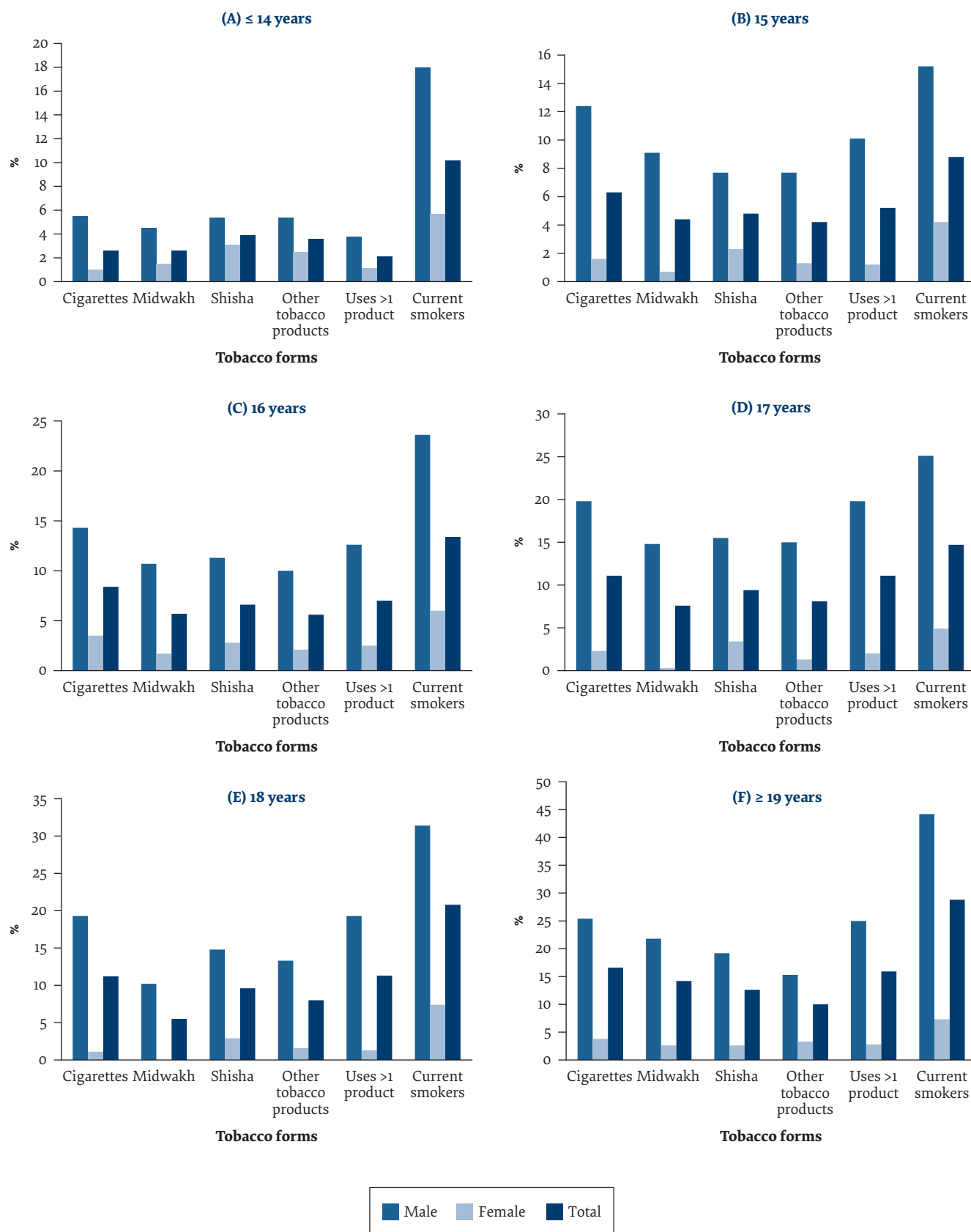


Figure 1 Distribution of tobacco use (%) in relation to age and gender, among adolescents who reside in the United Arab Emirates (n = 6363)



**Table 1** Demographic, socioeconomic, residential and behavioural profiles of study participants (n = 6363)

Variable	Classification	Prevalence of current smoking for:		
		Overall, n (%)	Male, n (%)	Female, n (%)
<b>Current smoking</b>		818 (14.0)	624 (100)	174 (100)
<b>Sex, n = 798</b>		***		
	Female	174 (5.5)		
	Male	624 (24.0)		
<b>Age, yr, n = 746</b>		***		
	≤ 14	31 (10.2)	20 (3.5)	11 (6.8)
	15	137 (8.8)	98 (17)	38 (23.5)
	16	221 (13.4)	161 (28)	57 (35.2)
	17	219 (14.7)	181 (31.4)	37 (22.8)
	18	81 (20.8)	66 (11.5)	13 (8)
	≥ 19	57 (28.8)	50 (8.7)	6 (3.7)
<b>School, n = 818</b>		**		
	Public	445 (12.8)	373 (59.8)	60 (34.5)
	Private	373 (15.9)	251 (40.2)	114 (65.5)
<b>Exposed to tobacco smoke at home or with friends, n = 698</b>		***		
	Not at all	272 (8.8)	198 (36.8)	69 (47.3)
	Occasionally	237 (17.5)	189 (35.1)	44 (30.1)
	Daily	189 (30.0)	44 (30.1)	33 (22.6)
<b>UAE born, n = 789</b>				
	No	209 (14.6)	138 (22.7)	69 (40.8)
	Yes	580 (13.6)	471 (77.3)	100 (59.2)
<b>Ethnicity, n = 792<sup>a</sup></b>		***		
	UAE	318 (11.3)	256 (42)	54 (31.6)
	GCC	61 (19.2)	54 (8.9)	6 (3.5)
	Arab/Middle East	215 (23.9)	155 (25.4)	60 (35.1)
	Arab/Africa	93 (16.0)	83 (13.6)	10 (5.8)
	South East Asia	66 (7.0)	44 (7.2)	21 (12.3)
	Western	22 (27.5)	6 (1.0)	15 (8.8)
	None/other	17 (23.0)	12 (2.0)	5 (2.9)
<b>Parental marital status, n = 783</b>		**		
	Married	687 (13.8)	535 (88.1)	150 (86.7)
	Widowed	27 (12.4)	41 (6.8)	7 (4.0)
	Separated/divorced	22 (9.8)	11 (1.8)	7 (4.0)
	Other	47 (20.2)	20 (3.3)	9 (5.2)
<b>Father graduated from high school, n = 605</b>				
	No	243 (12.5)	195 (42.1)	40 (30.5)
	Yes	362 (13.3)	268 (57.9)	91 (69.5)
<b>Mother graduated from high school, n = 597</b>				
	No	291 (12.4)	235 (51.6)	50 (37.9)
	Yes	306 (13.1)	220 (48.4)	82 (62.1)
<b>Monthly household income (AED), n = 479</b>				
	≤ 2 K	17 (11.8)	13 (3.4)	3 (3.2)
	> 2 and ≤ 5 K	100 (12.1)	88 (23.3)	12 (12.8)
	> 5 and ≤ 8 K	81 (12.8)	63 (16.7)	15 (16.0)
	> 8 and ≤ 10 K	52 (12.0)	41 (10.8)	10 (10.6)
	> 10 and ≤ 12 K	42 (13.0)	34 (9.0)	8 (8.5)
	> 12 and ≤ 15 K	44 (15.0)	33 (8.7)	10 (10.6)
	> 15 and ≤ 20 K	38 (14.6)	29 (7.7)	9 (9.6)
	> 20 K	105 (16.1)	77 (20.4)	27 (28.7)
<b>Income divided (AED), n = 469<sup>b</sup></b>				
	< 15 K	342 (12.9)	272 (74.3)	63 (65.6)
	≥ 15 K	127 (13.9)	94 (25.7)	33 (34.4)
<b>Location of residence, n = 818</b>		***		
	Abu Dhabi	411 (15.0)	331 (53.0)	71 (40.8)
	Ajman	39 (17.9)	23 (3.7)	16 (9.2)
	Dubai	75 (13.9)	64 (10.3)	11 (6.3)
	Fujairah	62 (12.8)	37 (5.9)	22 (12.6)
	RAK	51 (8.3)	38 (6.1)	10 (5.7)
	Sharjah	170 (15.5)	125 (20.0)	41 (23.6)
	UAQ	10 (7.6)	6 (1.0)	3 (1.7)
<b>Residential Crowding, n = 234<sup>c</sup></b>		*		
	No	106 (8.7)	74 (44.0)	30 (47.6)
	Yes	128 (6.7)	94 (56.0)	33 (52.4)

**Table 1 Demographic, socioeconomic, residential and behavioural profiles of study participants (n = 6363) (concluded)**

Variable	Classification	Prevalence of current smoking for:		
		Overall, n (%)	Male, n (%)	Female, n (%)
<b>Number of previous residences, n = 818</b>	None	580 (14.5)	444 (71.2)	117 (67.2)
	1	160 (13.5)	120 (19.2)	40 (23.0)
	2	41 (12.1)	30 (4.8)	10 (5.7)
	3	18 (11.3)	16 (2.6)	2 (1.1)
	4	19 (13.8)	14 (2.2)	5 (2.9)
<b>Ever used illegal drugs, n = 800</b>		***		
	No	757 (13.8)	584 (94.8)	159 (95.8)
	Yes	43 (47.8)	32 (5.2)	7 (4.2)
<b>Unconventional drug use, n = 795</b>	No	577 (14.8)	476 (77.8)	91 (54.8)
	Yes	218 (13.2)	136 (22.2)	75 (45.2)

\*P < 0.05; \*\*P < 0.01; \*\*\*P < 0.001.

aUAE = local; GCC = Kuwait, Saudi Arabia, Oman, Qatar, Bahrain and Yemen; Arab/Middle East = Lebanon, Syria, Jordan, Palestine and Iraq; Arab/Africa = Egypt, Tunisia, Morocco, Algeria, Libya, Sudan and Somalia; South East Asia = India, Pakistan, Bangladesh, Sri Lanka, Philippines and Indonesia; Western = Europe, United States of America, Australia, Canada; No nationality and Others = all other nationalities.

bCutoff based on data from the UAE Ministry of Economy, indicating that the average monthly income for Emirati households is AED 36 438.10 and that for expatriate households is AED 15 074.30.

cCalculated using the ratio for the number of individuals that reside in the household over the number of bedrooms in the house.

AED = United Arab Emirates dirham; RAK = Ras al-Khaimah; UAQ = Umm al-Quwain.

**Table 2 Demographic, socioeconomic, residential and behavioural profiles of study participants (n = 6363)**

Variable	Classification	Cigarettes	Midwakh	Shisha	Other	Uses > 1 tobacco form
		(n = 505)	(n = 355)	(n = 421)	(n = 380)	(n = 440)
		n (%)	n (%)	n (%)	n (%)	n (%)
<b>Sex</b>		***	***	***	***	***
	Female	71 (2.4)	29 (1.0)	84 (2.8)	57 (1.8)	52 (1.8)
	Male	416 (16.2)	310 (12.1)	320 (12.4)	303 (11.4)	371 (15.1)
<b>Age, yr</b>		***	***	***	***	***
	≤ 14	8 (2.6)	8 (2.6)	12 (3.9)	11 (3.6)	6 (2.1)
	15	94 (6.3)	66 (4.4)	72 (4.8)	67 (4.2)	74 (5.2)
	16	135 (8.4)	92 (5.7)	106 (6.6)	94 (5.6)	108 (7.0)
	17	158 (11.1)	109 (7.6)	134 (9.4)	122 (8.1)	148 (7.0)
	18	43 (11.2)	21 (5.5)	37 (9.6)	32 (8.0)	40 (11.3)
	≥ 19	33 (16.6)	28 (14.2)	25 (12.6)	21 (10.0)	29 (15.9)
<b>School</b>			**	***	**	*
	Public	303 (9.2)	235 (7.1)	211 (6.4)	253 (7.1)	274 (8.9)
	Private	202 (8.5)	120 (5.1)	210 (8.9)	127 (5.3)	166 (7.3)
<b>Exposed to tobacco smoke at home or with friends</b>		***	***	***	***	***
	Not at all	92 (3.0)	52 (1.7)	84 (2.8)	68 (2.1)	60 (2.0)
	Occasionally	159 (12.3)	108 (8.3)	134 (10.3)	116 (8.3)	150 (12.2)
	Daily	176 (29.4)	133 (22.1)	139 (23.0)	124 (19.3)	183 (28.7)
<b>UAE born</b>			**			*
	No	114 (8.0)	61 (4.3)	119 (8.4)	80 (5.4)	92 (6.7)
	Yes	372 (9.0)	278 (6.7)	284 (6.9)	284 (6.5)	331 (8.6)
<b>Ethnicity<sup>a</sup></b>		***		***		***
	UAE	187 (6.9)	155 (5.7)	121 (4.5)	173 (6.1)	170 (6.7)
	GCC	43 (13.6)	30 (9.5)	22 (6.9)	31 (9.1)	35 (11.6)
	Arab/Middle East	137 (16.0)	84 (9.9)	165 (19.3)	75 (8.1)	128 (15.9)
	Arab/Africa	70 (12.7)	41 (7.4)	42 (7.7)	49 (8.3)	51 (9.7)
	South East Asia	33 (3.4)	19 (2.0)	29 (3.0)	22 (2.3)	20 (2.1)
	Western	10 (12.3)	6 (7.5)	17 (21.0)	7 (8.8)	11 (13.9)
	None/other	7 (10.0)	4 (5.7)	9 (13.0)	4 (5.1)	6 (9.0)
<b>Parental marital status</b>		*	***		***	**
	Married	409 (8.4)	282 (5.8)	346 (7.2)	290 (5.7)	351 (7.7)
	Widowed	16 (7.5)	10 (4.7)	13 (6.2)	15 (6.9)	13 (6.6)
	Separated/	19 (8.7)	12 (5.5)	13 (5.9)	18 (7.8)	18 (8.6)
	Divorced	33 (14.8)	28 (12.6)	23 (10.3)	32 (14.0)	31 (14.8)
	Other					
<b>Father graduated from high school</b>			*	*		
	No	159 (8.5)	120 (6.4)	102 (5.5)	122 (6.1)	135 (7.7)
	Yes	197 (7.4)	130 (4.9)	195 (7.3)	159 (5.7)	174 (6.9)

**Table 2 Demographic, socioeconomic, residential and behavioural profiles of study participants (n = 6363) (concluded)**

Variable	Classification	Cigarettes (n = 505)	Midwakh (n = 355)	Shisha (n = 421)	Other (n = 380)	Uses > 1 tobacco form (n = 440)
		n (%)	n (%)	n (%)	n (%)	n (%)
<b>Mother graduated from high school</b>	No	179 (7.9)	132 (5.8)	124 (5.5)	147 (6.1)	149 (7.0)
	Yes	175 (7.7)	115 (5.0)	172 (7.5)	134 (5.6)	158 (7.2)
<b>Monthly household income (AED)</b>	< 2 K	10 (6.5)	9 (5.8)	10 (6.5)	11 (7.2)	9 (6.2)
	> 2 and ≤ 5 K	70 (8.8)	44 (5.5)	43 (5.4)	50 (5.9)	59 (7.7)
	> 5 and ≤ 8 K	44 (7.2)	32 (5.3)	35 (5.8)	33 (5.1)	44 (7.7)
	> 8 and ≤ 10 K	34 (8.1)	22 (5.3)	32 (7.6)	28 (6.4)	28 (7.1)
	> 10 and ≤ 12 K	38 (11.8)	23 (7.2)	30 (9.3)	23 (7.0)	26 (8.5)
	> 12 and ≤ 15 K	18 (6.2)	15 (5.1)	26 (8.9)	20 (6.6)	18 (6.4)
	> 15 and ≤ 20 K	18 (7.0)	12 (4.7)	18 (7.0)	16 (6.0)	18 (7.5)
	> 20 K	48 (7.7)	39 (6.2)	46 (7.3)	43 (6.4)	49 (8.2)
<b>Income divided (AED)</b>	< 15 K	222 (8.6)	153 (5.9)	181 (7.0)	169 (6.3)	198 (8.1)
	≥ 15 K	73 (8.2)	54 (6.1)	74 (8.3)	63 (6.7)	71 (8.4)
<b>Location of residence</b>		**		**		***
	Abu Dhabi	252 (10.3)	185 (7.6)	225 (9.2)	175 (6.2)	222 (9.6)
	Ajman	24 (10.5)	20 (8.6)	21 (9.1)	23 (10.3)	23 (10.8)
	Dubai	50 (8.8)	32 (5.7)	35 (6.2)	47 (8.4)	45 (8.4)
	Fujairah	43 (8.5)	17 (3.4)	15 (3.0)	31 (6.4)	25 (5.3)
	RAK	30 (4.7)	32 (5.0)	25 (3.9)	28 (4.5)	31 (5.1)
	Sharjah	99 (8.7)	65 (5.7)	95 (8.3)	73 (6.6)	89 (8.2)
	UAQ	7 (4.9)	4 (2.8)	5 (3.5)	3 (2.3)	5 (3.9)
<b>Residential crowding</b>	No	63 (5.2)	50 (4.2)	50 (4.2)	57 (4.6)	56 (5.0)
	Yes	86 (4.6)	62 (3.3)	79 (4.2)	77 (4.0)	75 (4.2)
<b>No. of previous residence</b>		*	**		**	**
	None	384 (9.8)	281 (7.2)	308 (7.9)	292 (7.1)	336 (9.1)
	1	72 (6.4)	44 (3.9)	62 (5.5)	55 (4.6)	63 (5.8)
	2	25 (7.6)	14 (4.2)	27 (8.2)	12 (3.6)	19 (6.0)
	3	14 (9.0)	9 (5.7)	14 (8.9)	12 (7.4)	14 (9.7)
	4	10 (7.7)	7 (5.4)	10 (7.7)	9 (6.1)	8 (6.6)
<b>Ever used illegal drugs</b>		***	***	***	***	***
	No	448 (8.4)	308 (5.8)	366 (6.9)	324 (5.7)	386 (7.5)
Yes	51 (55.4)	43 (47.3)	50 (55.6)	52 (56.5)	51 (57.3)	
<b>Unconventional drug use</b>	No	364 (9.6)	255 (6.7)	291 (7.7)	258 (6.4)	318 (8.8)
	Yes	136 (8.3)	94 (5.8)	124 (7.6)	116 (6.9)	120 (7.7)

\*P < 0.05; \*\*P < 0.01; \*\*\*P < 0.001.

aUAE = local; GCC = Kuwait, Saudi Arabia, Oman, Qatar, Bahrain and Yemen; Arab/Middle East = Lebanon, Syria, Jordan, Palestine and Iraq; Arab/Africa = Egypt, Tunisia, Morocco, Algeria, Libya, Sudan and Somalia; South East Asia = India, Pakistan, Bangladesh, Sri Lanka, Philippines and Indonesia; Western = Europe, United States of America, Australia, Canada; No nationality and None/other = all other nationalities.

AED = United Arab Emirates dirham; RAK = Ras al-Khaimah; UAQ = Umm al-Quwain.

Table 3 Predictors of different forms of tobacco use among adolescents who reside in UAE

Variable	Reference	Current smoking		Cigarettes		Midwakh		Shisha		Other		Uses > 1 tobacco form	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
<b>Sex (Female)</b>	Male	4.34***	2.95-6.38	5.77***	4.24-7.85	11.50***	6.68-19.81	3.68***	2.57-5.27	3.10***	2.34-4.11	7.21***	5.00-10.39
<b>Age (&lt; 14 yr)</b>	15 yr	1.08	0.48-2.46	3.43**	1.49-7.89	1.10	0.47-2.57	1.83	0.78-4.32	0.14***	0.10-0.21	3.36*	1.34-8.43
	16 yr	1.47	0.65-3.34	3.45***	1.51-7.86	0.79	0.34-1.87	2.18	0.93-5.10	0.13***	0.09-0.19	3.34**	1.34-8.32
	17 yr	1.53	0.66-3.55	4.45***	1.96-10.12	1.25	0.54-2.92	3.65**	1.56-8.50	0.20***	0.14-0.30	5.57***	2.24-13.81
<b>School (public)</b>	18 yr	1.33	0.48-3.72	4.90***	2.00-11.97	0.79	0.29-2.18	5.56***	2.18-14.20	0.23***	0.14-0.39	6.35***	2.38-16.96
	> 19 yr	2.23	0.72-6.91	6.45***	2.49-16.65	2.26	0.80-6.35	5.90**	2.08-16.79	0.24***	0.13-0.46	7.99***	2.79-22.92
<b>Exposed to tobacco smoke (not at all)</b>	Private	1.77*	1.06-2.94			0.77	0.51-1.17	1.47	0.98-2.20	0.54***	0.41-0.70	1.05	0.73-1.50
	Occasionally	1.07	0.62-1.85	2.89***	2.15-3.88	4.06***	2.63-6.27	2.67***	1.85-3.87	2.01***	1.47-2.73	4.04**	2.86-5.69
<b>UAE born (no)</b>	Daily	0.46	0.16-1.36	8.09***	5.90-11.11	12.78***	8.17-19.99	4.81***	3.22-7.17	5.54**	4.04-7.59	10.67***	7.43-15.34
	Yes					1.50	0.96-2.34					1.39	0.98-1.96
<b>Ethnicity (South East Asia)a</b>	GCC	2.77*	1.19-6.42	1.85*	1.01-3.41			1.40	0.58-3.37			1.88	0.85-4.17
	Arab/Middle East	3.10***	1.64-5.85	2.71***	1.67-4.42			5.18***	2.79-9.61			4.23***	2.28-7.82
	Arab/Africa	2.68**	1.31-5.47	2.42**	1.43-4.08			1.72	0.83-3.58			2.37*	1.20-4.70
	Western	6.88**	2.01-23.61	2.13	0.79-5.79			7.98***	3.04-20.92			3.49*	1.18-10.34
	UAE	2.15*	1.10-4.22	1.24	0.77-1.98			1.39	0.69-2.78			1.60	0.81-3.13
<b>Parental marital status (married)</b>	None/other	4.91**	1.62-14.91	1.47	0.49-4.40			2.14	0.60-7.64			1.51	0.42-5.46
	Widowed	1.04	0.52-2.09	1.10	0.69-1.76	1.24	0.71-2.81			1.06	0.65-1.72	1.21	0.73-2.00
<b>Father graduated high school (no)</b>	Separated/divorced	0.51	0.12-2.23	0.97	0.48-1.96	0.70	0.23-2.11			1.31	0.67-2.54	1.10	0.52-2.32
	Other	2.07	0.58-7.43	2.72**	1.28-5.77	1.92	0.51-7.29			3.30**	1.60-6.78	3.47**	1.60-7.68
<b>Mother graduated high school (no)</b>	Yes					1.00	0.70-1.42	0.93	0.61-1.44				
	Yes							1.07	0.72-1.60				
<b>Location of residence (RAK)</b>	Ajman	3.21**	1.36-7.53	2.61*	1.15-5.94			1.76	0.67-4.65			2.47*	1.04-5.86
	Dubai	1.28	0.59-2.80	2.23*	1.17-4.26			2.07	0.96-4.47			1.85	0.94-3.64
<b>Abu Dhabi</b>	Fujairah	1.09	0.45-2.67	2.90**	1.17-4.26			0.57	0.19-1.72			1.12	0.51-2.49
	Sharjah	1.33	0.66-2.70	2.63**	1.45-4.78			1.97	0.96-4.04			2.30**	1.24-4.27
<b>UAE</b>	UAE	1.57	0.33-7.49	0.64	0.067-6.05			1.69	0.28-10.15			0.83	0.08-8.50
	Abu Dhabi	1.37	0.73-2.59	2.83***	1.62-4.97			1.97*	1.01-3.83			2.41**	1.35-4.29

Table 3 Predictors of different forms of tobacco use among adolescents who reside in UAE (concluded)

Variable	Reference	Current smoking		Cigarettes		Midwakh		Shisha		Other		Uses > 1 tobacco form	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
No. of previous residences (4)	1			0.84	0.38–1.83	0.66	0.25–1.77			0.08***	0.05–0.12	0.77	0.32–1.84
	2			0.99	0.42–2.38	1.09	0.36–3.27			0.05***	0.02–0.11	0.88	0.33–2.35
	3			0.99	0.37–2.63	1.23	0.37–4.07			0.13***	0.06–0.28	1.20	0.41–3.50
Ever used illegal drugs (no)	None			1.26	0.60–2.66	1.10	0.43–2.81			0.10***	0.07–0.14	1.20	0.52–2.79
	Yes	4.69**	1.54–14.35	6.83***	3.58–13.05	5.11***	2.37–10.99	10.45***	4.91–22.23	11.92***	6.55–21.69	8.48***	4.28–16.80
Hosmer and Lemeshow test ( $\chi^2$ )			10.61		6.02		5.26		5.13		14.54		8.47

\*P < 0.05; \*\*P < 0.01; \*\*\*P < 0.001.

aUAE = local; GCC = Kuwait, Saudi Arabia, Oman, Qatar, Bahrain and Yemen; Arab/Middle East = Lebanon, Syria, Jordan, Palestine, and Iraq; Arab/Africa = Egypt, Tunisia, Morocco, Algeria, Libya, Sudan and Somalia; South East Asia = India, Pakistan, Bangladesh, Sri Lanka, Philippines and Indonesia; Western = Europe, United States of America, Australia and Canada; None/other = all other nationalities.

CI = confidence interval; OR = odds ratio; RAK = Ras Al Khaimah; UAE = United Arab Emirates; UAQ = Umm Al Quwain.

adolescents aged 13–15 years has increased from 15% in 2002 to 28.2% in 2005. The GYTS findings raise concerns over shisha use by a group of students who have never smoked (18). The overall prevalence of shisha smoking in our sample is comparable to the prevalence of cigarette smoking across all age groups. This highlights the need for continued public health strategies and education campaigns to discourage adolescents from smoking other forms of tobacco, specifically shisha.

We found that the prevalence of midwakh smoking was 7.6, 5.5 and 14.2% for the 17, 18 and > 19 years age groups, respectively. According to Al-Houqani, midwakh accounted for 15% of all tobacco smokers in Abu Dhabi, with a young age of onset (5). An alarming prevalence of midwakh smoking among medical students has been reported in Ajman, with 30 and 5% prevalence among male and female students, respectively (9). A more recent study conducted in 2015 for the same age group in Ajman reported a dramatic increase in the prevalence rate of midwakh smoking (36% had ever smoked and 29% currently smoked) (19). Similar to our results, prevalence rates increased with age. This increase in the use of other forms of tobacco could be due to the widespread misconception that these forms are less harmful than cigarettes.

Our study suggests that cigarettes are the most common form of tobacco among men, while shisha is the most common among women. This observed difference in smoking behaviour is not surprising given the social context in the UAE, where social norms may be more accepting of men smoking cigarettes. This may urge women to under-report their cigarette smoking habits, and report their shisha smoking given that the latter may be more socially accepted (20). Anti-tobacco education campaigns should address this social context, thus emphasizing the health risks of all forms of tobacco to both male and female adolescents.

There are policies to prevent adolescents aged < 18 years purchasing tobacco products in the UAE; however, those attending private school may be more likely to purchase these products than their counterparts. Our results also suggest that adolescents who attend private schools are more likely to be current smokers. Possible explanations focus on the issue of policy enforcement, as well as the ability for these adolescents to purchase tobacco products, as they are likely to have greater material resources compared to those who attend public schools. Moreover, it could be related to the demographic composition in UAE public schools, where the majority of students are expatriates, and that tobacco smoking may be more prevalent among expatriate adolescents compared to nationals.

There is a well-established link between parental smoking and adolescent initiation of smoking, regular smoking, and persistence of smoking into adulthood (21). Many prospective studies have also demonstrated positive associations between peer and adolescent tobacco use (22). Similarly, our results suggest that adolescents who are exposed to tobacco smoke at home

or with friends are more likely to smoke. This highlights the importance of supporting anti-tobacco education campaigns and interventions that aim to alter social norms in peer/family settings (21,22).

Our findings suggest that nationality is linked to tobacco smoking, which is consistent with previous findings (2,23). Adolescents from western countries are more likely to smoke shisha and use > 1 form of tobacco than adolescents from South East Asia. This may be because shisha smoking is gaining steady popularity among adolescents in western countries (24). Western adolescents who reside in the UAE also may be influenced by the social acceptance of smoking and feel inclined to smoke a variety of tobacco forms that are available in this country.

Our results indicate that location of residence is linked to tobacco use. This can be explained by the demographic and social differences among the different emirates. In particular, residents in Ras Al Khaimah have fewer opportunities for shisha bars and social gatherings. Furthermore, there was a lower representation of men from Umm al Quwain in this study, which is likely linked to the lower prevalence of smoking.

Our results show that adolescents who report ever using illegal drugs are more likely to engage in all types

of tobacco use. It may be useful to incorporate tobacco-use prevention strategies in drug abuse treatment programmes (25). Although the prevalence of illegal drug use is low in the UAE compared to international standards, it is imperative that public health programmes continue to focus on strengthening their current educational campaigns to prevent adolescents from using illegal drugs (26).

The present study had several limitations. Data were self-reported and may have been subject to response bias. Sampling led to lower representations of adolescents who attended private schools in Dubai and among men who resided in Umm al Quwain. This is relevant as the population of Dubai consists of a large proportion of expatriates. Response to the survey may have been influenced by the presence of social workers, with the possibility of under-reporting tobacco use among women, given social norms, as well as under-reporting of illegal drug use among all participants. Despite these limitations, our findings present a detailed profile of tobacco use among UAE adolescents that is crucial for reducing the prevalence of tobacco use among adolescents and tobacco-related diseases.

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## Facteurs prédictifs sociodémographiques du tabagisme parmi les adolescents expatriés et nationaux aux Émirats arabes unis

### Résumé

**Contexte :** Les recherches récentes permettent de dégager des estimations qui montrent que plus de 150 millions d'adolescents consomment du tabac dans le monde. Le tabagisme chez l'adolescent est une importante préoccupation de santé publique du fait des risques pour la santé liés au fait de fumer. Par ailleurs, il peut mener à d'autres formes d'abus de substances psychoactives.

**Objectif :** La présente étude examinait la prévalence, le profil et les facteurs prédictifs de la consommation de tabac chez les adolescents expatriés et nationaux aux Émirats arabes unis.

**Méthodes :** À l'aide d'un plan d'étude transversale (2007-2009), nous avons collecté des données sur la prévalence du tabagisme chez 6363 adolescents âgés de 13 à 20 ans, comprenant des fumeurs de cigarettes, de midwakh, de shisha et de toute autre forme de tabac au moment de l'enquête. Nous avons par ailleurs recueilli des données démographiques, socio-économiques, résidentielles et comportementales.

**Résultats :** Durant les 30 jours précédents, 505 (8,9 %) des participants avaient fumé des cigarettes, 355 (6,3 %) avaient fumé la midwakh, 421 (7,4 %) avaient fumé la shisha et 380 (6,4 %) avaient consommé toute autre forme de tabac. Globalement, 14,0 % des adolescents étaient des fumeurs au moment de l'étude, notifiant l'utilisation occasionnelle ou quotidienne d'au moins une forme de tabac au cours des 30 derniers jours. Les résultats ont généralement indiqué que la prévalence de la consommation de tabac était plus forte chez les hommes que chez les femmes, indépendamment de l'âge et de la forme de tabac consommée. Chez les hommes, la consommation de cigarettes était la plus populaire, tandis que la shisha était la forme de tabac la plus utilisée chez les femmes. Le fait d'être un homme et d'avoir déjà consommé des drogues illégales ressortait généralement comme facteur prédictif significatif de toutes formes de consommation de tabac.

**Conclusion :** Des stratégies de santé publique et des campagnes d'éducation permanentes sont nécessaires pour décourager les adolescents de consommer du tabac aux Émirats arabes unis.

## المنبئات الاجتماعية-السكانية لتدخين التبغ في صفوف اليافعين المغتربين والمواطنين في دولة الإمارات العربية المتحدة

عائشة صديقي، رانية دغيم، كارولين بركات-حداد

### الخلاصة

الخلفية: تشير الأبحاث الحديثة إلى تقديرات عالمية لاستهلاك التبغ بين اليافعين تزيد على ١٥٠ مليون. وأن تعاطي التبغ بين اليافعين من الأمور المثيرة للقلق في مجال الصحة العامة بسبب المخاطر الصحية الناجمة عن التدخين، والذي يمكن أن يؤدي إلى أنماط أخرى من تعاطي المخدرات.

الهدف: هدفت هذه الدراسة إلى تقييم انتشار تعاطي التبغ ومرتسمه ومنبئاته في صفوف اليافعين من المغتربين والمواطنين الذين يعيشون في دولة الإمارات العربية المتحدة.

طرق البحث: باستخدام دراسة مقطعية (٢٠٠٧-٢٠٠٩)، قمنا بجمع بيانات عن انتشار تعاطي التبغ في صفوف ٦٣٦٣ يافعاً في الفئة العمرية ١٣-٢٠ عاماً، بما في ذلك المدخنون الحاليون للسيجائر والمدواخ والشيشة وأي شكل آخر من أشكال إستهلاك التبغ. كما عمدنا إلى جمع بيانات سكانية واجتماعية-اقتصادية وسكنية وسلوكية.

النتائج: تبين أن ٥٠٥ (٩,٨٪) من المشاركين دخنوا السجائر و٣٥٥ (٦,٣٪) دخنوا أشكالاً أخرى من التبغ خلال فترة الثلاثين يوماً السابقة. وبوجه عام، تبين أن ١٤٪ من المراهقين يدخنون في الوقت الحالي، وأفادوا باستهلاك نوع واحد على الأقل من أنواع التبغ سواءً بشكل عرضي أو يومي خلال السنوات الثلاثين الماضية. وأشارت النتائج على نحو متسق إلى أن انتشار إستهلاك التبغ يزيد في صفوف الرجال عن النساء، بغض النظر عن العمر أو نوع التبغ. وفي صفوف الرجال، جاء تدخين السجائر النوع الأكثر شيوعاً، في حين جاءت الشيشة أكثر أنواع التبغ التي تدخنها النساء. وشكل عاملاً الذكورة وتعاطي المخدرات غير المشروعة في وقت سابق منبئين مهمين لجميع أشكال إستهلاك التبغ.

الاستنتاج: ثمة حاجة لمواصلة استراتيجيات الصحة العامة وإجراء حملات التثقيف لإثناء اليافعين في الإمارات العربية المتحدة عن إستهلاك التبغ.

## References

- Hajeri AA. Tobacco use in adolescents. Bahrain Med Bull. 2010 Dec;32(4) ([http://www.bahrainmedicalbulletin.com/december\\_2010/Tobacco.pdf](http://www.bahrainmedicalbulletin.com/december_2010/Tobacco.pdf)).
- Park SH. Smoking and adolescent health. Korean J Pediatr. 2011 Oct;54(10):401-4. <http://dx.doi.org/10.3345/kjpp.2011.54.10.401> PMID:22232621
- Caponnetto P, Polosa R. Common predictors of smoking cessation in clinical practice. Respir Med. 2008 Aug;102(8):1182-92. <http://dx.doi.org/10.1016/j.rmed.2008.02.017> PMID:18586479
- Hublet A, De Bacquer D, Valimaa R, Godeau E, Schmid H, Rahav G, et al. Smoking trends among adolescents from 1990 to 2002 in ten European countries and Canada. BMC Public Health. 2006 11 10;6(1):280. <http://dx.doi.org/10.1186/1471-2458-6-280> PMID:17096837
- Al-Houqani M, Ali R, Hajat C. Tobacco smoking using Midwakh is an emerging health problem-evidence from a large cross-sectional survey in the United Arab Emirates. PLoS One. 2012;7(6):e39189. <http://dx.doi.org/10.1371/journal.pone.0039189> PMID:22720071
- Fikri M, Abi Saab BH. Global Youth Tobacco Survey (GYTS): United Arab Emirates report 2002. Abu Dhabi: United Arab Emirates Ministry of Health; 2002 (<http://www.who.int/tobacco/surveillance/United%20Arab%20Emirates%20Report%202002.pdf>, accessed 12 December).
- Rai BS. MoH launches 3-year anti-smoking campaign. Emirates 24/7 News. 30 May 2013 (<http://www.emirates247.com/news/emirates/moh-launches-3-year-anti-smoking-campaign-2013-05-30-1.508584>, accessed 12 December 2017).
- Bener A, al-Ketbi LM. Cigarette smoking habits among high school boys in a developing country. J R Soc Promot Health. 1999 Sep;119(3):166-9. <http://dx.doi.org/10.1177/146642409911900306> PMID:10518355
- Jayakumary M, Jayadevan S, Ranade AV, Mathew E. Prevalence and pattern of dokha use among medical and allied health students in Ajman, United Arab Emirates. Asian Pac J Cancer Prev. 2010;11(6):1547-9. PMID:21338195
- Obaid HA, Hassan MA, Mahdy NH, ElDisouky MI, Alzarba FE, Alnayeemi SR, et al. Tobacco use and associated factors among school students in Dubai, 2010: intervention study. East Mediterr Health J. 2015 02 2;20(12):765-73. PMID:25664514
- Global Youth Tobacco Survey: country fact sheets. World Health Organization; 2010 ([http://www.emro.who.int/images/stories/tfi/documents/GYTS\\_FS\\_UAE\\_R2.pdf](http://www.emro.who.int/images/stories/tfi/documents/GYTS_FS_UAE_R2.pdf), accessed 12 December 2017).
- Barakat-Haddad C. Prevalence of high blood pressure, heart disease, thalassemia, sickle-cell anemia, and iron-deficiency anemia among the UAE adolescent population. J Environ Public Health. 2013;2013:680631.
- Guidelines for controlling and monitoring the tobacco epidemic. Geneva: World Health Organization; 1998.
- Public Notification: "Black Ant" contains undeclared drug ingredient. Silver Spring, MD: U.S. Food and Drug Administration; 2011 (<http://www.fda.gov/Safety/MedWatch/SafetyInformation/SafetyAlertsforHumanMedicalProducts/ucm247434.htm>, accessed 12 December 2017).

15. Global Youth Tobacco Survey: United Arab Emirates 2013 fact sheet. World Health Organization; 2013 ([http://apps.who.int/ftcc/implementation/database/sites/implementation/files/documents/reports/uae\\_annex2\\_gyts\\_2013.pdf](http://apps.who.int/ftcc/implementation/database/sites/implementation/files/documents/reports/uae_annex2_gyts_2013.pdf), accessed 12 December 2017).
16. UAE Anti-tobacco law in effect: rules and fines... Emirates 24/7 News 21 January 2014 (<http://www.emirates247.com/news/emirates/uae-anti-tobacco-law-in-effect-rules-and-fines-2014-01-21-1.535551>, accessed 12 December 2017).
17. Vupputuri S, Hajat C, Al-Houqani M, Osman O, Sreedharan J, Ali R et al. Midwakh/dokha tobacco use in the Middle East: much to learn. *Tob Control*. 2016 Mar;25(2):236–41. <http://dx.doi.org/10.1136/tobaccocontrol-2013-051530> PMID:25342581
18. El-Awa F, Warren CW, Jones NR. Changes in tobacco use among 13-15-year-olds between 1999 and 2007: findings from the Eastern Mediterranean Region. *East Mediterr Health J*. 2010 Mar;16(3):266–73. PMID:20795439
19. Al Shemmari N, Shaikh RB, Sreedharan J. Prevalence of dokha use among secondary school students in Ajman, United Arab Emirates. *Asian Pac J Cancer Prev*. 2015;16(2):427–30. <http://dx.doi.org/10.7314/APJCP.2015.16.2.427> PMID:25684466
20. El-Roueiheb Z, Tamim H, Kanj M, Jabbour S, Alayan I, Musharrafieh U. Cigarette and waterpipe smoking among Lebanese adolescents, a cross-sectional study, 2003-2004. *Nicotine Tob Res*. 2008 Feb;10(2):309–14. <http://dx.doi.org/10.1080/14622200701825775> PMID:18236295
21. Turner L, Mermelstein R, Flay B. Individual and contextual influences on adolescent smoking. *Ann N Y Acad Sci*. 2004 Jun;1021(1):175–97. <http://dx.doi.org/10.1196/annals.1308.023> PMID:15251888
22. Simons-Morton BG, Farhat T. Recent findings on peer group influences on adolescent smoking. *J Prim Prev*. 2010 Aug;31(4):191–208. <http://dx.doi.org/10.1007/s10935-010-0220-x> PMID:20614184
23. Tobacco use: data by country. World Health Organization; 2009 (<http://apps.who.int/gho/data/node.main.65>, accessed 16 January 2018).
24. Akl EA, Gunukula SK, Aleem S, Obeid R, Jaoude PA, Honeine R, et al. The prevalence of waterpipe tobacco smoking among the general and specific populations: a systematic review. *BMC Public Health*. 2011 Apr 19;11(1):244. <http://dx.doi.org/10.1186/1471-2458-11-244> PMID:21504559
25. Richter KP, Ahluwalia HK, Mosier MC, Nazir N, Ahluwalia JS. A population-based study of cigarette smoking among illicit drug users in the United States. *Addiction*. 2002 Jul;97(7):861–9. <http://dx.doi.org/10.1046/j.1360-0443.2002.00162.x> PMID:12133125
26. United Arab Emirates 2013 crime and safety report: Abu Dhabi: Overseas Security Advisory Council; 2013 (<https://www.osac.gov/Pages/ContentReportDetails.aspx?cid=13886>, accessed 12 December 2017).



## Seroprevalence and social determinants of varicella in Turkey

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### Abstract

**Background:** In Turkey, varicella vaccine was introduced into routine childhood immunization in 2013, with a single dose administered to children aged 12 months. However, there is limited information on the morbidity (incidence and seroprevalence), mortality and burden of disease of varicella in the overall Turkish population.

**Aim:** To determine varicella seroprevalence and its social determinants in Manisa Province, Turkey in children aged > 2 years before single-dose varicella vaccination was introduced in 2013.

**Methods:** The presence of anti varicella-zoster virus IgG antibodies was determined using enzyme-linked immunosorbent assay in serum samples collected from 1250 participants.

**Results:** The overall seroprevalence was 92.8% and the seroprevalence was > 90% among all age groups except 2–9 years (55.7%). Seroprevalence was significantly associated with family size, annual per capita equivalent income, number of people per room and education level. After adjusting by age, only education level remained significantly associated with seroprevalence, reflecting the early age effect.

**Conclusion:** High seroprevalence depends on natural exposure to the infectious agent itself and is not associated with social determinants. High vaccine coverage should be maintained for effective varicella control and switching to a 2-dose schedule may also be considered to reduce the number and size of outbreaks in the Turkish population.

Keywords: seroprevalence, social factors, Turkey, vaccination, varicella

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### Introduction

Varicella or chickenpox is distributed worldwide and is an acute highly contagious infectious disease caused by varicella-zoster virus (VZV), which has no animal reservoir (1,2). While varicella occurs predominantly in childhood in temperate climate regions, it is also a disease of people aged 20–25 years in subtropical and tropical climate regions, with a lower overall incidence (2–4). Although varicella is often mild and self-limiting in healthy children, some complications such as secondary bacterial infection of the skin, viral or bacterial pneumonia, encephalitis and cerebellitis can be life threatening especially in adolescents, adults and immunosuppressive individuals (2,5–7).

In 1998, the World Health Organization (WHO) recommended routine vaccination for countries where varicella is an important public health and socioeconomic problem, if high vaccine coverage could be provided and it were economically viable (8). In some countries such as the United States of America (USA), Greece, Republic of Korea, Canada and Saudi Arabia, varicella is included in the routine childhood immunization programme. In some countries such as England and Belgium, the vaccine is administered to seronegative individuals after childhood and at high risk for varicella (9,10). In developing countries, as the burden of other diseases is

higher than that of varicella, introduction of varicella vaccination into the national immunization programme is not a high priority. For these countries, a targeted vaccination strategy may be an option (2,8).

In Turkey, varicella vaccine was introduced into the routine childhood immunization programme in 2013, with a single dose administered to children aged 12 months. However, there is limited information on the morbidity (incidence and seroprevalence), mortality and disease burden of varicella in the overall Turkish population (11–22). Furthermore, varicella was only included in the notifiable diseases list in Turkey in 2011. Therefore, we aimed to determine varicella seroprevalence in the population aged > 2 years in Manisa Province and to examine some of the social determinants for varicella seroprevalence. This reflects the population before the introduction of varicella vaccination into the routine childhood immunization programme in Turkey in 2013.

### Methods

This cross-sectional study was conducted as part of the population survey titled “Determination of the seroprevalence of some vaccine preventable diseases in Manisa, 2014”. Manisa is located in Western Anatolia and has a population of ~1.3 million. In terms of

socioeconomic development, Manisa was ranked 23rd among 81 provinces of Turkey in 2011 (23).

The sampling frame consisted of all individuals aged > 2 years who were registered under Manisa Province Family Medicine Information System in October 2013 (n = 1 317 917). The minimum sample size required was calculated as 1337 people within a 95% confidence level using the EpiInfo computer programme (Centers for Disease Control and Prevention, Atlanta, USA), assuming anticipated seronegativity of 2.0% and absolute precision of 0.75%. The estimated sample size was then inflated by 30% to reach 1740 to overcome nonresponse bias. The sample was selected using a simple random sampling method from the Manisa Province Family Medicine Information System. Individuals who were selected for the study were invited to the family health centres by physicians or midwives. Data were collected from participants in family health centres between 18 March and 22 June 2014.

Ten interviewers were trained and standardized for data collection. Written informed consent was obtained from the participants, and questionnaires were completed by the interviewers during face-to-face interviews. Serum samples were collected in the family health centres, transported to a centre in Manisa at 4–8°C and stored at –20°C. Once weekly, samples were sent to the laboratory at –20°C to be stored at –80°C until they were tested. The study protocol was approved by the Dokuz Eylül University Clinical Research Ethics Board.

Among 1740 people who were sampled, 168 could not be reached in their place of residence, 312 refused to participate in the study and 10 participants' blood samples were excluded from the analyses due to haemolysis or insufficient quantity. We analysed data from 1250 people (response rate: 71.8%).

The dependent variable of the study was varicella seropositivity. The independent variables were gender, age groups, area of residence, family size, number of people per room, annual per capita equivalent income, education level and employment status. The presence of specific varicella antibodies in serum samples was determined using Euroimmun (Medizinische Labordiagnostika AG, Lübeck, Germany) anti-VZV IgG ELISA test. Test results with < 80 IU/ml were considered as negative and those with ≥ 110 IU/ml were considered as positive. The results between these values were considered as uncertain. For the analysis, uncertain and negative results were interpreted as seronegative and positive results were interpreted as seropositive.

Categorical variables were summarized with count, percentage and 95% confidence interval (CI) and compared using the  $\chi^2$  test in univariate analysis. Continuous variables were summarized with median, minimum and maximum values. Crude and age-adjusted odds ratios and 95% CIs for social determinants of varicella seropositivity were calculated using logistic regression analysis. All statistical analyses were performed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA).

## Results

The study group was 52.1% female and 47.9% male, with a median age of 36 (2–89) years. Varicella seroprevalence was 92.8% (95% CI: 91.2–94.1%) among all the participants. The seroprevalence changed between 92.6 and 100.0% in children aged > 9 years but it was 37.1 and 61.9% for the 2–4- and 5–9-year age groups, respectively (P < 0.001) (Figure 1). There was no significant difference in seroprevalence according to gender (P = 0.37), area of residence (P = 0.57) and employment status (P = 0.83) (Table 1). Seroprevalence was significantly increased in participants whose family size was ≤ 4 (OR = 1.75, 95% CI: 1.12–2.72); participants who had ≤ 1 person per room (OR = 2.32, 95% CI: 1.49–3.62); and participants in the 3rd and 4th quartiles of annual per capita equivalent income (OR = 1.94, 95% CI: 1.03–3.65 and OR = 2.21, 95% CI: 1.14–4.27). These associations disappeared after age adjustment. There was also a significant difference in varicella seroprevalence according to education level. Seroprevalence was > 95% for participants at all education levels, apart from those who were not of school age (38.1%) or attending primary school (74.2%) (P < 0.001). After adjusting by age, the only significant variable for varicella seroprevalence was education level. Age-adjusted OR for varicella seroprevalence was 0.16 (95% CI: 0.03–0.92) in participants who were not of school age.

## Discussion

Varicella seroprevalence was 92.8% among people aged > 2 years in Manisa in 2014. The study population did not receive varicella vaccine in the national immunization programme since it was not introduced for children aged 12 months until 2013. Therefore, our findings reflect the seroepidemiology of varicella before the vaccine was introduced as part of the national immunization programme. The seroprevalence was > 90% among all age groups except 2–9 years, which was 55.7%. This suggests that varicella exists in the population and almost 90% of the population contract the virus by age 10 years.

In most temperate climates, > 90% of the population become seropositive for varicella before adolescence and the incidence ranges from 13 to 16/1000 per year (2). In a comparative seroepidemiology study in 11 countries in Europe between 1996 and 2003, varicella seroprevalence was > 90% in children aged 10–14 years, except in Italy (81.7%) and England and Wales (89.7%) (24). There have been several previous epidemiological studies on varicella in Turkey that included different age groups (11–22). In 9 provinces of Turkey in 2002, the seroprevalence was 77.8% in the population aged < 30 years and this increased with age and reached 85% at 10 years (11). In eastern regions of the country the seroprevalence was 78% in people aged < 30 years in 2004 and 69% in those aged 1–16 years in 2006 (12,13). Varicella seroprevalence among school children aged 7–15 years residing in Manisa was 61.6% in 2009–2010 (14). In a 2010 study of people aged 1–80 years in Izmir, which is a neighbouring province of Manisa, varicella seroprevalence was 71.5% (15). The

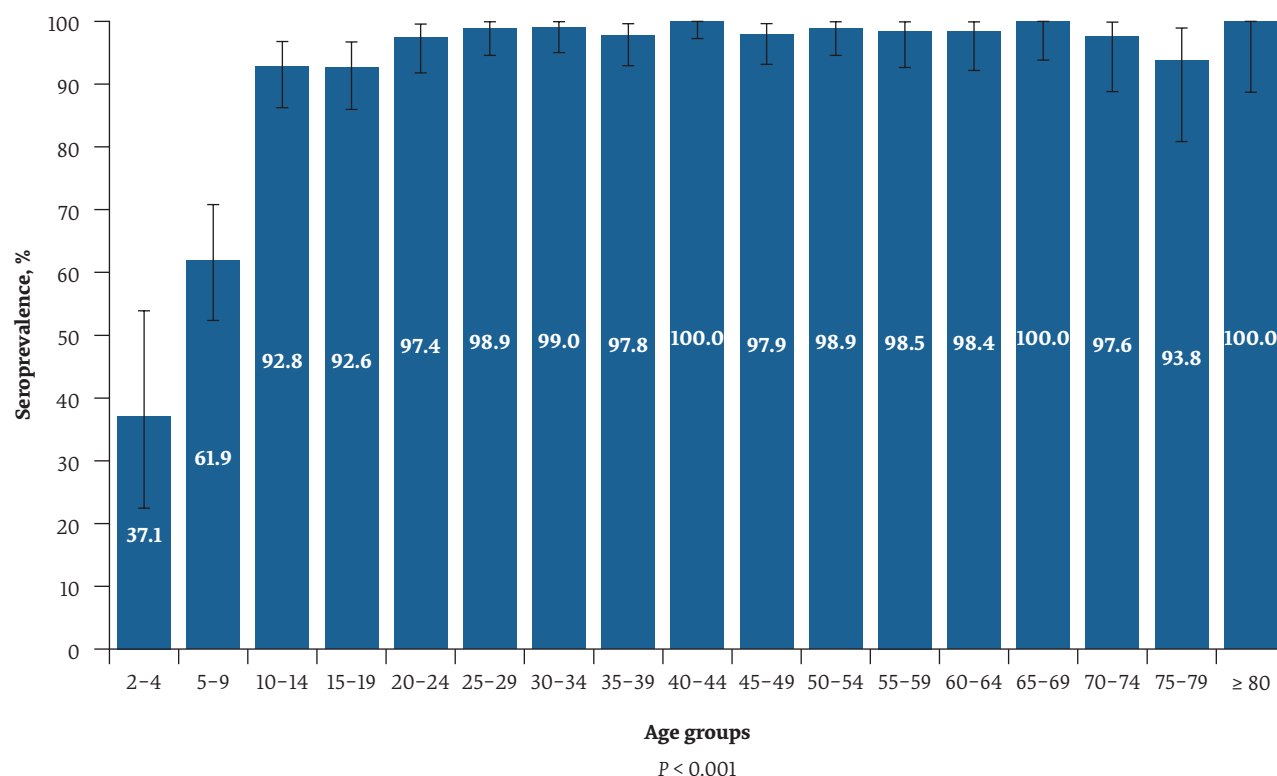


Figure 1 Varicella seroprevalence and 95% confidence intervals by age groups, Manisa Province, Turkey, 2014.

Table 1 Varicella seroprevalence by social determinants of health in population aged > 2 years, Manisa province, Turkey, 2014

Variables (n)	Seroprevalence, % (95% CI)	P	Crude OR (95% CI)	Age adjusted OR (95% CI)
<b>Gender</b>				
Female (654)	93.4 (91.2–95.1)	0.370	Reference group	
Male (596)	92.1 (89.6–94.0)		0.82 (0.53–1.26)	0.97 (0.61–1.55)
<b>Living area</b>				
Surrounding counties (970)	92.6 (90.8–94.1)	0.571	Reference group	
Central counties (280)	93.6 (90.2–96.0)		1.16 (0.68–1.19)	1.14 (0.61–2.03)
<b>Family size</b>				
> 4 people in house (356)	89.9 (86.2–92.8)	0.012	Reference group	
≤ 4 people in house (894)	94.0 (92.2–95.3)		1.75 (1.12–2.72)	0.92 (0.56–1.48)
<b>No. of people per room</b>				
> 1 (551)	89.7 (86.9–92.0)	< 0.001	Reference group	
≤ 1 (698)	95.3 (93.5–96.6)		2.32 (1.49–3.62)	1.22 (0.75–1.99)
<b>Quartiles of annual per capita equivalent income (Turkish Lira<sup>a</sup>)</b>				
1st quartile (<1814, n = 299)	90.3 (86.5–93.3)	0.030	Reference group	
2nd quartile (1815–3265, n = 302)	91.1 (87.4–93.9)		1.09 (0.63–1.89)	0.93 (0.51–1.70)
3rd quartile (3266–5692, n = 305)	94.8 (91.8–96.8)		1.94 (1.03–3.65)	1.38 (0.70–2.73)
4th quartile (> 5692, n = 302)	95.4 (92.5–97.3)		2.21 (1.14–4.27)	1.33 (0.65–2.71)
<b>Education level</b>				
Illiterate (102)	97.1 (92.2–99.2)	< 0.001	Reference group	
Literate (42)	95.2 (85.1–99.1)		0.62 (0.10–3.89)	1.12 (0.16–7.59)
Primary school (525)	98.3 (96.8–99.1)		1.75 (0.46–6.59)	3.89 (0.93–16.11)
Secondary school (182)	96.7 (92.8–98.7)		0.89 (0.21–3.67)	3.47 (0.69–17.39)
High school (152)	96.7 (92.8–98.7)		0.90 (0.21–3.85)	2.71 (0.55–13.23)
University (90)	97.8 (92.8–99.6)		1.34 (0.22–8.24)	3.59 (0.54–23.85)

**Table 1** Varicella seroprevalence by social determinants of health in population aged > 2 years, Manisa province, 2014 (concluded)

Variables (n)	Seroprevalence, % (95% CI)	P	Crude OR (95% CI)	Age adjusted OR (95% CI)
Attending primary school (93)	74.2 (64.5–82.3)		0.08 (0.02–0.30)	0.64 (0.12–3.41)
Not of school age (63)	38.1 (26.7–50.5)		0.01 (0.0–0.06)	0.16 (0.03–0.92)
<b>Employment status (&gt; 18 years)</b>				
Employed (539)	98.5 (97.2–99.3)	0.826	Reference group	
Unemployed (68)	98.5 (92.9–99.3)		1.00 (0.12–8.19)	1.05 (0.12–8.68)
Out of workforce/student (347)	98.0 (96.0–99.1)		0.73 (0.26–8.19)	0.73 (0.26–2.04)

<sup>a</sup>1 Turkish lira was equal to average 2.14 US dollars between March and June 2014.

seroprevalence increased to 80.0% in the 10–14-year age group and to 88.3% among young adults. In another study in Izmir in 2009–2010, the seroprevalence was 94.3% in the population aged > 15 years (16). Seroprevalence was reported to be 91.8% among Turkish immigrants in the Amsterdam adult population in 2004 and 96% among the 21–25-year age group in the Turkish population of Cyprus in 2007 (17–25). According to these results, which are consistent with the current study, varicella is common in the Turkish population and the seroprevalence increases with age, with a peak incidence in childhood.

It is known that the most important risk factors associated with severity and mortality of varicella are older age and a compromised immune system. Varicella case fatality rates are about 1 per 100 000 people in children and the risk of death is 4 times higher in infants than in children and 23–29 times higher in adults. Average crude varicella mortality rates range from 0.3 to 0.5 per million people annually. It is estimated that varicella leads to 4.2 million severe complications annually that require hospitalization and 4200 deaths globally (26). In developed countries, overall case fatality rates are 2–4 per 100 000 cases compared to 1–3 per 1000 cases for measles (2,26). Despite the routine use of measles and pertussis vaccination, the age-standardized death rate per 100 000 cases in 2010 was lower for varicella (0.1) than measles (1.7) and pertussis (1.1) (26). According to WHO recommendations, varicella should be considered an important public health problem that requires routine vaccination (8). A few studies in Turkey have evaluated the financial burden and mortality of varicella in children and adults (18,19). In a multicentre study from 2008 to 2010 that included 824 children aged < 15 years hospitalized for varicella, total median length of hospital stay was 6 days and 0.36% of the children died of complications. Approximately 26% of these varicella-related hospitalized children had an immunosuppressive condition or chronic underlying disease and death was 5 times higher in such children than in previously healthy children (18). This study was hospital based, and deaths from varicella were possibly overestimated. Therefore, varicella case fatality rate is expected to be < 0.36% in the population.

Varicella is one of the most contagious diseases. The basic reproduction number ( $R_0$ ) estimates for varicella ranged between 3.3 and 16.9 in serum banks that were collected between 1996 and 2003 in 11 European countries,

and herd immunity thresholds varied from 70 to 94% (24). This means that if the varicella-susceptible proportion in a population is over this threshold, an outbreak is not expected to occur in that population (24–27). However, we currently have no  $R_0$  and herd immunity threshold estimation for the Turkish population. WHO recommends that resources should be sufficient to ensure reaching and sustaining varicella vaccine coverage for  $\geq 80\%$  of the population. If vaccine coverage remains < 80% over the long term, it is expected to shift varicella infection to older age groups in some settings, and this may increase morbidity and mortality despite a reduction in the total number of cases. The number of doses administered is determined by the goal of the vaccination programme. If the goal of the programme is to reduce mortality and severe morbidity from varicella, 1 dose is sufficient. A 2-dose schedule increases vaccine effectiveness. Therefore, 2 doses are recommended in countries where the goal is to reduce the number of cases and outbreaks as well as mortality and severe morbidity (26).

We found that varicella seroprevalence was not associated with the social factors that were explored, except for education level, which actually reflects the early age effect. Our expectation was to demonstrate higher exposure to VZV and higher varicella seroprevalence in disadvantaged groups, for example, people with lower education, lower income per capita or crowded housing. However, only the group who was not of school age or at primary school had low varicella seroprevalence, suggesting that exposure to varicella increased with schooling. Some studies have reported that living in urban areas, living in a large family ( $\geq 4$  people) and children with more siblings are factors associated with higher varicella seroprevalence. Many studies have found no gender difference for varicella seroprevalence (2, 3, 16, 17, 28–30). Consistent with the current study, varicella seroprevalence was not associated with household size, income, occupation and education in a population-based study in Izmir in 2009–2010 (16).

The current study had some strengths. First, the study group was randomly sampled from a general population and had a high response rate, hence it was representative of all age groups > 2 years in Manisa Province. The study reflected the epidemiology of varicella before the introduction of routine varicella vaccination, which can

provide invaluable baseline information for evaluating the impact of the vaccination programme. Although some socioeconomic and primary healthcare quality variations existed between the provinces, the findings may give some indicators about the whole country since our study group was a random sample from Manisa.

Our study also had some limitations. First, vaccination histories were not taken from the participants, and some may have received varicella vaccine in private clinics before the vaccination programme started. However the number of such people should not be a large proportion of the study participants. Second, the overall response rate was 72% and we evaluated the age and gender structure of responders and nonresponders. There was no significant difference between the 2 groups by age but there were more female than male participants in the study. However, there was no significant gender difference in seroprevalence; therefore it can be considered that the overall seroprevalence was not greatly affected by this limitation. Third, since there were fewer participants in the subcategories according to social determinant

variables, the statistical power may have been lower to determine the difference in seroprevalence between those subcategories. For example, the literate group had only 42 participants and the unemployed group 68.

In conclusion, since the study included age groups before starting routine varicella vaccination in Turkey, the observed varicella seroprevalence depended on natural exposure to VZV and was not associated with social determinants. For successful varicella control by routine vaccination programme, vaccine coverage and effectiveness, burden of varicella and change in seroepidemiology in Turkey should carefully be followed up. High vaccine coverage should be targeted and maintained. Otherwise, varicella outbreaks affecting older age groups, with more severe clinical features, are inevitable. To reduce the number and size of varicella outbreaks, as well as severe morbidity and mortality, switching to a 2-dose vaccination schedule may also be considered for the national immunization programme in Turkey.

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**Competing interests:** None declared.

## Séroprévalence et déterminants sociaux de la varicelle en Turquie

### Résumé

**Contexte :** En Turquie, le vaccin contre la varicelle a été introduit dans le programme de vaccination systématique des enfants en 2013, avec une seule dose administrée aux enfants de 12 mois. Toutefois, les informations concernant la morbidité (incidence et séroprévalence), la mortalité et la charge de morbidité de la varicelle dans l'ensemble de la population turque sont limitées.

**Objectif :** Déterminer la séroprévalence de la varicelle et ses déterminants sociaux dans la province de Manisa (Turquie) chez des enfants de plus de deux ans avant l'introduction de la vaccination en une seule dose en 2013.

**Méthodes :** La présence d'anticorps IgG dirigés contre le virus varicelle-zona (VZV) a été déterminée à l'aide de la méthode immuno-enzymatique (ELISA) sur des échantillons de sérum collectés auprès de 1250 participants.

**Résultats :** La séroprévalence globale de la varicelle était de 92,8 % et la séroprévalence était supérieure à 90 % au sein de tous les groupes d'âge, excepté chez les 2-9 ans (55,7 %). La séroprévalence de la varicelle était associée à la taille de la famille, au revenu annuel équivalent par habitant, au nombre d'individus par classe et au niveau d'éducation ( $p < 0,05$ ). Après un ajustement par l'âge, seul le niveau d'éducation restait significativement associé à la séroprévalence de la varicelle ( $p < 0,05$ ), reflétant l'importance d'un jeune âge.

**Conclusion :** Une forte séroprévalence dépend de l'exposition naturelle à l'agent infectieux et n'est pas associée aux déterminants sociaux. Une couverture vaccinale élevée devrait être maintenue si l'on veut que la lutte contre la varicelle soit efficace et le passage à un schéma vaccinal à deux doses afin de réduire le nombre et l'ampleur des flambées de varicelle dans la population turque.

## الانتشار المصلي والمحددات الاجتماعية للحماق في تركيا

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## الخلاصة

الخلفية: بدأ العمل بلقاح الحماق في تركيا في إطار برنامج تطعيم الأطفال الروتيني في عام ٢٠١٣ بإعطاء جرعة واحدة للأطفال عند الشهر ١٢ من عمرهم، ولم يدرج الحماق في قائمة الأمراض واجبة التبليغ إلا بدءاً من عام ٢٠١١.

الهدف: هدفت هذه الدراسة القائمة على السكان قبل إطلاق برنامج التطعيم الروتيني ضد الحماق الذي بدأ العمل به في تركيا في عام ٢٠١٣ إلى تحديد الانتشار المصلي للحماق لدى السكان في الفئة العمرية الأكبر من ستين في مقاطعة مانيسا، ودراسة بعض المحددات الاجتماعية للانتشار المصلي للحماق.

طرق البحث: تحدد وجود الأجسام المضادة للجلوبولين المناعي «جيم» لفيروس فاريسلا زوستر باستخدام ELISA في العينات المصلية المجمعة من ١٢٥٠ مشاركاً. وجمعت البيانات باستخدام استبيانات أثناء إجراء مقابلات مباشرة.

النتائج: بلغ المعدل الكلي للانتشار المصلي للحماق ٨,٩٢٪ وجاء معدل الانتشار المصلي أعلى من ٩٠٪ بين جميع الفئات العمرية باستثناء الفئة العمرية ٢-٩ أعوام (٧,٥٥٪). وارتبط الانتشار المصلي للحماق بحجم الأسرة، والدخل السنوي المكافئ لكل فرد، وعدد الأفراد في كل غرفة، ومستوى التعليم ( $P > ٠,٠٥$ ). وبعد تحييد عامل العمر، ظل مستوى التعليم فقط مرتبطاً بالانتشار المصلي للحماق ( $P > ٠,٠٥$ ) وهو ما يرجع إلى أثر المراحل الأولى من العمر. ويصل معدل الانتشار المصلي للحماق إلى المستوى الحدي للمناعة القطيعة عند بلوغ سن ١٠ أعوام في مانيسا. وحيث إن هذه الدراسة أدرجت الفئات العمرية قبل بداية التطعيم الروتيني ضد الحماق، فإن الانتشار المصلي المشاهد يعتمد على التعرض الطبيعي للعامل المعدني في حد ذاته ولا يرتبط بالمحددات الاجتماعية.

الاستنتاج: ينبغي توجيه مستوى التغطية المرتفع للقاحات بصورة جيدة والحفاظ عليه لإنجاح برنامج التطعيم، وإلا سيتفشى الحماق حتماً في الفئات العمرية الأكبر محدثاً آثاراً سريرة أكثر حدة.

## References

1. Myers MG, Stanberry LR. Varicella-zoster virus. In: Behrman RE, Kliegman RM, Jenson HB, editors. Nelson textbook of pediatrics. Philadelphia: W.B. Saunders; 2000:973-7.
2. Heininger U, Seward JF. Varicella. Lancet. 2006 Oct 14;368(9544):1365-76. [https://doi.org/10.1016/S0140-6736\(06\)69561-5](https://doi.org/10.1016/S0140-6736(06)69561-5) PMID:17046469
3. Lolekha S, Tanthiphabha W, Sornchai P, Kosuwan P, Sutra S, Warachit B, et al. Effect of climatic factors and population density on varicella zoster virus epidemiology within a tropical country. Am J Trop Med Hyg. 2001 Mar;64(3):131-6. <https://doi.org/10.4269/ajtmh.2001.64.131> PMID:11442207
4. Wharton M. The epidemiology of varicella-zoster virus infections. Infect Dis Clin North Am. 1996 Sep;10(3):571-81. [https://doi.org/10.1016/S0891-5520\(05\)70313-5](https://doi.org/10.1016/S0891-5520(05)70313-5) PMID:8856352
5. Choo PW, Donahue JG, Manson JE, Platt R. The epidemiology of varicella and its complications. J Infect Dis. 1995 Sep;172(3):706-12. <https://doi.org/10.1093/infdis/172.3.706> PMID:7658062
6. Enders G, Bolley I, Miller E, Craddock-Watson J, Ridehalgh M. Consequences of varicella and herpes zoster in pregnancy: prospective study of 1739 cases. Lancet. 1994 Jun 18;343(8912):1548-51. [https://doi.org/10.1016/S0140-6736\(94\)92943-2](https://doi.org/10.1016/S0140-6736(94)92943-2) PMID:7802767
7. Takahashi M, Gershon AA, Seward JF. Varicella vaccine. In: Plotkin SA, Orenstein WA, Offit PA, editors. Vaccines. Philadelphia: Elsevier; 2004:783-823.
8. Varicella vaccines. WHO position paper. Wkly Epidemiol Rec. 1998 Aug 7;73(32):241-8. PMID:9715106
9. Bonanni P, Breuer J, Gershon A, Gershon M, Hryniewicz W, Papaevangelou V, et al. Varicella vaccination in Europe - taking the practical approach. BMC Med. 2009 05 28;7(1):26. <https://doi.org/10.1186/1741-7015-7-26> PMID:19476611
10. Sengupta N, Booy R, Schmitt HJ, Peltola H, Van-Damme P, Schumacher RF, et al. Varicella vaccination in Europe: are we ready for a universal childhood programme? Eur J Pediatr. 2008 Jan;167(1):47-55. <https://doi.org/10.1007/s00431-007-0424-0> PMID:17334784
11. Kanra G, Tezcan S, Badur S; Turkish National Study Team. Varicella seroprevalence in a random sample of the Turkish population. Vaccine. 2002 Jan 31;20(9-10):1425-8. [https://doi.org/10.1016/S0264-410X\(01\)00459-5](https://doi.org/10.1016/S0264-410X(01)00459-5) PMID:11818162
12. Alp H, Altinkaynak S, Ertekin V, Kiliçaslan B, Giiraksin A. Seroepidemiology of varicella-zoster virus infection in a cosmopolitan city (Erzurum) in the eastern Turkey. Health Policy. 2005 Apr;72(1):119-24. <https://doi.org/10.1016/j.healthpol.2004.03.008> PMID:15760704
13. Gürgöze MK, Yilmaz E, Gödekmerdan A, Akça Z, Doğan Y, Akarsu S, et al. Seroprevalence of mumps, varicella and rubella antibodies in children 1-16 years of age in eastern Turkey. Turk J Pediatr. 2006 Jul-Sep;48(3):185-8. PMID:17172059
14. Kose U, Ozguven AA, Ecemis T, Akçalı S, Lagarlı T, Onag A. Prevalence of chickenpox in children aged 7-15 years residing in Manisa. Ege J Med. 2011;50(3):187-91.

15. Koturoglu G, Kurugol Z, Turkoglu E. Seroepidemiology of varicella-zoster virus and reliability of varicella history in Turkish children, adolescents and adults. *Paediatr Perinat Epidemiol*. 2011 Jul;25(4):388–93. <https://doi.org/10.1111/j.1365-3016.2010.01180.x> PMID:21649681
16. Kose S, Mandiracioglu A, Senger SS, Ulu Y, Cavdar G, Gol B, et al. Seroprevalence of varicella-zoster virus in the prevaccine era: a population-based study in Izmir, Turkey. *J Infect Public Health*. 2013 Apr;6(2):115–9. <https://doi.org/10.1016/j.jiph.2012.10.003> PMID:23537824
17. Kurugol Z, Koturoglu G, Aksit S, Ozacar T. Varicella seroprevalence in Turkish population in Cyprus. *Acta Paediatr*. 2007 Jun;96(6):861–3. <https://doi.org/10.1111/j.1651-2227.2007.00289.x> PMID:17465984
18. Dinleyici EC, Kurugol Z, Turel O, Hatipoglu N, Devrim I, Agin H, et al.; VARICOMP Study Group. The epidemiology and economic impact of varicella-related hospitalizations in Turkey from 2008 to 2010: a nationwide survey during the pre-vaccine era (VARICOMP study). *Eur J Pediatr*. 2012 May;171(5):817–25. <https://doi.org/10.1007/s00431-011-1650-z> PMID:22170238
19. Ozdemir H, Candir MO, Karbuz A, Belet N, Tapisiz A, Ciftçi E, et al. Chickenpox complications, incidence and financial burden in previously healthy children and those with an underlying disease in Ankara in the pre-vaccination period. *Turk J Pediatr*. 2011 Nov–Dec;53(6):614–25. PMID:22389983
20. Savaş S, Dallar Y, Arıkan I, Onde U. [Varicella-zoster virus seroprevalence in children between 0–15 years old]. *Mikrobiyol Bul*. 2004 Jan–Apr;38(1-2):69–75 (in Turkish). PMID:15293904
21. Dilli D, Dallar Y, Onde U, Dogan F, Yagci. [Measles, rubella, mumps, and varicella seroprevalence among adolescents]. *Cocuk Dergisi*. 2008;8(3):172–8 (in Turkish) [https://www.journalagent.com/cocuk/pdfs/CD\\_8\\_3\\_172\\_178.pdf](https://www.journalagent.com/cocuk/pdfs/CD_8_3_172_178.pdf).
22. Ozkan S, Maral I, Ilhan F, Aycan S, Cirak MY, Beyazova U, et al. Varicella zoster seroprevalence in children less than 5 years old. *J Trop Pediatr*. 2005 Jun;51(3):141–4. <https://doi.org/10.1093/tropej/fmh102> PMID:15831668
23. The Ministry of Development of the Turkish Republic. [The socio-economic developmental ranking of provinces and regions (SEGE-2011)] (in Turkish) (<http://www.kalkinma.gov.tr/Lists/Yaynlar/Attachments/548/SEGE-2011.pdf>, accessed 5 March 2018).
24. Nardone A, de Ory F, Carton M, Cohen D, van Damme P, Davidkin I, et al. The comparative sero-epidemiology of varicella zoster virus in 11 countries in the European region. *Vaccine*. 2007 Nov 7;25(45):7866–72. <https://doi.org/10.1016/j.vaccine.2007.07.036> PMID:17919788
25. van Rijckevorsel GG, Damen M, Sonder GJ, van der Loeff MF, van den Hoek A. Seroprevalence of varicella-zoster virus and predictors for seronegativity in the Amsterdam adult population. *BMC Infect Dis*. 2012 06 21;12(1):140. <https://doi.org/10.1186/1471-2334-12-140> PMID:22721551
26. Varicella and herpes zoster vaccines: WHO position paper, June 2014. *Wkly Epidemiol Rec*. 2014 Jun 20;89(25):265–87. PMID:24983077
27. Nardone A, de Ory F, Carton M, Cohen D, van Damme P, Davidkin I, et al. The comparative sero-epidemiology of varicella zoster virus in 11 countries in the European region. *Vaccine*. 2007 Nov 7;25(45):7866–72. <https://doi.org/10.1016/j.vaccine.2007.07.036> PMID:17919788
28. Halloran ME, Struchiner CJ, Longini IM Jr. Study designs for evaluating different efficacy and effectiveness aspects of vaccines. *Am J Epidemiol*. 1997 Nov 15;146(10):789–803. <https://doi.org/10.1093/oxfordjournals.aje.a009196> PMID:9384199
29. Silhol R, Alvarez FP, Arena C, Amoros JP, Flahault A, Hanslik T, et al. Micro and macro population effects in disease transmission: the case of varicella. *Epidemiol Infect*. 2010 Apr;138(4):482–90. <https://doi.org/10.1017/S0950268809990896> PMID:19796448
30. Heininger U, Braun-Fahrlander C, Desgrandchamps D, Glaus J, Grize L, Wutzler P, et al.; SCARPOL Team. Seroprevalence of varicella-zoster virus immunoglobulin G antibodies in Swiss adolescents and risk factor analysis for seronegativity. *Pediatr Infect Dis J*. 2001 Aug;20(8):775–8. <https://doi.org/10.1097/00006454-200108000-00011> PMID:11734740

# Growth patterns of Palestinian children from birth to 24 months

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## Abstract

**Background:** Growth faltering in early life can adversely affect health in later childhood and adulthood. Growth monitoring of children can provide evidence to help formulate effective strategies to address growth problems but such information on Palestinian children is lacking.

**Objectives:** This study aimed to determine the growth patterns of children under 2 years in Gaza, Palestine.

**Methods:** This retrospective cohort study was conducted in 2014 in 10 randomly selected primary health care clinics in 5 governorates of Gaza. Weight and length data were obtained from the health cards of children born in 2012, and z-scores were calculated and compared with the WHO Growth Standard (2006).

**Results:** A total of 2 632 children's cards were included at the beginning of the study. Weight-for-age and weight-for-length decreased from birth to 6 months to about  $-0.40$  SD but increased afterwards to  $-0.11$  SD and  $0.34$  SD at 24 months respectively. Length-for-age declined after 6 months, reaching  $-0.85$  SD at 24 months. At 6 months, the prevalence of underweight and stunting were 5% and 9% but at 24 months, the prevalence was 4% and 20% respectively. Wasting was highest at 6 months (10%) but decreased to 3% at 24 months. Significantly more girls were stunted at 9, 12 and 18 months ( $P < 0.001$ ), underweight at 24 months ( $P < 0.05$ ) and wasted at 12 months ( $P < 0.05$ ). Early life faltering in length was more pronounced than weight, with stunting occurring in one fifth of boys and girls by 2 years of age.

**Conclusions:** Preventive strategies are urgently needed to address early life causes of undernutrition, particularly stunting, in Palestinian children in Gaza.

Keywords: Young children, growth faltering, underweight, stunting, wasting

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## Introduction

Undernutrition is the underlying cause of death in 45% of all deaths among children under 5 years of age (1). The global prevalence of stunting, underweight and wasting among children under 5 years has been reported to be 23%, 14% and 10% respectively, with most undernourished children are living in Asia and Africa (2,3). In developing countries, 29.9%, 19.4% and 10% of children under 5 years were stunted, underweight and wasted respectively (4,5). In the Middle East, 3.9%, 9.7%, and 4.4% of children under 5 years were reported to be underweight, stunted and wasted respectively (5). In Palestine, stunting (10.3%) remains the most prevalent form of undernutrition among children under 5 years, followed by underweight (2.5%) and wasting (2.4%) (6).

The first 2 years of life are characterized by high energy and nutrient requirements to meet the needs for growth and development (7–9). Inadequate dietary quality and frequent infections are important risk factors for undernutrition in young children (10,11). Infants in low- and middle- income communities often experience growth faltering in the first 2 years of life and evidence suggests that growth faltering commonly starts at 4–6 months of age (12–14). Data from developing countries

show that faltering in weight often starts around 4 months whereas stunting starts from birth (15). Growth faltering in early life can adversely affect health in later childhood and adulthood with effects ranging from cognitive deficits to risk of chronic diseases (16–18).

Growth monitoring of children facilitates early identification of growth deviation and the period of greatest risk for malnutrition. With such information, effective strategies can be formulated to address the specific growth problem (19). As growth information on Palestinian young children is lacking, this study was conducted to track the growth status of children from birth to 2 years so as to inform the growth patterns and prevalence of undernutrition of children during this critical period of growth.

## Methods

### Study setting, design and subjects

This retrospective cohort study was conducted from April to June 2014 in 10 randomly selected primary health care clinics in 5 governorates of the Gaza Strip. Five clinics were selected from 20 clinics of the United Nations Relief and Work Agency (UNRWA) and another 5 clinics from 54



clinics of the Ministry of Health (MoH). Each governorate was represented by 1 UNRWA and 1 MoH clinic. A total of 8 852 health cards of children born in the year 2012 were available in these 10 clinics and were screened for study eligibility (healthy, i.e. no physical disability and diseases, appropriate for gestational age). The sample size calculation was based on the World Health Organization formula. A prevalence of wasting of 34.3% among children under 2 years in Gaza and a 1.9% margin of error were used in the calculation (20,21). The minimum sample size was 2382, and a total of 2650 health cards were selected (10% more cards were added in case of excluded children who had a biologically improbable anthropometric observation, and to improve precision). Upon screening, 6463 health cards were eligible for the study from which 2650 health cards were randomly selected in proportion to the percentages of refugee and non-refugee children in each governorate. Random sampling of clinics and health cards was done using a computerized table of random numbers.

### Measurements

In both UNRWA and MoH clinics, each newborn is assigned a health card which contains information on sociodemographics, birth, medical conditions, schedule of vaccination and growth monitoring (birth to 2 years). In clinics, recumbent weight and length of children are measured by nurses using standard techniques for children 2 years and below. Portable infant electronic scales (Seca Chica 345) and paediatric length measuring mats (Seca 210) are used to measure recumbent weight and length respectively. Growth data are available at birth, 6, 9, 12, 15, 18 and 24 months on the child health card. In this study, age and sex-specific z-scores for weight-for-age (WAZ), length-for-age (LAZ) and weight-for-length (WLZ) of the children were calculated using WHO *Anthro* software (version 3). Underweight, stunting and wasting

for children were defined as WAZ, LAZ and WLZ below 2 standard deviations (SD) of the median (22).

### Ethics approval

The study protocol was approved by the Ethics Committee for Research Involving Human Subjects of the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia and the Helsinki Ethics Committee of Gaza Strip. Permissions to conduct the study in MoH and UNRWA clinics were obtained from the Department of General Administration and Human Resources Development and the Health Affairs Centre of UNRWA respectively.

### Data analysis

SPSS for Windows, version 21, was used for data analysis. Descriptive statistics were used to describe continuous and categorical data. The chi-squared test was used to examine the association between prevalence of undernutrition and gender. Subjects were excluded (18 at birth, 61 at 6 months, 68 at 9 months, 52 at 12 months, 43 at 15 months, 28 at 18 months and 3 at 24 months) when one of their anthropometric observations was considered to be biologically improbable according to the cut-offs defined by the World Health Organization (19). Specifically, the cut-offs are LAZ < -5 SD or > +3 SD, WAZ < -5 SD or > +5 SD or WLZ < -4 SD or > +5 SD.

### Results

A total of 2632 (2650 - 18) children were included at the beginning of the study, 1307 (49.7%) boys and 1 325 (50.3%) girls (Table 1). The proportions of children from the 5 governorates were 920 (35.0%) (Gaza), 511 (19.4%) (North), 376 (14.3%) (Middle), 503 (19.1%) (Khanyounis) and 322 (12.2%) (Rafah). The median birth weight and length were 3.30 kg and 50 cm respectively. A total of 1 016 (38.6%) children were born at the 40th week of gestation and the median gestational age was 39 (SD 0.93) weeks. The

Table 1. Sample characteristics (n = 2632)

Characteristic	No. (%)	Median (SD)	Min–Max
<b>Sex</b>			
Male	1307 (49.7%)		
Female	1325 (50.3%)		
<b>Governorate</b>			
North	511 (19.4%)		
Gaza	920 (35%)		
Middle	376 (14.3%)		
Khanyounis	503 (19.1%)		
Rafah	322 (12.2%)		
<b>Refugee status</b>			
Refugee	1744 (66.3%)		
Not a refugee	888 (33.7%)		
<b>Family size (persons)</b>		6 (2.11)	3–15
1–4	625 (23.7%)		
5–8	1560 (59.3%)		
≥ 9	447 (17%)		

**Table 1. Sample characteristics (n = 2632) (concluded)**

Characteristic	No. (%)	Median (SD)	Min–Max
<b>Mother's employment status</b>			
Working	191 (7.3%)		
Housewife	2441 (92.7%)		
<b>Father's employment status</b>			
Working	2241 (85.2%)		
Not working	391 (14.8%)		
<b>Educational level</b>			
Illiterate or read and write only	0 (0%)		
Primary school	806 (30.6%)		
Secondary school	813 (30.9%)		
Above secondary school	1013 (38.5%)		
<b>Number of siblings (persons)</b>			
1–3	1144 (43.5%)	4 (2.11)	
4–6	1041 (39.5%)		
≥ 7	449 (17%)		
Birth weight (kg)		3.30 (0.29)	2.55–3.90
Birth length (cm)		50.0 (1.84)	45.50–53.50
<b>Gestational age (weeks)</b>			
38	584 (22.2%)	39 (0.93)	
39	774 (29.4%)		
40	1016 (38.6%)		
41	258 (9.8%)		
<b>Age breastfeeding stopped (months)</b>			
6–8.9	696 (26.4%)	10 (2.31)	6–18
9–11.9	1304 (49.6%)		
12–14.9	474 (18%)		
15–17.9	152 (5.8%)		
≥ 18	6 (0.2%)		

SD = standard deviation.

median age of infants when breastfeeding stopped was 10 (SD 2.31) months, with 2 000 (76.0%) mothers stopping breastfeeding before their infant reached 12 months of age.

Table 2 presents the median z-scores for WAZ, LAZ and WLZ of the children. The trends of WAZ, LAZ and WLZ from birth to 24 months are shown in Figure 1. In the first 6 months of life, the median WAZ and WLZ were lower than LAZ. Specifically, WAZ at birth was below the median ( $-0.07$  SD), declined further to  $-0.35$  SD at 6 months but increased thereafter and remained relatively stable by 24 months. LAZ started above the median ( $0.06$  SD) at birth, increased to  $0.17$  SD at 6 months but declined thereafter, reaching  $-0.85$  SD at 24 months. At birth, WLZ was  $-0.17$  SD, decreased to  $-0.40$  SD at 6 months but increased to above the median by 12 months and increased slightly thereafter.

Figure 2 illustrates the prevalence of undernutrition by age and sex of the children. None of the children was underweight, stunted or wasted at birth. From 6 to 24 months, while the prevalence of underweight was relatively stable ( $\sim 5\%$ ), there was a decreasing trend in

the prevalence of wasting (10% to 2.8%) but an increasing trend for stunting prevalence (9% to 20.4%) (Figure 2a). A significantly greater proportion of girls were stunted than boys at 9, 12 and 18 months ( $P < 0.001$ ) but at 24 months the proportion was similar for boys (20.1%) and girls (20.6%) (Figure 2b). More boys than girls were underweight at 9 months ( $P < 0.001$ ) but by 24 months, underweight was significantly more prevalent in girls (5.0%) compared with boys (3.4%) ( $P < 0.05$ ) (Figure 2c). The proportion of girls and boys with wasting was similar for at all time points except at 12 months where wasting was more prevalent in girls ( $P < 0.05$ ) (Figure 2d).

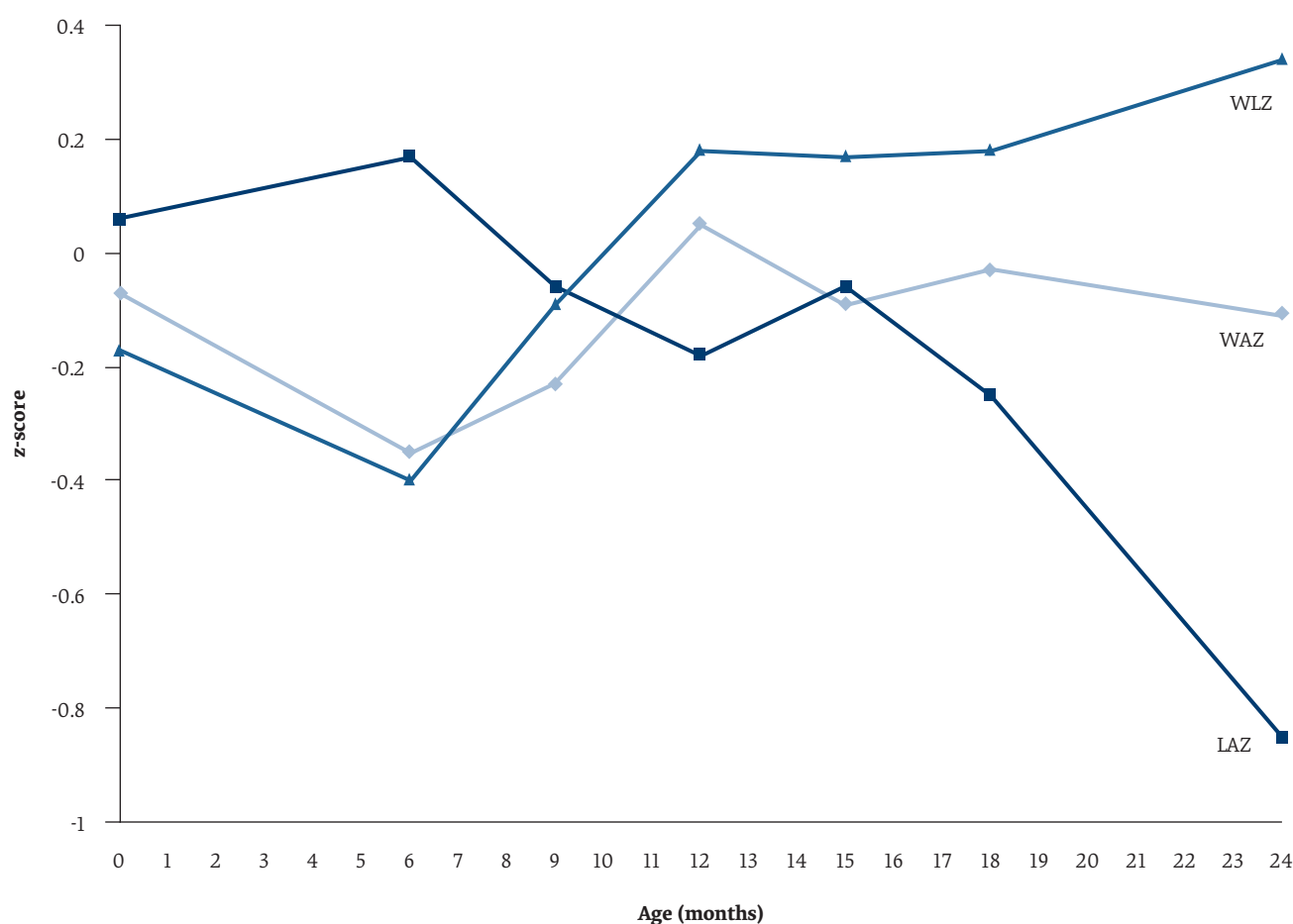
## Discussion

Undernutrition in Palestine is largely determined by the worsening political and socioeconomic conditions in the country (23). In 2013, the Palestinian Central Bureau of Statistics reported that 11 out of 100 children under 5 years suffered chronic malnutrition or stunting (23). The prevalence of stunting in Palestine increased from 7.5% in 2000 to 10.9% in 2010 with the Gaza Strip recording a stunting prevalence of 10.4% (23). In 2010, a United

**Table 2 Z-scores for weight-for-age (WAZ), length-for-age (LAZ) and weight-for-length (WLZ) of children 0–24 months (both sexes combined)**

Variable	At birth	6 months	9 months	12 months	15 months	18 months	24 months
Weight (kg)	3.30 (2.55 to 3.90)	7.20 (4.30 to 11.50)	8.30 (4.80 to 13.20)	9.20 (6.50 to 14.80)	10 (6.90 to 15.30)	10.50 (6.60 to 15.80)	11.50 (7.80 to 16.50)
Length (cm)	50 (45.5 to 53.5)	67 (56 to 72)	71 (62 to 77)	75 (63 to 81.6)	78 (65 to 85)	81 (66.5 to 89)	84 (71.7 to 95)
WAZ	-0.07 (-1.78 to 1.37)	-0.35 (-4.14 to 3.49)	-0.23 (-4.35 to 3.74)	0.05 (-3.52 to 4.07)	-0.09 (-3.57 to 3.67)	-0.03 (-3.89 to 3.34)	-0.11 (-3.61 to 2.67)
LAZ	0.06 (-2.05 to 2.34)	0.17 (-4.50 to 2.97)	-0.06 (-4.89 to 2.84)	-0.18 (-4.10 to 2.85)	-0.06 (-4.57 to 2.73)	-0.25 (-4.89 to 2.87)	-0.85 (-4.92 to 2.57)
WLZ	-0.17 (-3.97 to 3.76)	-0.40 (-3.61 to 4.81)	-0.09 (-3.88 to 4.35)	0.18 (-3.90 to 4.07)	0.17 (-4 to 3.83)	0.18 (-3.98 to 3.81)	0.34 (-3.96 to 3.77)

Values are median (range).

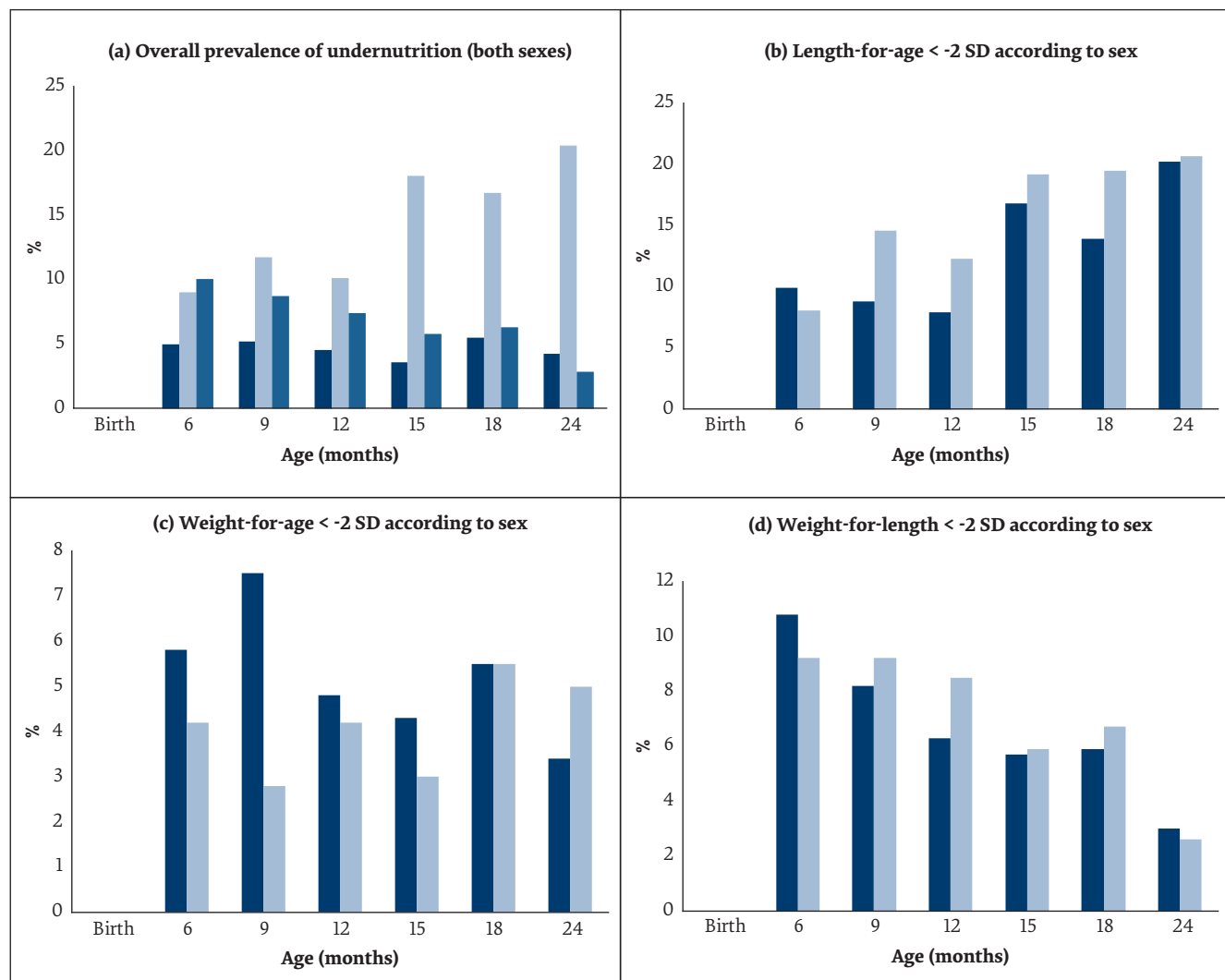


**Figure 1 Median anthropometric z-scores of Gazan children relative to the World Health Organization growth standards. Sample: n = 2 650; subjects were excluded when one of their anthropometric observations was considered to be biologically improbable (18 were excluded at birth, 61 at 6 months, 68 at 9 months, 52 at 12 months, 43 at 15 months, 28 at 18 months and 3 at 24 months)**

Nations Children’s Fund (UNICEF) report indicated that the prevalence of stunting among children under 5 years of age had increased from a national average of 7% in 2004 to 10% in 2006, with a significant difference between the West Bank (8%) and the Gaza Strip (13%) (24). In recent years, stunting has been the most prevalent form of undernutrition (~10%) as compared to underweight and wasting in Gazan children under 5 years (24,25). Our study showed that stunting prevalence at 24 months was

2 times greater than reported in previous studies (23–25), although underweight and wasting rates prevalence were similar.

In our study, the proportion of undernutrition was significantly more prevalent in girls compared with boys. A review of child health differences in 15 Arab countries showed that girls had a higher rate of stunting than boys in 5 countries, including Palestine, and girls had



**Figure 2** Prevalence of undernutrition among Gazan children: 2b shows significant differences in prevalence at 9, 12 and 18 months ( $P < 0.001$ ); 2c shows significant difference in prevalence at 9 ( $P < 0.001$ ) and 24 ( $P < 0.05$ ) months; and 2d shows significant difference in prevalence at 12 months ( $P < 0.05$ )

a significantly higher rate of wasting in Jordan, Sudan and Tunisia (26). In 2003, the Palestinian Central Bureau of Statistics showed that the prevalence of stunting and underweight among Palestinian girls was higher than boys (27). However, the 2010 Palestinian family survey showed that the prevalence of underweight, stunting and wasting among boys under 5 years was higher than that in girls (28). Similarly, studies in Africa have reported that the rate of undernutrition among boys was consistently higher than that in girls (29,30). Important determinants of such differences included low socioeconomic status, older siblings of a similar gender, birth order and gender bias (31,32). Therefore, a possible reasons for the gender disparities in Palestine could be low socioeconomic status, the family set-up, and gender bias.

We showed that WAZ and WLZ of Gazan children faltered from birth to 6 months but increased thereafter. LAZ however, increased from birth to 6 months but declined after this age. An analysis of growth faltering among children under 5 years in 54 developing countries showed that height-for-age (HAZ) and WAZ were slightly

below the standard mean at 1 month and faltered thereafter until 24 months, with the growth faltering pattern more pronounced for LAZ than WAZ. In contrast, weight-for-height (WHZ) started above the standard mean but faltered slightly until 9 months and increased thereafter to around the standard mean by 24 months of age (14). For countries in North Africa and the Middle East, the analysis further showed that WAZ, HAZ and WHZ in Egypt increased from 1 month to 12 months but declined thereafter. In Jordan, WAZ and HAZ started above the standard mean but gradually declined to  $-0.41$  SD and  $-0.74$  SD respectively at 59 months. On the other hand, WHZ showed a fluctuating pattern of decrease and increase with the z-scores well above the standard mean. Similar to our results, in both countries, HAZ faltering was more pronounced than WAZ and WHZ (14).

There are several explanations for the observed growth faltering in children under 2 years in the Gaza Strip. Sub-optimum breastfeeding and frequent infections can contribute to weight and length faltering in the first 6 months of life (33). The 2014 survey of the

Palestinian Central Bureau of Statistics reported that exclusive breastfeeding rates averaged at 38.6% from birth to 5 months of age (34). Growth faltering among Palestinian children could also be attributed to the early introduction of complementary foods. A study published in 2007 reported that about 62% of children under 5 years in the Gaza Strip received complementary foods before 6 months of age (35). Lower weight-for-age, length-for-age, and higher risk of infections are significantly associated with early feeding of complementary foods to infants (36–38). In addition, food insecurity has been shown to adversely affect the growth status of children under 5 year (39,40). In the Occupied Palestinian Territories, food insecurity continues to be prevalent and about 85% of the population are food insecure (41,42). Gordon and Halileh in 2013 reported the determinants of stunting among 9 051 Palestinian children aged < 5 years; these were: lower birth weight ( $P < 0.001$ ), age > 12 months ( $P < 0.001$ ), higher levels of food insecurity ( $P < 0.001$ ), lower household socioeconomic index ( $P < 0.001$ ), maternal illiteracy ( $P < 0.01$ ), and absence of supplementation to breastfeeding during the first 4 months of the life ( $P < 0.05$ ) (43).

## Acknowledgement

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**Competing interests:** None declared.

Because of time constraints, our study was conducted retrospectively. Retrospective designs have a number of limitations which may lead to the exclusion of some subjects from contributing to the study, and the possibility of observational bias arising from measurements or documenting errors. Therefore, we used a large sample and excluded subjects who had improbable measurements from the analysis.

Our study showed that stunting, a form of chronic undernutrition, was prevalent among the children under 2 years in the Gaza Strip, Palestine. Promoting adequate antenatal and postnatal care, breastfeeding and appropriate complementary feeding practices is important because length faltering has important health consequences for infants and young children. In a resource-constrained setting such as the Gaza Strip, timely micronutrient supplementation or food fortification could also improve the health and nutrition of these children. Further studies, however, are needed to ascertain specific nutrition interventions that could effectively prevent growth faltering among children under 2 years in the Gaza Strip.

## Schémas de croissance des enfants palestiniens de la naissance à l'âge de 24 mois

### Résumé

**Contexte :** Le ralentissement de la croissance en début de vie peut avoir un impact négatif sur la santé plus tard dans l'enfance et à l'âge adulte. Le suivi de la croissance des enfants fournit des données permettant d'élaborer des stratégies efficaces pour lutter contre les problèmes de croissance, mais de telles données n'existent pas pour les enfants palestiniens.

**Objectifs :** La présente étude visait à déterminer les schémas de croissance des enfants de moins de deux ans à Gaza (Palestine).

**Méthodes :** Cette étude de cohorte rétrospective a été conduite en 2014 auprès de 10 dispensaires de soins de santé primaires sélectionnés au hasard dans cinq gouvernorats de Gaza. Les données sur le poids et la taille ont été obtenues à partir de carnets de santé d'enfants nés en 2012, et les z-scores ont été calculés et comparés à l'aide des Normes OMS de croissance (2006).

**Résultats :** Au total, 2632 carnets de santé d'enfants ont été inclus au début de l'étude. Le poids pour l'âge et le poids pour la taille baissaient entre la naissance et six mois jusqu'à environ -0,40 écart type, mais augmentaient ensuite en passant à -0,11 ET à 0,34 ET respectivement à l'âge de 24 mois. La taille pour l'âge chutait après 6 mois, et atteignait -0,85 ET à 24 mois. À 6 mois, la prévalence du déficit pondéral et du retard de croissance était de 5 % et 9 %, mais à 24 mois elle était de 4 % et 20 % respectivement. L'émaciation était la plus élevée à 6 mois (10 %), mais passait à 3 % à 24 mois. Un nombre significativement plus élevé de filles présentait un retard de croissance, à 9, 12 et 18 mois ( $p < 0,001$ ), ainsi qu'un déficit pondéral à 24 mois ( $p < 0,05$ ) et une émaciation à 12 mois ( $p < 0,05$ ). Le ralentissement de la croissance affectant la taille en début de vie était plus prononcé que celui du poids, avec une émaciation survenant chez un cinquième des garçons et des filles âgées de 2 ans.

**Conclusions :** Des stratégies de prévention sont requises de toute urgence afin de lutter contre les causes de dénutrition en début de vie, et particulièrement contre le retard de croissance, chez les enfants palestiniens de Gaza.

## أنماط نمو الأطفال الفلسطينيين حتى سن ٢٤ شهراً

علي البليسي، زليخة شريف، شان من، هيجر عبد الرحمن، يحيى عابد

### الخلاصة

الخلفية: يمكن أن يؤثر تعثر النمو في مراحل العمر المبكرة تأثيراً ضاراً على الصحة في مرحلتها الطفولة المتأخرة والبلوغ. ومن شأن رصد نمو الأطفال أن يوفر براهين للمساعدة في صوغ استراتيجيات فعّالة من أجل التصدي لمشكلات النمو، إلا أنه لا تتوفر مثل تلك المعلومات بالنسبة للأطفال الفلسطينيين.

الأهداف: هدفت هذه الدراسة إلى تحديد أنماط نمو الأطفال دون السنتين في قطاع غزة بفلسطين.

طرق البحث: أجريت دراسة الأثر الرجعية الأثر هذه في عام ٢٠١٤ في ١٠ عيادات مختارة من عيادات الرعاية الصحية الأولية في ٥ محافظات في قطاع غزة. واستُمدت بيانات الوزن والطول من البطاقات الصحية للأطفال مواليد عام ٢٠١٢، وتم حساب الدرجات المعيارية ومقارنتها بمعيار منظمة الصحة العالمية لنمو الأطفال (٢٠٠٦).

النتائج: أُدرجت البطاقات الصحية لما مجموعه ٢٦٣٢ طفلاً في بداية الدراسة. ولوحظ انخفاض نسبة الوزن مقابل العمر والوزن مقابل الطول من الميلاد حتى سن ٦ أشهر بانحراف معياري بلغ نحو ٤٠، -٠، وإن ازدادت النسبتان لاحقاً لتصل إلى ١١، -٠، ٣٤، ٠ عند سن ٢٤ شهراً على التوالي. وعند سن ٦ أشهر، بلغ معدل انتشار نقص الوزن والتقرّم ٩٪، ٥٪، في حين بلغ معدل الانتشار في سن ٢٤ شهراً ٤٪، ٢٠٪ على التوالي. وانخفضت نسبة الطول مقابل العمر بعد ٦ أشهر، مسجلة انحرافاً معيارياً مقداره ٨٥، -٠ عند سن ٢٤ شهراً. وبلغ الهزال أعلى مستوياته عند سن ٦ أشهر (١٠٪) وإن انخفض إلى ٣٪ عند سن ٢٤ شهراً. وسجلت الإناث معدلات أعلى للقرامة عند سن ٩ و ١٢ و ١٨ شهراً ( $P < 0.001$ )، ونقص الوزن عند سن ٢٤ شهراً ( $P < 0.05$ )، والهزال عند سن ١٢ شهراً ( $P < 0.05$ ). وبدأ تعثر الطول في مراحل العمر المبكرة أكثر بروزاً من تعثر الوزن، مع حدود التقرّم في خمس الأطفال الذكور والإناث بحلول عامهم الثاني.

الاستنتاجات: ثمة حاجة ملحة لاعتماد استراتيجيات وقائية من أجل التصدي لأسباب نقص التغذية في مراحل العمر المبكرة، لا سيما التقرّم، في صفوف الأطفال الفلسطينيين في غزة.

## References

1. World Health Organization. Media centre. Children: reducing mortality. Fact sheet. Updated October 2017 (<http://www.who.int/mediacentre/factsheets/fs178/en/>, accessed 19 November 2017).
2. UNICEF. Monitoring the situation of children and women. Undernutrition contributes to nearly half of all deaths in children under 5 and is widespread in Asia and Africa (<http://data.unicef.org/topic/nutrition/malnutrition/>, accessed 19 November 2017).
3. World Health Organization. Global Health Observatory data repository. Global and regional trends by WHO Regions, 1990–2016. Underweight (<http://apps.who.int/gho/data/view.main.NUTWHOUNDERWEIGHTv>, accessed 19 November 2017).
4. Progress for children: a world fit for children. Statistical review. New York: UNICEF; 2007 ([https://www.unicef.org/progressforchildren/2007n6/files/Progress\\_for\\_Children\\_-\\_No.\\_6.pdf](https://www.unicef.org/progressforchildren/2007n6/files/Progress_for_Children_-_No._6.pdf), accessed 19 November 2017).
5. Levels and trends in child malnutrition. UNICEF-WHO-World Bank. Joint Child Malnutrition Estimates. New York: UNICEF, Geneva: WHO, Washington, DC: The World Bank; 2012 ([http://www.who.int/nutgrowthdb/jme\\_unicef\\_who\\_wb.pdf](http://www.who.int/nutgrowthdb/jme_unicef_who_wb.pdf), accessed 19 November 2017).
6. Abdeljawad A, Humeid JM. Nutritional status of Palestinian children under five (6–59 months) in three governorates of the Gaza Strip: a rapid assessment study. Paper presented at the Siege and Mental Health... Walls vs. Bridges International Conference, 27–29 October, 2008, Gaza City, Palestine.
7. Victora CG, Adair L, Fall C, Hallal PC, Martorell R, Richter L, et al.; Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: consequences for adult health and human capital. *Lancet*. 2008 Jan 26;371(9609):340–57. [http://dx.doi.org/10.1016/S0140-6736\(07\)61692-4](http://dx.doi.org/10.1016/S0140-6736(07)61692-4) PMID:18206223
8. Arnold F, Parasuraman S, Arokiasamy P, Kothari M. Nutrition in India. National Family Health Survey (NFHS-3), India, 2005–2006. Mumbai: International Institute for Population Sciences & Calverton, Maryland, USA; 2009.
9. Butte NF. Energy requirements of infants. *Public Health Nutr*. 2005 Oct;8(7A) 7a:953–67. <http://dx.doi.org/10.1079/PHN2005790> PMID:16277814
10. Goulet O. Growth faltering: setting the scene. *Eur J Clin Nutr*. 2010 May;64 Suppl 1:S2–4. <http://dx.doi.org/10.1038/ejcn.2010.38> PMID:20442721
11. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, et al.; Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet*. 2008 Jan 19;371(9608):243–60. [http://dx.doi.org/10.1016/S0140-6736\(07\)61690-0](http://dx.doi.org/10.1016/S0140-6736(07)61690-0) PMID:18207566
12. Maleta K, Virtanen S, Espo M, Kulmala T, Ashorn P. Timing of growth faltering in rural Malawi. *Arch Dis Child*. 2003 Jul;88(7):574–8. <http://dx.doi.org/10.1136/adc.88.7.574> PMID:12818899
13. Neumann CG, Harrison GG. Onset and evolution of stunting in infants and children. Examples from the Human Nutrition Collaborative Research Support Program. Kenya and Egypt studies. *Eur J Clin Nutr*. 1994 Feb;48 Suppl 1:S90–102. PMID:8005095

14. Victora CG, de Onis M, Hallal PC, Blössner M, Shrimpton R. Worldwide timing of growth faltering: revisiting implications for interventions. *Pediatrics*. 2010 Mar;125(3):e473–80. doi: 10.1542/peds.2009-1519 PMID:20156903
15. Shrimpton R, Victora CG, de Onis M, Lima RC, Blössner M, Clugston G. Worldwide timing of growth faltering: implications for nutritional interventions. *Pediatrics*. 2001 May;107(5):E75. <http://dx.doi.org/10.1542/peds.107.5.E75> PMID:11331725
16. Dewey KG, Begum K. Long-term consequences of stunting in early life. *Matern Child Nutr*. 2011 Oct;7 Suppl 3:5–18. <http://dx.doi.org/10.1111/j.1740-8709.2011.00349.x> PMID:21929633
17. Hodidinott J, Behrman JR, Maluccio JA, Melgar P, Quisumbing AR, Ramirez-Zea M, et al. *Adult consequences of growth failure in early childhood*. *Am J Clin Nutr*. 2013 Nov;98(5):1170–8. <http://dx.doi.org/10.3945/ajcn.113.064584> PMID:24004889
18. Lanigan J, Singhal A. Early nutrition and long-term health: a practical approach. *Proc Nutr Soc*. 2009 Nov;68(4):422–9. <http://dx.doi.org/10.1017/S002966510999019X> PMID:19698202
19. Physical status: the use and interpretation of anthropometry: Report of a WHO Expert Committee. Geneva: World Health Organization; 1995 (WHO Technical Report Series, 854).
20. World Health Organization. Chronic diseases and health promotion. STEPS sample size calculator and sampling spreadsheet. 2008 (<http://www.who.int/chp/steps/resources/sampling/en/>, accessed 30 November 2017).
21. Radi S, Mourad TA, Papatreou C. Nutritional status of Palestinian children attending primary health care centers in Gaza. *Indian J Pediatr*. 2009 Feb;76(2):163–6. <https://doi.org/10.1007/s12098-009-0046-9> PMID:19330304
22. *WHO Child Growth Standards: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: Methods and development*. Geneva: World Health Organization; 2006 ([http://www.who.int/childgrowth/standards/Technical\\_report.pdf](http://www.who.int/childgrowth/standards/Technical_report.pdf), accessed 19 November 2017).
23. Palestinian children – issues and statistics. Annual report, 2013. Child Statistics Series (No. 16). Ramallah: Palestinian Central Bureau of Statistics; 2013 (<http://www.pcbs.gov.ps/Downloads/book1971.pdf>, accessed 19 November 2017).
24. The situation of Palestinian children in the Occupied Palestinian Territory, Jordan, Syria and Lebanon: An assessment based on the Convention on the Rights of the Child. New York: UNICEF; 2010.
25. Tsigga M, Grammatikopoulou MG. Assessing the silent epidemic of malnutrition in Palestinian preschool children. *J Epidemiol Glob Health*. 2012 Dec;2(4):181–91. <http://dx.doi.org/10.1016/j.jegh.2012.12.002> PMID:23856499
26. Khawaja M, Dawns J, Meyerson-Knox S, Yamout R. Disparities in child health in the Arab region during the 1990s. *Int J Equity Health*. 2008 Nov 20;7:24. <https://doi.org/10.1186/1475-9276-7-24> PMID:19021903.
27. Health Survey 1996. Ramallah, Palestinian Central Bureau of Statistics; 2003.
28. Palestinian Family Survey 2010. Ramallah: Palestinian Central Bureau of Statistics; 2013 (<http://www.pcbs.gov.ps/Downloads/book1941.pdf>, accessed 30 November 2017).
29. Kabubo-Mariara J, Ndenge GK, Mwabu DK. Determinants of children's nutritional status in Kenya: evidence from demographic and health surveys. *J Afr. Econ*. 2009;18(3):363–87. <https://doi.org/10.1093/jae/ejn024>
30. Lwambo N, Brooker S, Siza J, Bundy D, Guyatt H. Age patterns in stunting and anaemia in African schoolchildren: a cross-sectional study in Tanzania. *Eur J Clin Nutr*. 2000 Jan;54(1):36–40. PMID:10694770.
31. Dey I, Chaudhuri R. Gender inequality in nutritional status among under five children in a village in Hooghly district, West Bengal. *Indian J Public Health*. 2008;52(4):218–20. PMID:19189827
32. Pande RP. Selective gender differences in childhood nutrition and immunization in rural India: the role of siblings. *Demography*. 2003;40(3):395–418. PMID:12962055
33. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, et al.; Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet*. 2008 Jan 19;371(9608):243–60. [http://dx.doi.org/10.1016/S0140-6736\(07\)61690-0](http://dx.doi.org/10.1016/S0140-6736(07)61690-0) PMID:18207566
34. Palestinian multiple indicator cluster Survey 2014: monitoring the situation of children and women. Ramallah: Palestinian Central Bureau of Statistics; 2015 ([https://mics-surveys-prod.s3.amazonaws.com/MICS5/Middle%20East%20and%20North%20Africa/State%20of%20Palestine/2014/Final/State%20of%20Palestine%202014%20MICS\\_English.pdf](https://mics-surveys-prod.s3.amazonaws.com/MICS5/Middle%20East%20and%20North%20Africa/State%20of%20Palestine/2014/Final/State%20of%20Palestine%202014%20MICS_English.pdf), accessed 30 November 2017).
35. El-Kariri M, Kanoa B. Infant feeding in Gaza Strip: mother knowledge, attitudes and practices. *Annals of Alquds Medicine*. 2007;3(1428):58–65.
36. Kimani-Murage EW, Madise NJ, Fotso JC, Kyobutungi C, Mutua MK, Gitau TM, et al. Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi Kenya. *BMC Public Health*. 2011 05 26;11(1):396. <http://dx.doi.org/10.1186/1471-2458-11-396> PMID:21615957
37. Kalanda BF, Verhoeff FH, Brabin BJ. Breast and complementary feeding practices in relation to morbidity and growth in Malawian infants. *Eur J Clin Nutr*. 2006 Mar;60(3):401–7. <http://dx.doi.org/10.1038/sj.ejcn.1602330> PMID:16306929
38. Tessema M, Belachew T, Ersino G. Feeding patterns and stunting during early childhood in rural communities of Sidama, South Ethiopia. *Pan Afr Med J*. 2013 Feb 26;14:75. <http://dx.doi.org/10.11604/pamj.2013.14.75.1630> PMID:23646211
39. Ali D, Saha KK, Nguyen PH, Diressie MT, Ruel MT, Menon P, et al. Household food insecurity is associated with higher child undernutrition in Bangladesh, Ethiopia, and Vietnam, but the effect is not mediated by child dietary diversity. *J Nutr*. 2013 Dec;143(12):2015–21. <http://dx.doi.org/10.3945/jn.113.175182> PMID:24089419

40. Psaki S, Bhutta ZA, Ahmed T, Ahmed S, Bessong P, Islam M, et al.; for MALED Network Investigators. Household food access and child malnutrition: results from the eight-country MAL-ED study. *Popul Health Metr.* 2012 12 13;10(1):24. <http://dx.doi.org/10.1186/1478-7954-10-24> PMID:23237098
41. Radi SM, El-Sayed NA, Nofal LM, Abdeen ZA. Ongoing deterioration of the nutritional status of Palestinian preschool children in Gaza under the Israeli siege. *East Mediterr Health J.* 2013 Mar;19(3):234–41. PMID:23879074
42. United Nations World Food Programme and Food and Agricultural Organization of the United Nations. West Bank and Gaza Strip: Comprehensive food security and vulnerability analysis. January 2007:18 ([https://unispal.un.org/pdfs/CFSVA\\_WBGS.pdf](https://unispal.un.org/pdfs/CFSVA_WBGS.pdf), accessed 19 November 2017).
43. Gordon NH, Halileh S. An analysis of cross sectional survey data of stunting among Palestinian children less than five years of age. *Matern Child Health J.* 2013 Sep;17(7):1288–96. <http://dx.doi.org/10.1007/s10995-012-1126-4> PMID:22948964



# Factors affecting empathetic patient care behaviour among medical doctors and nurses: an integrative literature review

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## Abstract

**Background:** Healthcare professionals' empathetic behaviour is an important component of quality health care. Patients' reports suggest that empathy is often lacking. Specific factors that may facilitate or inhibit empathetic behaviour have not been extensively examined. In Qatar, empathy may be affected by a completely multicultural, multilinguistic setting where healthcare professionals and patients interact.

**Aim:** The purpose of this integrative literature review is to provide the latest evidence on factors that influence the demonstration of empathetic behaviour of nurses and physicians toward patients and to draw general conclusions that increase understanding.

**Methods:** A literature search was conducted in CINAHL, Medline (Ovid), PsycINFO, Psychology and Behavioral Sciences Collection, Middle Eastern and Central Asian Studies, Education Research Complete, ERIC, Health Source: Nursing/Academic databases, and Google Scholar to identify relevant studies. A total of 18 quantitative and qualitative studies that satisfied the inclusion criteria were selected to be included in the review.

**Results:** Three high order factors are described: organizational, personal and interpersonal, and demographic factors. Seven subfactors included: burnout, increased workload, lack of organizational support, training workshops, patient behaviour, inappropriate role modelling, and informal, experiential learning.

**Conclusion:** The organizational culture is strongly implicated in inhibiting empathy. Healthcare providers' empathetic responses to patients are linked and connected to a well-resourced, collegial, professional organizational environment that builds empathy towards everyone (not only patients).

Keywords: Compassion, Healthcare Professionals, Communication, Barriers, Facilitators

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## Introduction

This integrative review synthesizes current publications about medical doctors' and nurses' capacity to show empathy. The review was conducted as a preliminary step to explore these health professionals' empathy in the Arabian Gulf Region where empathy has not yet been studied.

It is our view that, internationally, a high degree of empathy toward patients is important for all healthcare professionals. This view is supported by research indicating that empathy is implicated in patients' trust, satisfaction and compliance (1-5). However, research also shows that healthcare professionals often ignore opportunities for acts of empathy (6), and patients are treated with detached functionality rather than empathetically (7).

This review was conducted to respond to the question: what are the inhibiting and facilitating factors that affect the demonstration of empathetic behaviour by medical doctors and nurses toward patients?

## Methods

An integrative review is “a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated” (8). Our review used Knafl and Whittemore's 5-step process (9): (1) problem identification, (2) literature search, (3) data evaluation, (4) data analysis, and (5) presentation.

### Problem identification

Knowledge about the factors that affect the demonstration of empathetic behaviour by medical doctors and nurses is not well developed.

### Sources

Databases accessed included Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline (Ovid), PsycINFO, Psychology and Behavioral Sciences Collection, Middle Eastern and Central Asian Studies, Education Research Complete, ERIC, Health Source: Nursing/Academic, and Google Scholar. We searched for

publications from 2000 to 2015 using the terms *empath\**, *nurs\**, *therapeutic communicat\**, *communicat\**, *factor\**, *influen\**, *barrier\**, *facilitator\**, *perception\**, *perspective\**, and *points of view*. The initial search generated 1408 articles.

### Preliminary scan for inclusion and exclusion

Following Knafl and Whitemore (9), the topical articles were evaluated for eligibility using titles and abstracts. Delimiters included: (i) written in English; (ii) peer-reviewed; (iii) primary sources; and (iv) addressed facilitators and barriers for empathy. A manual search of article reference lists yielded 18 additional articles. Grey literature was excluded. Ultimately, 24 articles met the inclusion criteria.

### Critical appraisal

The next step included a 10-item Critical Appraisal Skills Programme (10) that was applied to the qualitative research, and Barker's 12-item critical appraisal tool (11) to assess the quantitative studies. Six articles were rated as low-quality studies and excluded. Eighteen articles were included in the final review: 5 qualitative and 13 quantitative (Figure 1).

### Compilation and interpretation of data

Analysis was carried out in 3 phases: data reduction, data display and data comparison (9). It involved iterative comparisons seeking higher-order thematic clusters across data sources. During data reduction a categorization structure was developed. Foremost, this was a strategy for managing data from each study. Relevant data were entered into a literature review matrix that was used to facilitate constant comparison, focused on finding patterns, themes, variation, and relationships among the barriers and facilitators. The extracted data were then displayed in a graph and a chart to enhance the visualization of themes and patterns. The data comparison phase involved grouping data together to determine if there were higher- and lower-order themes. Finally, the interpretation and integrated findings were represented in a newly created conceptual model that depicts barriers and facilitators of empathy (Figure 2).

### Results

Three high-order themes that affect empathy emerged: organizational, personal and interpersonal, and

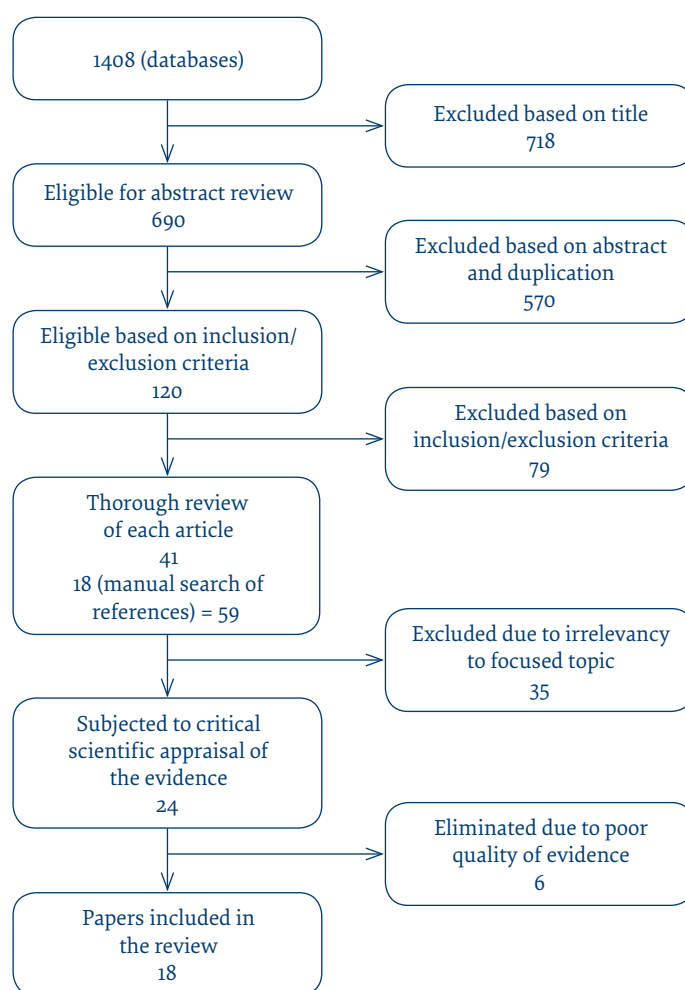


Figure 1. Selection process of studies

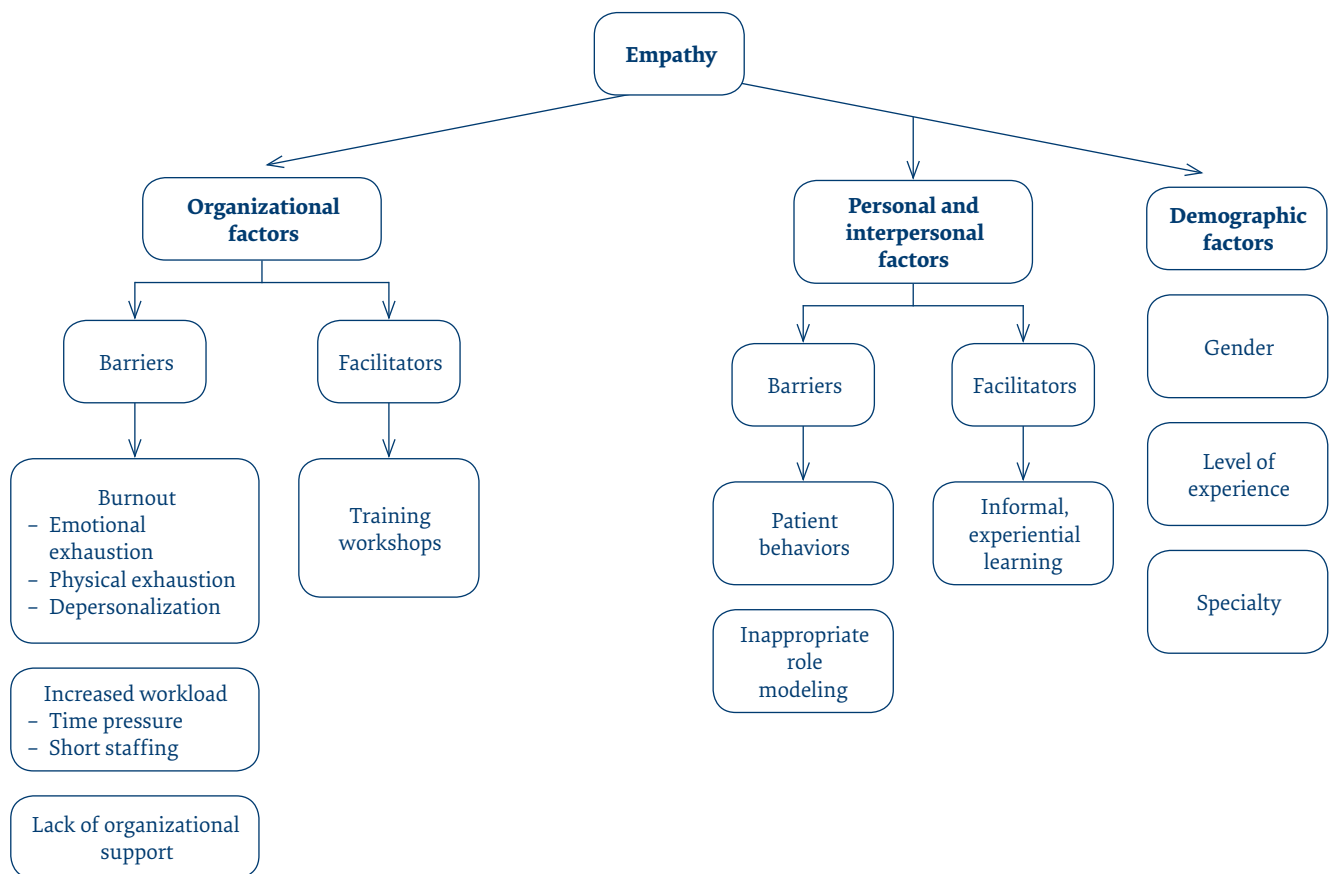


Figure 2. Conceptual framework representing barriers and facilitators of empathy

demographics. These categories, though useful to support an analysis of empathy, are linked and overlapping. The major themes are not mutually exclusive but provide a useful way to conceptually frame the findings.

**Organizational barriers**

The demonstration of empathy is vulnerable to organizational factors that may compromise healthcare professionals’ intentions to provide empathetic care.

**Lack of organizational support**

Healthcare professionals’ ability to demonstrate and practice empathetic behaviour is largely influenced by organizational support. Lack of organizational support may include decreased availability of resources; lack of support from supervisors for empathetic care; and failure to acknowledge bonds between staff and patients. Schell and Kayser-Jones (12) studied the care provided to dying patients and reported that lack of organizational support could be an impediment for healthcare professionals’ empathy during end of life care. Similarly, Bayne et al. (13) reported that physicians who feel unsupported by their administration are more prone to lack empathy.

**Workload**

Lack of empathy is partly attributed to increased workload. An overly demanding pace of work is exhausting and health professionals simply do not have the emotional energy to demonstrate empathy (13). Bayne

et al. examined 21 healthcare professionals’ viewpoints of the practicalities of empathy in clinical practice (13). Under the theme external barriers, the authors found that shortened consultation times led to reduced empathy. Likewise, under the theme obstacles to improving communication, Klitzman found that time pressure was an obstacle for physicians’ empathy (14). Students balancing heavy course loads and mastering clinical skills find it difficult to express empathy in their interactions with patients (13,15). Hojat et al., using the Jefferson Scale of Physician Empathy found a decline in medical students’ mean empathy scores from programme entry to completion (15). The research linked time pressures to students’ reduced levels of empathy. Similarly Ward et al. noted a significant reduction in mean empathy score from admission to the end of the programme in a group of undergraduate nursing students (16).

**Burnout**

Burnout is closely linked to the daily pressures and pace of work faced by health professionals. Shanafelt et al. (17) cited Maslach, Jackson and Leiter (1996) when they stated: “Burnout is a syndrome of depersonalization, emotional exhaustion, and a sense of low personal accomplishment that leads to decreased effectiveness at work” (p. 358). Empathetic behaviour toward patients is reduced as a result of healthcare professionals’ emotional exhaustion, burnout, lack of sleep, workload and physical exhaustion (13,15,18,19). Thomas et al. studied

the relationship between decreased levels of empathy and burnout among 545 medical students, using the Interpersonal Reactivity Index to measure dimensions of empathy and the Maslach Burnout Inventory to measure depersonalization, emotional exhaustion and personal accomplishment (19). The authors found a significant reduction in empathy with increased depersonalization ( $P < 0.02$ ). Similarly, Brazeau et al. surveyed 90 medical students and showed that a high level of burnout was correlated with a decreased level of empathy (18). Hojat et al. found that lack of sleep, and heavy workload, resulted in a loss of empathy among medical students (15). Those healthcare professionals who were assessed as not suffering from burnout adopted strategies to guard themselves against potential sources of emotional tension (13).

### Organizational facilitators

Despite the different organizational factors that exert a negative influence on empathy, evidence suggests that strategies implemented by organizations can enhance empathetic behaviour of healthcare professionals.

### Training workshops

Training can improve empathetic skills. Razavi et al. found significant enhancement of effective empathy 3–6 months after 105 hours of an empathy training programme that used videotapes of simulated interviews to evaluate the ability of 115 oncology nurses to use emotional words (20). They found that nurses who had empathetic training used fewer neutral expressions than untrained nurses, particularly 3 months after training ( $P = 0.055$ ). Furthermore, the level and depth of emotional expression was significantly increased in nurses who did the training in comparison to untrained nurses ( $P = 0.023$  and  $0.016$ , respectively). Chism and Magnan studied 223 nurses and found that empathy training was significantly more effective for people who identified themselves as spiritual ( $P < 0.01$ ) (21). Similar positive results from an organizational intervention were reported by DiLalla et al. who examined 1181 medical students' self-rating of empathy after attending wellness sessions (22). The wellness training resulted in greater empathy ( $P < 0.01$ ).

Dow et al. designed an intervention study whereby professors from the drama/theatre department acted emotionally with 14 internal medicine residents in a controlled environment to assess whether empathy could be learned using theatre techniques (23). Evaluation before, and 4 months after the intervention, relied on observed interactions between practitioners and patients in clinical visits. The intervention group showed a significant improvement in listening, nonverbal communication, respect for dignity, and overall impression ( $P < 0.01$ ) but no significant improvement in verbal communication ( $P = 0.058$ ).

### Personal and interpersonal barriers

Empathy is a human interaction that is relational and is influenced reciprocally by the behaviour and responses of the other person.

### Patients' behaviour

Evidence suggests that the response of healthcare professionals varies according to the type of emotion that is expressed by patients (6,24,25). Sheldon et al. reported on a study with 74 nurses to explore their empathetic responses to patients' emotion (24). Nurses had a significant increase in affective response to sadness versus anger. Kennifer et al. recruited 48 oncologists and audiotaped their responses to patients (25). A subset of 44 recordings in which patients expressed at least 1 negative emotion were analysed. The oncologists scored higher in responding to sadness than to fear. Likewise, Hsu et al. found that patients' expressions of grief and family strain are more likely to induce an empathetic response than the response generated by patients who are angry or distrustful of their doctors (6). Hojat et al. found that medical students had reduced empathy for patients whose behaviour was judged as demanding, difficult, hostile, insulting, unappreciative and/or malingering (15). Bayne et al. supported these findings, adding drug seeking to the list of patients unlikely to receive empathy (13).

### Inappropriate role modelling

Role modelling is one of the ways that healthcare professionals learn how to interact empathetically with patients (14,15,18). Brazeau et al. used a questionnaire to study the relationship between medical students' empathy and the general climate of professionalism, which was defined within characteristics such as altruism, accountability, duty, excellence and service (18). Based on the results of 90 responses they found that the level of empathy was positively related to the professional climate.

### Personal and interpersonal facilitators

#### Experiential, informal learning

Bayne et al. used grounded theory to develop a model of empathy that highlighted 2 types of empathy: initial and genuine (13). Initial empathy is a primary level empathy that is superficial and can be taught. Genuine empathy is a deeper level of empathy that rests in the capacity to imagine and to "walk in a patient's shoes". Klitzman interviewed 50 doctors who had experienced serious illness and identified that this experience served as a catalyst that enabled them to connect with their patients at a deeper level, showing more genuine empathy (14).

#### Demographic factors

Significant variance in healthcare professionals' empathy has been attributed to personal demographic differences related to gender, experience and area of practice (16,22,24,26).

Evidence suggesting that female healthcare professionals are more empathetic to patients than men was consistent across studies (15,19,22,27-29). DiLalla et al. evaluated self-ratings of empathy by 1181 medical students and healthcare practitioners to investigate variations according to gender, experience and age (22). They found that women had significantly

higher empathy scores ( $P < 0.001$ ). Ward et al. found that among undergraduate nursing students empathy was significantly higher in women (29). Quince et al. found the same gender related difference in empathy among medical students (28).

Healthcare professionals' level of experience is another factor influencing the demonstration of empathy. Bayne et al. found that physicians with more experience demonstrated more empathetic behaviour (13). A similar finding was reported in the study of Ward et al. of nursing students in which mean empathy scores were higher among nursing students with the most clinical experience (29). In contrast, a subsequent study by Ward et al. found a decline in empathy measured at the beginning and end of 1 academic year (16).

There is evidence that the level of health professionals' empathy differs among specialty areas (15,26,27). In a study of 456 medical students, Hojat et al. found that those who pursued their residency training in psychiatry had the highest mean empathy scores (127.0), while anaesthesiology had the lowest (116.1) (15). Kataoka et al. used the Jefferson Scale of Empathy (JSE) with 285 female physicians (26). The results showed that physicians in people-oriented specialties, such as general internal medicine and psychiatry, showed significantly higher empathy scores than physicians in technology-oriented specialties, such as anaesthesiology and surgery ( $P < 0.001$ ).

## Discussion and implications

Despite that there has been no research conducted in the Arabic Gulf Region, implications can be drawn from this integrative review. The health workforce in Qatar is dominated by multinational professionals who likely differ, both from one another, and with patients in their cultural approaches to communication and interactions. The patients for whom they provide care also differ in their nationalities and cultures. One of the routine challenges facing healthcare workers in Qatar is a language barrier between themselves and their patients. The initial findings for this review identified the importance of educational programmes to increase and maintain professionals' empathetic awareness and practice. In Qatar, the emphasis of health professionals' empathy training needs to focus on nonverbal communication that respects the cultural diversity of patients in Qatar. This includes lessons in culturally sensitive physical gestures and the appropriate and inappropriate use of physical touch. This literature review reinforces the need for health professionals in Qatar to learn optimal ways to manage and care for patients who do not speak the same language as the caregiver. The language barriers and social hierarchies that manifest in Qatar generate tensions and frustrations that demand that healthcare professionals learn how to respond with empathy to angry or hostile patients (and with one another). Such training sessions need to be offered on a regular basis, as a way to check the level of burnout and to foster and maintain empathetic skills.

As with healthcare organizations around the world, in Qatar, cost-effectiveness has become a prevailing driver and health professionals are being tasked with increasing workloads. In light of the findings of this integrative review, it rests on healthcare leaders and managers to monitor the increasing veracity of healthcare professionals' work to ensure that duty shifts, assigned workload and working conditions are reasonable and not too taxing. Managerial/leadership focus on empathy should support the development of the professional environment, which has been shown to support empathy. Health professionals who experience their work within collegial, empathetic working relationships are key to building a culture of empathy.

Training and organizational support are insufficient without appropriate role modelling (14). In Qatar, there are many highly committed experienced practitioners who contribute an important resource to develop empathetic behaviour. Brazeau et al. stressed the importance of enhancing role models' awareness of their responsibility to model explicitly empathetic care that can be constantly developed and refined for each instance of practice (18). This refined modelling of empathy is important with patients who have been characterized as difficult or those expressing anger (30).

Finally, an implication from this integrative review is the significant research finding that female healthcare professionals are more empathetic to patients than men are. This finding can be utilized in a highly selective way. Quince et al. indicated that there might be a natural empathetic difference between genders that would have implications in job selection (28). Appointing women to jobs in which patients need a lot of empathetic care is one of the ways to utilize women's empathetic advantage.

## Conclusion

This review adds to the limited body of literature about facilitators and barriers to health professionals' empathetic behaviour toward patients. The evidence shows how these factors are inter-related and may work together to affect empathetic behaviour. The review revealed a dearth of research being conducted in the Arabian Gulf within the unique context of health care that has developed here. From our perspective, it is important to begin to generate knowledge from this region.

Overall, the results identified that some of the inhibiting factors for empathy are related to organizational issues. We suggest that this integrative review and the future research it generates are an important contribution to the work of healthcare administrators. The findings indicate that empathy is more than a personal characteristic that is promoted within each individual's practice. The capacity for healthcare providers to demonstrate empathy is linked and connected to a well-resourced, collegial, professional organizational environment that builds empathy (not only towards patients) as the cultural norm. Administrative strategies to support individual empathetic behaviour include periodic empathy training; careful monitoring of overwork and

fatigue; and identification of key role models whose experience provides a way for them to embrace and embody empathy. Ultimately, this integrative review suggests that strategies to address factors that impede or facilitate empathy should be made an important

focus of contemporary healthcare providers. It is an ongoing, dynamic, organizational and interpersonal issue that every member of the healthcare complex must take seriously.

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## Facteurs influant sur le comportement empathique dans les soins prodigués aux patients par les médecins et les infirmières : analyse documentaire intégrative

### Résumé

**Contexte :** Le comportement empathique des professionnels des soins de santé est une composante importante d'une prise en charge de qualité. Selon les dires des patients, il semble que l'empathie soit souvent manquante. Les facteurs spécifiques qui facilitent ou inhibent le comportement empathique n'ont pas été largement étudiés. Au Qatar, l'empathie peut être affectée par un environnement complètement multiculturel et plurilingue au sein duquel les professionnels des soins de santé et les patients ont des interactions.

**Objectif :** L'objet de la présente analyse documentaire intégrative est de fournir les derniers éléments d'information sur les facteurs qui influencent l'expression du comportement empathique des personnels infirmiers et des médecins vis-à-vis des patients et permettent de tirer des conclusions générales qui augmentent la compréhension.

**Méthodes :** Une recherche documentaire a été menée sur CINAHL, Medline (Ovid), PsycINFO, Psychology and Behavioral Sciences Collection, Middle Eastern and Central Asian Studies, Education Research Complete, ERIC, Health Source : Nursing/Academic databases, et Google Scholar pour identifier les études pertinentes. Au total, 18 études quantitatives et qualitatives qui répondaient aux critères d'inclusion ont été sélectionnées pour être incluses dans l'analyse.

**Résultats :** Trois facteurs d'ordre importants sont décrits : il s'agit des facteurs organisationnels, personnels et interpersonnels, et démographiques. Sept sous-facteurs comprenaient : l'épuisement professionnel, l'augmentation de la charge de travail, les ateliers de formation, le comportement des patients, le manque d'appui organisationnel, les modèles à suivre inappropriés, et l'apprentissage expérientiel informel.

**Conclusion :** La culture organisationnelle est fortement impliquée dans l'inhibition de l'empathie. Les réactions empathiques des prestataires de soins face aux patients sont associées à un environnement organisationnel professionnel collégial, bien doté en ressources, établissant une empathie autour de chacun (et pas seulement des patients).

### العوامل التي تؤثر على السلوك التعاطفي في رعاية المرضى في صفوف الأطباء وأطقم التمريض : استعراض تكاملي للدراسات السابقة

منتهى عليان، جانيت رانكين، محمد الشعراي

#### الخلاصة

الخلفية: يمثل السلوك التعاطفي للعاملين في مجال الرعاية الصحية مكوناً مهماً لتوفير الرعاية الصحية الجيدة. وتشير تقارير المرضى إلى انعدام التعاطف في كثير من الأحيان. ولم تجر أي دراسة موسّعة من قبل للعوامل المحددة التي يمكن أن تسهل أو تثبط السلوك التعاطفي. وفي قطر، يمكن أن يتأثر التعاطف مع المرضى بالسياق الذي يتفاعل فيه العاملون في مجال الرعاية والصحية والمرضى مع بعضهم البعض والذي يتسم بتعدد الثقافات واللغات بشكل تام.

الهدف: الغرض من هذا الاستعراض التكاملي للدراسات السابقة هو توفير أحدث البراهين عن العوامل التي تؤثر على إبداء أطقم التمريض والأطباء سلوكاً تعاطفياً نحو المرضى، والخروج باستنتاجات عامة لتعزيز الفهم.

طرق البحث: أُجري بحث عن الدراسات السابقة في الفهرس العلمي CINAHL وقاعدتي البيانات Medline (Ovid) و PsycINFO وقواعد بيانات مجموعة علم النفس والعلوم السلوكية، ودراسات الشرق الأوسط وآسيا الوسطى، والبحوث التعليمية الكاملة، ومركز معلومات الموارد التعليمية، وقاعدة بيانات Health Source: فضلاً عن قواعد بيانات التمريض/قواعد البيانات الأكاديمية، ومحرك بحث «جوجل سكولار» للتعرف على الدراسات ذات الصلة. وجرى اختيار ما مجموعه 18 دراسة كمية وكيفية استوفت معايير إدراجها في الاستعراض.

النتائج: تصف الدراسة ثلاثة عوامل عالية التصنيف، وهي: العوامل التنظيمية، والشخصية والتواصلية، والسكانية. كما تضمنت سبعة عوامل فرعية على النحو التالي: الإنهاك، وزيادة عبء العمل، وانعدام الدعم المؤسسي، والحلقات التدريبية وسلوك المرضى، والافتقار بنهاج غير ملائمة، والتعلم غير الرسمي القائم على التجربة.

الاستنتاج: تشكل الثقافة المؤسسية عاملاً قوياً في تهيئ التعاطف مع المرضى. فيرتبط التجاوب التعاطفي لمقدمي الرعاية الصحية إزاء المرضى بتوفر بيئة مؤسسية مزودة بالموارد الكافية وقائمة على العمل الجماعي وتتسم بالمهنية، تبني التعاطف مع الجميع (وليس المرضى فحسب).

## References

1. Becker ER, Roblin DW. Translating primary care practice climate into patient activation: the role of patient trust in physician. *Med Care*. 2008 Aug;46(8):795–805. <http://dx.doi.org/10.1097/MLR.0b013e31817919c0> PMID:18665059
2. Davies N. (2014). Empathic nursing: Going the extra mile. *Pract Nurs*. 2014 Apr 1425(9):198–202. <http://www.magonlinelibrary.com/doi/abs/10.12968/pnur.2014.25.4.198>
3. Fiscella K, Meldrum S, Franks P, Shields CG, Duberstein P, McDaniel SH, et al. Patient trust: is it related to patient-centered behavior of primary care physicians? *Med Care*. 2004 Nov;42(11):1049–55. <http://dx.doi.org/10.1097/00005650-200411000-00003> PMID:15586831
4. Nygårdh A, Malm D, Wikby K, Ahlström G. The experience of empowerment in the patient-staff encounter: the patient's perspective. *J Clin Nurs*. 2012 Mar;21(5–6):897–904. <http://dx.doi.org/10.1111/j.1365-2702.2011.03901.x> PMID:22081948
5. Safran DG, Taira DA, Rogers WH, Kosinski M, Ware JE, Tarlov AR. Linking primary care performance to outcomes of care. *J Fam Pract*. 1998 Sep;47(3):213–20. PMID:9752374
6. Hsu I, Saha S, Korthuis T, Sharp V, Chon J, Moore RD, et al. Providing support to patients in emotional encounters: A new perspective on missed empathic opportunities. *Patient Educ Couns*. 2012 Sep;88(3):436–42. <http://dx.doi.org/10.1016/j.pec.2012.06.015> PMID:22818767
7. Kruijver IP, Kerkstra A, Bensing JM, van de Wiel HB. Communication skills of nurses during interactions with simulated cancer patients. *J Adv Nurs*. 2001 Jun;34(6):772–9. <http://dx.doi.org/10.1046/j.1365-2648.2001.01807.x> PMID:11422547
8. Torraco RJ. Writing integrative literature reviews: guidelines and examples. *Hum Resour Dev Rev*. 2011;4(3):356–67. <http://dx.doi.org/10.1177/1534484305278283>
9. Whittmore R, Knaf K. The integrative review: updated methodology. *J Adv Nurs*. 2005 Dec;52(5):546–53. <http://dx.doi.org/10.1111/j.1365-2648.2005.03621.x> PMID:16268861
10. Critical Appraisal Skills Programme. CASP systematic review checklist. 10 questions to help you make sense of a review ([http://docs.wixstatic.com/ugd/dded87\\_a02ff2e3445f4952992d5a96ca562576.pdf](http://docs.wixstatic.com/ugd/dded87_a02ff2e3445f4952992d5a96ca562576.pdf), accessed 8 November 2017).
11. Barker J. Evidence-based practice for nurses. London: SAGE; 2010.
12. Schell ES, Kayser-Jones J. "Getting into the skin": empathy and role taking in certified nursing assistants' care of dying residents. *Appl Nurs Res*. 2007 Aug;20(3):146–51. <http://dx.doi.org/10.1016/j.apnr.2006.05.005> PMID:17693218
13. Bayne H, Neukrug E, Hays D, Britton B. A comprehensive model for optimizing empathy in person-centered care. *Patient Educ Couns*. 2013 Nov;93(2):209–15. <http://dx.doi.org/10.1016/j.pec.2013.05.016> PMID:23769885
14. Klitzman R. Improving education on doctor-patient relationships and communication: lessons from doctors who become patients. *Acad Med*. 2006 May;81(5):447–53. <http://dx.doi.org/10.1097/01.ACM.0000222271.52588.01> PMID:16639199
15. Hojat M, Vergare MJ, Maxwell K, Brainard G, Herrine SK, Isenberg GA, et al. The devil is in the third year: a longitudinal study of erosion of empathy in medical school. *Acad Med*. 2009 Sep;84(9):1182–91. <http://dx.doi.org/10.1097/ACM.0b013e3181b17e55> PMID:19707055
16. Ward J, Cody J, Schaal M, Hojat M. The empathy enigma: an empirical study of decline in empathy among undergraduate nursing students. *J Prof Nurs*. 2012 Jan–Feb;28(1):34–40. <http://dx.doi.org/10.1016/j.profnurs.2011.10.007> PMID:22261603
17. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med*. 2002 Mar 5;136(5):358–67. <http://dx.doi.org/10.7326/0003-4819-136-5-200203050-00008> PMID:11874308
18. Brazeau CML, Schroeder R, Rovi S, Boyd L. Relationships between medical student burnout, empathy, and professionalism climate. *Acad Med*. 2010 Oct;85(10) Suppl:S33–6. <http://dx.doi.org/10.1097/ACM.0b013e3181ed4c47> PMID:20881699
19. Thomas MR, Dyrbye LN, Huntington JL, Lawson KL, Novotny PL, Sloan JA, et al. How do distress and well-being relate to medical student empathy? A multicenter study. *J Gen Intern Med*. 2007 Feb 22(2):177–83. <http://dx.doi.org/10.1007/s11606-006-0039-6> PMID:17356983
20. Razavi D, Delvaux N, Marchal S, Durieux J-F, Farvacques C, Dubus L, et al. Does training increase the use of more emotionally laden words by nurses when talking with cancer patients? A randomised study. *Br J Cancer*. 2002 Jul 1;87(1):1–7. <http://dx.doi.org/10.1038/sj.bjc.6600412> PMID:12085247
21. Chism LA, Magnan MA. The relationship of nursing students' spiritual care perspectives to their expressions of spiritual empathy. *J Nurs Educ*. 2009 Nov;48(11):597–605. <http://dx.doi.org/10.3928/01484834-20090716-05> PMID:19650610
22. DiLalla LF, Hull SK, Dorsey JK; Department of Family and Community Medicine, Southern Illinois University School of Medicine, Carbondale 62901, USA. Effect of gender, age, and relevant course work on attitudes toward empathy, patient spirituality, and physician wellness. *Teach Learn Med*. 2004 Spring;16(2):165–70. [http://dx.doi.org/10.1207/s15328015t1m1602\\_8](http://dx.doi.org/10.1207/s15328015t1m1602_8) PMID:15276893
23. Dow AW, Leong D, Anderson A, Wenzel RP; VCU Theater-Medicine Team. Using theater to teach clinical empathy: a pilot study. *J Gen Intern Med*. 2007 Aug;22(8):1114–8. <http://dx.doi.org/10.1007/s11606-007-0224-2> PMID:17486385

24. Sheldon LK, Ellington L, Barrett R, Dudley WN, Clayton ME, Rinaldi K. Nurse responsiveness to cancer patient expressions of emotion. *Patient Educ Couns*. 2009 Jul;76(1):63–70. <http://dx.doi.org/10.1016/j.pec.2008.11.010> PMID:19110396
25. Kennifer SL, Alexander SC, Pollak KI, Jeffreys AS, Olsen MK, Rodriguez KL, et al. Negative emotions in cancer care: do oncologists' responses depend on severity and type of emotion? *Patient Educ Couns*. 2009 Jul;76(1):51–6. <http://dx.doi.org/10.1016/j.pec.2008.10.003> PMID:19041211
26. Kataoka HU, Koide N, Hojat M, Gonnella JS. Measurement and correlates of empathy among female Japanese physicians. *BMC Med Educ*. 2012 06 22;12(1):48. <http://dx.doi.org/10.1186/1472-6920-12-48> PMID:22726449
27. Hojat M, Gonnella JS, Nasca TJ, Mangione S, Vergare M, Magee M. Physician empathy: definition, components, measurement, and relationship to gender and specialty. *Am J Psychiatry*. 2002 Sep;159(9):1563–9. <http://dx.doi.org/10.1176/appi.ajp.159.9.1563> PMID:12202278
28. Quince TA, Parker RA, Wood DF, Benson JA. Stability of empathy among undergraduate medical students: a longitudinal study at one UK medical school. *BMC Med Educ*. 2011 10 25;11(1):90. <http://dx.doi.org/10.1186/1472-6920-11-90> PMID:22026992
29. Ward J, Schaal M, Sullivan J, Bowen ME, Erdmann JB, Hojat M. Reliability and validity of the Jefferson Scale of Empathy in undergraduate nursing students. *J Nurs Meas*. 2009;17(1):73–88. <http://dx.doi.org/10.1891/1061-3749.17.1.73> PMID:19902660
30. Halpern J. Empathy and patient-physician conflicts. *J Gen Intern Med*. 2007 May;22(5):696–700. <http://dx.doi.org/10.1007/s11606-006-0102-3> PMID:17443382



## Meeting of the Eastern Mediterranean Research Ethics Review Committee<sup>1</sup>

<sup>1</sup>This report is extracted from the Summary report on the Meeting of the Eastern Mediterranean Research Ethics Review Committee, Cairo, Egypt, 22–23 October 2017 ([http://applications.emro.who.int/docs/IC\\_Meet\\_Rep\\_2017\\_16772\\_EN.pdf?ua=1](http://applications.emro.who.int/docs/IC_Meet_Rep_2017_16772_EN.pdf?ua=1), accessed 17 April 2018).

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The World Health Report 2013: Research for Universal Health Coverage (1) 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 2010, the 63<sup>rd</sup> World Health Assembly (2) recognized the contribution of research to development of solutions to health problems and endorsed the WHO strategy on research for health. This strategy aims to ensure the highest norms and standards of good research within WHO, and provide support to Member States in taking relevant actions to strengthen national health research systems.

Research proposals recommended for WHO funding through different grant schemes require methodological and ethical review. In 2017, the Eastern Mediterranean – Research Ethics Review Committee (EM/RERC) was reformulated with the essential function to review the protocols of all health research projects involving human subjects submitted to WHO for funding in the Region. The Committee has the authority to verify that ongoing studies comply with the Organization's policies and regulations for conduct of health research in the Region, and it may suspend or terminate approval for ongoing studies under its jurisdiction.

In order to ensure compliance with WHO policies and regulations, the EM/RERC members meet on an annual basis to follow up WHO-supported health research in the Region. The 2017 annual meeting was organized by the WHO Regional Office for Eastern Mediterranean (WHO/EMRO) from 22 to 23 October 2017 at the Regional Office in Cairo, Egypt. The objectives of the meeting were to:

- review RERC's work during 2016–2017;
- agree on modalities for taking forward the recommendations of recent meetings; and
- plan future work in light of the Programme Budget for 2018–2019.

The meeting was chaired by Professor Gamal Serour, Director, International Islamic Center for Population Studies and Research (IICPSR), Egypt.

### Summary of discussions

The EM/RERC has two mandates: reviewing the health research proposals involving human subjects subjected to funding by WHO to ensure protecting dignity, integrity,

human rights, safety and well-being of all human participants in research; and ensuring compliance with the International Ethical Guidelines for Health-Related Research Involving Humans (3).

During discussions, participants highlighted the need for bioethics capacity-building in the Region, including further capacity development of RERC members (themselves) through possible online courses and participation in WHO activities. They also discussed the situation of multi-centre studies and exemptions versus expedited review.

The recommendations of the 2016 RERC meeting were reviewed and discussed with participants. Detailed statistics were presented including the number of reviewed proposals from projects funded under the Improving program Implementation through Embedded Research (iPIER), Research in Priority Areas of Public Health (RPPH); and Tropical Disease Research (TDR) over the years.

The RERC checklists for reviewers and principal investigators (PIs) were thoroughly reviewed based on the modifications recommended by the RERC during its 2016 meeting (4). More amendments were made to the RERC checklist for PIs, especially for the sections on minors (less than 18 years old), pregnant women and emergency contexts.

The Committee reviewed the recommendations of two recent meetings and their implications for its work, i.e. the Regional Bioethics Summit for the Eastern Mediterranean/Arab States, held in Muscat, Oman, April 2017 (5); and a workshop on teaching bioethics and research ethics, held in Damascus, Syrian Arab Republic, August 2017 (6). Both meetings focused on the functions and work of national bioethics and ethics committees and recommended strengthening their internal mechanisms, role in promoting bioethics, health research ethics, coordination and cooperation. The Committee discussed ways to take forward the recommendations of these meetings and proposed the following actions.

### Recommendations

Based on the discussions during the meeting, the following actions were recommended for the Committee and WHO Secretariat.

1. Developing terms of reference for the RERC, including the duration of assignment (considering the model of the tuberculosis Green Light Committee).

2. Developing a list of FAQs to be posted online in relation to ethical review as a guide for research applicants.
3. Developing a template for informed consent forms, including for genetic and biobank-related research, and for RERC clearance.
4. Identifying a modality to link the RERC with national committees.
5. Encouraging principal investigators of WHO-funded proposals to publish their papers and make manuscript submission conditional with receiving payments.
6. Considering holding side meetings for the RERC during global and regional bioethics summits.

## References

1. World Health Organization. World Health Report 2013: research for universal health coverage. Geneva: world Health Organization; 2013 (<http://www.who.int/whr/2013/report/en/>).
2. Sixty-third World Health Assembly. Geneva, Switzerland 17-21 May 2010 (<http://www.who.int/mediacentre/events/2010/wha63/en/>).
3. Council for International Organizations of Medical Sciences (CIOMS). International ethical guidelines for health-related research involving humans. Geneva: CIOMS; 2016 (<https://cioms.ch/wp-content/uploads/2017/01/WEB-CIOMS-EthicalGuidelines.pdf>).
4. WHO Regional Office for the Eastern Mediterranean (EMRO). Meeting of the Eastern Mediterranean Research Review Ethics Review Committee. Cairo: EMRO; 2016 (<http://www.emro.who.int/rpc/rpc-news/meeting-of-the-eastern-mediterranean-research-review-ethics-review-committee.html>).
5. WHO Regional Office for the Eastern Mediterranean (EMRO). Eastern Mediterranean/Arab states regional summit of national ethics and bioethics. Cairo: EMRO; 2017 (<http://www.emro.who.int/rpc/rpc-events/regional-summit-of-national-ethics-and-bioethics-committees.html>).
6. UNESCO & WHO. Workshop “Teaching Bioethics and Research Ethics” 27-30 August 2017, Damascus, Syrian Arab Republic ([http://www.unesco.org/new/en/syria-crisis-response/regional-response/single-view/news/unesco\\_beirut\\_promotes\\_ethics\\_teaching\\_and\\_research\\_in\\_syria/](http://www.unesco.org/new/en/syria-crisis-response/regional-response/single-view/news/unesco_beirut_promotes_ethics_teaching_and_research_in_syria/)).

## State of Kuwait Prize for the Control of Cancer, Cardiovascular Diseases and Diabetes in the Eastern Mediterranean Region

The State of Kuwait Prize for the Control of Cancer, Cardiovascular Diseases and Diabetes in the Eastern Mediterranean Region is one of several Foundation awards, administered by the World Health Organization, to acknowledge the work of well-known scientists, researchers or dedicated people who have made an outstanding contribution in prevention, control or research in one or more of the following disease groups: cancer, cardiovascular disease and diabetes.

The prize consists of a bronze medal and a sum of money, which is presented at the WHO Regional Committee for the Eastern Mediterranean by the Committee's Chairman.

More information about the eligibility criteria and access to the online application form is available at: <http://kuwaitprize.emro.who.int/>

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