



Maintaining access to essential emergency services (ECS) requires integration of outpatient services into the ECS response to enable health systems to safely meet the emergency care needs of the public, while preserving facility capacity for the COVID-19 response. Thus, the World Health Organization has embarked on a regional initiative using a collaborative, cross-departmental approach to reinforce support for ECS development in the Eastern Mediterranean Region.

## Eastern Mediterranean Health Journal

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## Leveraging the COVID-19 response to improve emergency care systems in the Eastern Mediterranean Region

Hani Mowafi,<sup>1</sup> Hala Sakr,<sup>2</sup> Hamid Ravaghi,<sup>2</sup> Osman Elmahal,<sup>2</sup> Slim Slama,<sup>2</sup> Dalia Samhoury<sup>2</sup> and Pryanka Relan<sup>3</sup>

<sup>1</sup>Yale University, New Haven, United States of America; <sup>2</sup>World Health Organization Regional Office for the Eastern Mediterranean, Cairo, Egypt.

<sup>3</sup>World Health Organization Headquarters, Geneva, Switzerland. (Correspondence to: Hani Mowafi: hani.mowafi@yale.edu).

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The COVID-19 pandemic began as a cluster of reported cases of acute respiratory illness in China on 31 December 2019 and went on to spread with exponential growth across the globe. By the time it was characterized as a global pandemic on 11 March 2020 (1), 17 of 22 countries in the Eastern Mediterranean Region (EMR) had reports of infected persons (2,3). EMR countries are particularly susceptible to such outbreaks due to the presence of globally interconnected markets; complex emergencies in more than half of the countries; religious mass gatherings that draw tens of millions of pilgrims annually; and variation in emergency care systems capacity and health systems performance within and between countries (4).

Emergency care is an essential part of the health system and serves as the first point of contact for many around the Region. In times of mass emergency events – including natural disasters, conflict and outbreaks like COVID-19 – the need for care for injuries and other acute conditions increases (5). The emergency care system encompasses key functions from the scene of injury or illness, during transport and through to emergency unit and early inpatient care (6). In well-functioning health systems it is the everyday emergency care system that rapidly surges human, material and organizational resources in times of public health emergency to maintain access to essential emergency care services, to limit direct mortality, and avoid secondary mortality altogether (5).

Even prior to the COVID-19 pandemic, the World Health Organization (WHO) and Member States expressed commitment to scaling up emergency care through resolutions of the Eastern Mediterranean Regional Committee (EM/RC63/R.1) and the World Health Assembly (WHA72.16). In response, WHO at the global and regional levels embarked on initiatives to support ECS development through conducting Emergency Care Systems Assessments in 10 EMR countries to help policy-makers coordinate system development activities and use existing processes and resources more effectively. Further work has been done to support implementation of a package of emergency care tools including: the Integrated Interagency Triage Tool (prehospital, routine and mass casualty); Emergency Medical and Trauma Care Checklists; the Basic Emergency Care – an open-access training course for frontline health-care providers who manage acute illness and injury with limited resources;

and the International Registry of Trauma and Emergency care to help gather essential data about the performance of emergency care systems (6,7). Despite these positive steps more work is needed to develop and strengthen emergency care systems in the Region. In the coming months many activities that will be undertaken as part of the COVID-19 response will overlap key functions of the emergency care system. These activities should be integrated into the underlying emergency care system to strengthen their ability to maintain access to essential emergency services, and their ability to respond to the current and future public health emergencies.

One important emergency care systems function component is system activation – frequently through an emergency care access number – whereby the public can activate an emergency response in times of illness or injury. Only 13 of 22 EMR countries report having a national emergency care access number (8). Meanwhile, a survey of EMR ministry of health websites, personal communications with ministry of health staff, and reviews of public news reports reveal that 20 of 22 EMR member-states (and Palestine) have established ad hoc national or regional COVID-19 hotlines for the public to access information, report suspected cases, and be screened for symptoms of COVID-19. Early reports indicate widespread utilization of these hotlines with Egypt registering more than 40 000 calls per day, prompting the creation of an integrated smartphone application that has been downloaded by over 1 million Egyptians (9).

Overwhelming public demand in the United Arab Emirates for access to COVID-19 information has led to the creation of a WhatsApp account powered by artificial intelligence to answer the large number of public inquiries. The creation of COVID-19 hotlines and the widespread public use of these numbers present an opportunity to maintain this architecture to create emergency access numbers for system activation in countries where this has been lacking.

Another key functional component is field-to-facility communication. Such pre-arrival notification and coordination between ambulance services and emergency units is rare in the Region (10). Limited availability of personal protective equipment and lack of isolation capability heighten the need to identify

suspected COVID-19 patients even before their arrival at health facilities. It is essential that as countries establish pre-arrival notification protocols for suspected COVID-19 cases, that they make plans to integrate such field-to-facility communication into routine operations to ensure emergency units are similarly prepared for all critical and time-sensitive cases such as acute myocardial infarction, stroke, and trauma. Doing so can reduce time to treatment and improve outcomes in the Region (11-14).

Despite countries' efforts to control patient flow by directing suspected COVID-19 patients to dedicated facilities, many "self-present" to facilities of their choosing. Moreover, patients presenting for unrelated emergencies (e.g., trauma) may also be co-infected with COVID-19 – whether or not they are symptomatic. It is imperative that all EMR emergency units implement WHO guidance on Clinical Management of COVID-19, including routine screening at the first point of contact with the health system, strict adherence to infection prevention and control measures, and acuity-based triage in order to limit health care worker exposure and ensure that critically ill and injured patients receive timely access to emergency services (15-18).

A recent WHO survey showed that since the COVID-19 pandemic began, 26% of EMR countries have reported partial or complete disruption of cardiovascular emergency care (19). Updated WHO technical guidance emphasizes management of emergency health conditions, common acute presentations requiring time-sensitive intervention, and 24-hour access to acute care services at first-level hospitals as key elements of maintaining access to essential health services (20,21). EMR countries have begun to explore strategies to maintain access to noncommunicable disease care for populations at highest risk. These efforts should be highlighted to enable the health system to safely meet the overall emergency care needs of the public while preserving facility capacity for the COVID-19 response.

A systematic approach to emergency care – centered on acuity-based triage, early recognition and resuscitation, and simple initial management and referral – has been shown to decrease the mortality associated with a range of medical and surgical conditions (6). Current WHO technical guidance not only includes systematic approaches to Clinical Management of COVID-19 but also includes the Basic Emergency Care Course as essential guidance for management of suspected COVID-19 cases, as well as the larger population, which continues to present with acute conditions and exacerbations of chronic illness. EMR countries should re-double efforts to train frontline providers in Basic Emergency Care, as these systematic approaches to emergency care are crucial to saving lives now and in the future.

Throughout the Region, populations displaced by conflict and social dislocation are settled in camps and

low-income communities characterized by close quarters and inadequate access to water and sanitation needed to manage an infectious disease outbreak. Additionally, many EMR countries lack legislation guaranteeing access to emergency care for all (a key WHO Health System Building Block under governance), which limits access to marginal communities (10). Since the Region is host to the largest number of displaced persons in the world, region-specific guidance has been developed to guide health system response to COVID-19 in the context of displacement (22). What is further needed, however, is the rationalization of health policies to ensure that all acutely ill or injured persons may access emergency care to limit unnecessary morbidity and mortality and to eliminate potential reservoirs of infection in the wider community.

Violence against health care workers has increased globally in the context of COVID-19 (23). Such workplace violence is unfortunately routinely prevalent in emergency units across the Region and frequency of exposure to violence is cited as a major cause of health worker burnout in EMR countries (24-28). Ensuring patient and provider safety are core cross-cutting functional components of the WHO Emergency Care Systems Framework. It is imperative that EMR countries not only implement WHO guidance on rights, roles and responsibilities of health workers to include increased security for emergency units and ambulance teams, but that they support a zero-tolerance policy towards violence against health workers and establish monitoring and reporting of violations to protect emergency patients and staff (29).

Lastly, there is a paucity of high-quality published data on emergency care systems in the Region and an urgent need for operational research to understand the emergency care needs and emergency care systems performance in EMR countries. This is also true in the context of COVID-19, with only a few published reports of primarily single facility experience rather than systematic analysis of the emergency care system performance in this time of public health emergency. Establishing robust emergency care data collection through the International Registry of Trauma and Emergency Care, and linking to other existing public health information systems, can strengthen emergency surveillance systems. In addition, it can serve as a bridge between public health emergency response and ongoing quality and performance improvement of national emergency care systems (30).

The COVID-19 pandemic represents a stress test of countries' health systems. Policy-makers in the Region must seize the opportunity to identify gaps in their emergency care systems, thereby integrating elements of the pandemic response to create lasting improvements that strengthen the ability of their emergency care system to respond to routine and public health emergencies in the future.

## Reference

1. World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19. Geneva: World Health Organization; 11 March 2020. (<https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>, accessed 26 March 2020).
2. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). Eastern Mediterranean Region COVID-19 Affected Countries. Cairo: WHO/EMRO; 2020. (<https://app.powerbi.com/view?r=eyJrIjoiN2ExNWl3ZGQtdk3My00YzE2LWFjYmQtNGMwZjkoOWQ1MjFhIiwidCI6ImY2MTBjMGI3LWJkMjQtNGIzOSo4MTBiLTNkYzI4MGFmYjU5MCIImMiOjh9>, accessed 26 March 2020).
3. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). Coronavirus disease 2019 (COVID-19) Weekly Situation report 02. Cairo: WHO/EMRO; 2020.
4. World Health Organization. WHO Eastern Mediterranean Region: Joint External Evaluation Mission Reports. Geneva: World Health Organization; 2005.
5. World Health Organization. Emergency Care System Framework. Geneva: World Health Organization; 2018. (<https://www.who.int/publications-detail-redirect/who-emergency-care-system-framework>, accessed 17 June 2020).
6. Reynolds T, Sawe H, Rubiano A, Shin SD, Wallis L, Mock CN. Strengthening health systems to provide emergency care. In: Jamison DT, Gelband H, Horton S, Jha P, Laxminarayan R, Mock CN, Nugent R (ed). Disease control priorities: improving health and reducing poverty. Washington, DC: World Bank; 2018:247-65.
7. World Health Organization. Emergency Care. Geneva: World Health Organization; 2020. ([https://www.who.int/health-topics/emergency-care#tab=tab\\_2](https://www.who.int/health-topics/emergency-care#tab=tab_2), accessed 26 March 2020).
8. World Health Organization. Global status report on road safety 2018. Geneva: World Health Organization; 2018.
9. Over a million people download Egypt's coronavirus phone app. Ahram Online. 31 May 2020.
10. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). Emergency Care as an essential component of Universal Health Coverage. 63rd Session of the WHO Regional Committee for the Eastern Mediterranean. Cairo: WHO/EMRO; 2016.
11. Ting HH, Krumholz HM, Bradley EH, Cone DC, Curtis JP, Drew BJ, et al. Implementation and integration of prehospital ECGs into systems of care for acute coronary syndrome. *Circulation* 2008;118(10):1066-79.
12. Klein K, Lefering R, Jungbluth P, Lendemann S, Hussmann B. Is prehospital time important for the treatment of severely injured patients? A matched-triplet analysis of 13,851 patients from the TraumaRegister DGU®. *BioMed Res Int*. 2019;5936345.
13. Liberman M, Mulder DS, Jurkovich GJ, Sampalis JS. The association between trauma system and trauma center components and outcome in a mature regionalized trauma system. *Surgery* 2005;137(6):647-58.
14. Sheppard JP, Mellor RM, Greenfield S, Mant J, Quinn T, Sandler D, et al. The association between prehospital care and in-hospital treatment decisions in acute stroke: a cohort study. *Emerg Med J* 2015;32(2):93-9.
15. Casagrande I, Coen D, Paolillo C, Cervellini G, Bellone A, Perlini S, et al. Changing Emergency Department and hospital organization in response to a changing epidemic. *Emerg Care J*. 2020;16(1). <https://doi.org/10.4081/ecj.2020.8969>
16. Qing MX, Li S, Yu S, Ouyang Y, Zeng L, Li X, et al. Emergency management of the prevention and control of novel coronavirus pneumonia in specialized branches of hospital. *Acad Emerg Med* 9 March, 2020; <https://doi.org/10.1111/acem.13958>
17. World Health Organization. COVID-19: Strategic planning and operational guidance for maintaining essential health services during an outbreak. Geneva: World Health Organization; 2020.
18. Zeng J, Huang J, Pan L. How to balance acute myocardial infarction and COVID-19: the protocols from Sichuan Provincial People's Hospital. *Intens Care Med* 2020 Jun;46(6):1111-1113
19. World Health Organization. Rapid assessment of service delivery for NCDs during COVID-19 pandemic. Geneva: World Health Organization; 2020.
20. World Health Organization. Maintaining essential health services: operational guidance for the COVID-19 context: Interim Guidance 01 June 2020. Geneva: World Health Organization; 2020.
21. World Health Organization. Pillar 9: Maintaining essential health services and systems. Geneva: World Health Organization; 2020. (<https://covid-19-response.org/pillar/9>, accessed 14 June 2020).
22. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). WHO interim guidance: Health system response to COVID-19 in the context of internally displaced persons, refugees, migrants and returnees in the Eastern Mediterranean Region. Cairo: WHO/EMRO; 2020.
23. McKay D, Heisler M, Mishori R, Catton H, Kloiber O. Attacks against health-care personnel must stop, especially as the world fights COVID-19. *Lancet* 2020;395(10239):1743-5.
24. AlBashtawy M, Al-Azzam M, Rawashda A, Batiha A-M, Bashairah I, Sulaiman M. Workplace violence toward emergency department staff in Jordanian hospitals: a cross-sectional study. *J Nurs Res* 2015;23(1):75-81.
25. Abdellah RF, Salama KM. Prevalence and risk factors of workplace violence against health care workers in emergency department in Ismailia, Egypt. *Pan Afr Med J* 2017; 26(1).



26. Nayyer ul I, Yousuf-Islam M, Farooq MS, Mazharuddin SM, Hussain SA, Umair ul I. Workplace violence experienced by doctors working in government hospitals of Karachi. *J Coll Physicians Surg Pak* 2014;24(9):698-9.
27. Abdo SA, El-Sallamy RM, El-Sherbiny AA, Kabbash IA. Burnout among physicians and nursing staff working in the emergency hospital of Tanta University, Egypt. *East Mediterr Health J* 2016;21(12):906-15.
28. Harthi MM, Olayan MA, Abugad HA, Wahab MMA. Workplace violence among health care workers in emergency departments of public hospitals in Dammam, Saudi Arabia. *East Mediterr Health J*. 2020;26(x):xxx-xxx <http://doi.org/10.26719/emhj.20.069> [In Press]
29. World Health Organization. Coronavirus Disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health. Geneva: World Health Organization; 2020.
30. Mowafi H, Ngaruiya C, O'Reilly G, Kobusingye O, Kapil V, Rubiano AM, et al. Emergency care surveillance and emergency care registries in low-income and middle-income countries: conceptual challenges and future directions for research. *BMJ Glob Health* 2019;4(Suppl 6):e001442.

# The necessity of continuing to ban tobacco use in public places post-COVID-19

Fatimah El-Awa,<sup>1</sup> Charles Patrick Fraser,<sup>1</sup> Keyrellous Adib,<sup>1</sup> Asmus Hammerich,<sup>1</sup> Nisreen Abdel Latif,<sup>1</sup> Ranti Fayokun,<sup>2</sup> Vinayak Prasad,<sup>2</sup> Dongbo Fu,<sup>2</sup> Gemma Vestal,<sup>2</sup> Kerstin Schotte,<sup>2</sup> Heba Gouda<sup>2</sup> and Simone St Claire<sup>2</sup>

<sup>1</sup>World Health Organization Regional Office for the Eastern Mediterranean, Cairo, Egypt. <sup>2</sup>World Health Organization Headquarters, Geneva, Switzerland. (Correspondence to: Charles Patrick Fraser: cfraser@who.int).

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## Introduction

The coronavirus disease 2019 (COVID-19) emerged in late 2019 and has since been declared a pandemic by the World Health Organization (WHO). Millions of cases have been reported globally and in all 22 countries of the WHO's Eastern Mediterranean Region (EMR) (1).

In the EMR, 15 countries have temporarily banned waterpipe use in both indoor and outdoor public places in response to the COVID-19 pandemic<sup>1</sup>. This coincided with the release of the WHO Regional Office for the Eastern Mediterranean (WHO/EMRO) “Questions and Answers on Tobacco, Waterpipe and E-cigarette Use in the context of COVID-19” in March 2020 (2). The prohibition is the first of its kind after years of challenges in adopting and/or enacting such a ban (3–5). Countries in other WHO regions have also taken specific tobacco control policy measures related to the pandemic, including the banning of spitting in public places in India due to a potentially higher risk of transmission of the virus.

The policy response during the COVID-19 pandemic demonstrates that countries in the EMR have both the political will and technical means to adopt and implement strong tobacco control measures to protect public health. It is hoped that this can continue beyond the COVID-19 pandemic by sustaining these new measures at the national level.

## Tobacco use and COVID-19

Evidence to date indicates that tobacco use, including waterpipe use, may further complicate health outcomes for COVID-19 patients (2,6) and may be associated with an increased risk of more severe COVID-19 (7–10). Smoking is a known risk-factor for the prevalence and severity of many acute and chronic respiratory infections, including influenza, pneumonia and tuberculosis (11–13). Exposure to second-hand smoke is similarly risky (11).

In addition, the way tobacco, including waterpipe, is used may increase the risk of transmission of COVID-19 by compromising physical distancing in social and communal settings. Cigarette smoking involves the repetitive touching of the fingers and (potentially contaminated) cigarettes to the mouth. Smoking tobacco via waterpipe may increase transmission because waterpipes are often used in social settings that make physical distancing practically impossible. Moreover, equipment may be used by multiple users (despite changes in the mouthpiece) (14–17).

Stopping smoking has an almost immediate positive impact on respiratory and cardiovascular function and these benefits only increase with time (11). Within just 20 minutes of quitting, an ex-smoker's heart rate drops, and within 12 hours, the carbon monoxide level in the blood drops to normal. Within 2–12 weeks, the risk of heart attack begins to drop, and lung function begins to improve.

## Policy considerations in connection to COVID-19 and beyond

The burden of tobacco use in the EMR has always been substantial (18). In some countries the prevalence of tobacco smoking is as high as 50% among adult males, while in several countries youth tobacco use is above 30% (19,20). Strong and sustainable policies are needed to meet the global target of a 30% relative reduction in adult tobacco use by 2025 (21).

The COVID-19 pandemic has increased awareness about the dangers of tobacco use. The momentum now exists for strengthening tobacco control policies, including in the 19 EMR Member States that are parties to the WHO Framework Convention on Tobacco Control (WHO FCTC). Immediate action to strengthen tobacco control policies post-COVID-19, including a permanent ban on tobacco use in public places, accompanied by awareness campaigns, will contribute to reducing the rates of tobacco smoking and accordingly may

<sup>1</sup> In response to the COVID-19 pandemic, 15 countries in the EMR have introduced a temporary ban on waterpipe use in all indoor and outdoor public places. This is in addition to the two countries in the EMR that had already introduced a permanent ban on waterpipe use in all public places prior to the COVID-19 pandemic.

reduce susceptibility and vulnerability to different communicable diseases.

Banning tobacco use in public places during COVID-19 shows that countries have both the political will and capacity to implement such policies. Countries in the Region can build on their success by considering sustaining the ban on tobacco use in all public places. This ban should include all forms of tobacco and e-cigarette use in indoor public places.

It is also important to note that during the COVID-19 response, people are spending longer periods at home, increasing the risk of second-hand and third-hand smoke exposure, which is especially dangerous for children (11,22). Consequently, running awareness campaigns about the dangers of such exposure, including in the home, is important. In addition, policy-makers could consider limiting access to tobacco products from the home (e.g. limiting access via home delivery).

Relatedly, strengthening cessation services will be essential in order to meet a likely increased demand for quitting tobacco. While physical distancing measures continue, innovative approaches to providing cessation services are needed. Toll-free tobacco quit lines, mobile services and digital health solutions to ensure broad access may be even more important at this time (23).

## Conclusion

It is important to further explore the relation between tobacco use and COVID-19. Countries are encouraged to collect relevant and reliable national level data to examine this association. However, even the existing evidence provides good reason to pursue the full implementation of high-impact tobacco control measures during and after the COVID-19 pandemic.

In light of the measures taken so far to control tobacco use in public places in the context of COVID-19, countries have a rare opportunity to imbed a more sustainable approach to tobacco control at the national level. In addition to tobacco-free public places, such an approach will need to consider all other key tobacco control measures, including effective graphic health warnings, increasing tobacco taxes and banning all forms of tobacco advertising, promotion and sponsorship. Furthermore, measures to control illicit trade in tobacco products and the use of e-cigarettes, which are also harmful to the heart and lungs, are needed. In addition, it is important to monitor tobacco industry tactics and strategies during the COVID-19 pandemic and beyond to prevent future interference and influence in tobacco control policy-making (24).

A comprehensive, multi-sectoral and all-of-government approach to tobacco control, which takes into account all articles of the WHO FCTC, is needed to end the tobacco epidemic and save lives (25).

## References

1. World Health Organization. Rolling updates on coronavirus disease (COVID-19). Geneva: World Health Organization; 2020. (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>, accessed 13 May 2020).
2. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). Tobacco and waterpipe use increases the risk of suffering from COVID-19. Tobacco Free Initiative. Cairo: WHO/EMRO; 2020 (<http://www.emro.who.int/tfi/know-the-truth/tobacco-and-waterpipe-users-are-at-increased-risk-of-covid-19-infection.html>, accessed 12 May 2020).
3. World Health Organization. Exposure to second-hand smoke in selected public places in the WHO Eastern Mediterranean Region. Geneva: World Health Organization; 2012 (<https://apps.who.int/iris/handle/10665/116793>, accessed 12 May 2020).
4. World Health Organization. WHO Report on the Global Tobacco Epidemic. Geneva: World Health Organization; 2019 ([https://www.who.int/tobacco/global\\_report/en/](https://www.who.int/tobacco/global_report/en/), accessed 12 May 2020).
5. El-Awa F; Bettcher D; Al-Lawati JA; Alebshehy R; Gouda H; Fraser CP. The status of tobacco control in the Eastern Mediterranean Region: progress in the implementation of the MPOWER measures. *East Mediterr Health J.* 2020;26(1):102–109. <https://doi.org/10.26719/2020.26.1.102>
6. WHO FCTC Knowledge Hub for Waterpipe Tobacco Smoking. Increased risk of COVID-19 infection amongst smokers and amongst waterpipe users. [Online] 2020. (<https://untobaccocontrol.org/kh/waterpipes/covid-19/>, accessed 13 May 2020).
7. Vardavas C, Nikitara K. COVID-19 and smoking: A systematic review of the evidence. *Tob Induc Dis.* 2020;18:20 DOI:10.18332/tid/119324
8. Liu W, Tao Z, Lei W, Ming-Li Y, Kui L, Ling Z, et al. Analysis of factors associated with disease outcomes in hospitalized patients with 2019 novel coronavirus disease. *Chinese Med J.* 2020;133(9):1032–1038.
9. Alqahtani J, Oyelade T, Aldahir A, Alghamdi S, Almeahmadi M, Alqahtani A, et al. Prevalence, Severity and Mortality associated with COPD and Smoking in patients with COVID-19: A Rapid Systematic Review and Meta-Analysis. *Plos One.* 2020; 15(5).
10. Patanavanich R, Glantz S. Smoking is associated with COVID-19 progression: A meta-analysis. *Nicotine and Tobacco Research.* 2020: ntaao82. DOI:10.1093/ntr/ntaa082.
11. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. The health consequences of smoking: 50 years of progress - A report by the Surgeon General. 2014 ([https://www.cdc.gov/tobacco/data\\_statistics/sgtr/50th-anniversary/index.htm](https://www.cdc.gov/tobacco/data_statistics/sgtr/50th-anniversary/index.htm), accessed 12 May 2020).
12. Han L, Ran J, Mak Y, Suen L, Lee P, Peiris J, et al. Smoking and Influenza-associated Morbidity and Mortality: A Systematic Review and Meta-analysis. *Epidemiology.* 2019;30(3):405–417.

13. Feldman C, Anderson R. Cigarette smoking and mechanisms of susceptibility to infections of the respiratory tract and other organ systems. *J Infect.* 2013;67(3):169-184
14. Maziak W, Taleb Z, Bahelah R, Islam F, Jaber R, Auf R, et al. The global epidemiology of waterpipe smoking. *Tob Control.* 2015;24(Suppl 1):3-12.
15. WHO Study Group on Tobacco Product Regulation. Waterpipe tobacco smoking: health effects, research needs and recommended actions for regulators (2nd ed.). Geneva: World Health Organization; 2015.
16. Koul P, Hajni M, Sheikh M, Khan U, Shah A, Khan Y, et al. Hookah smoking and lung cancer in the Kashmir valley of the Indian subcontinent. *Asian Pac J Cancer P.* 2011;12(2):519-24.
17. Daniels K, Roman N. A descriptive study of the perceptions and behaviors of waterpipe use by university students in the Western Cape, South Africa. *Tob Induc Dis.* 2013;11(1).
18. World Health Organization. Global Report on Trends in the Prevalence of Tobacco Use (3rd Edition). Geneva: World Health Organization; 2019. (<https://www.who.int/publications-detail/who-global-report-on-trends-in-prevalence-of-tobacco-use-2000-2025-third-edition>, accessed 12 May 2020).
19. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). STEPwise Survey of NCD Risk-Factors Factsheets 2012-2019. Cairo: WHO/EMRO; 2020 (<http://www.emro.who.int/tfi/statistics/index.html>, accessed 12 May 2020).
20. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). Global Youth Tobacco Survey Factsheets 2007-2018. Cairo: WHO/EMRO; 2020 (<http://www.emro.who.int/tfi/statistics/index.html>, accessed 12 May 2020).
21. World Health Organisation. WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020. Geneva: World Health Organization; 2013. ([https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236\\_eng.pdf?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236_eng.pdf?sequence=1), accessed 17 May 2020).
22. Jacob P, Benowitz N, Destailats H, Gundel L, Hang B, Martins-Green M, et al. Thirdhand Smoke: New Evidence, Challenges, and Future Directions. *Chem Res Toxicol.* 2017;30(1):270-294.
23. Berlin I, Thomas D, Le Faou A, Cornuz J. COVID-19 and Smoking. *Nicotine and Tobacco Research.* 2020: 1-3; ntaa059. DOI: 10.1093/ntr/ntaa059.
24. Global Center for Good Governance in Tobacco Control. COVID-19 and Tobacco Industry Interference. [Online] 2020. (<https://ggtc.world/2020/03/24/covid-19-and-tobacco-industry-interference-2020/>, accessed 12 May 2020).
25. Al-Mandhari A; Hammerich A; El-Awa F; Bettcher D; Mandil A. Full implementation of the WHO Framework Convention on Tobacco Control in the Eastern Mediterranean Region is the responsibility of all. *East Mediterr Health J.* 2020;26(1):4-5. <https://doi.org/10.26719/2020.26.1.4>



# COVID-19 highlights the need for a strong health laboratories foundation for infectious disease surveillance and control in the Eastern Mediterranean Region

Frank Konings,<sup>1</sup> Amal Barakat,<sup>1</sup> Yvan Hutin<sup>1</sup> and Rana Hajjeh<sup>1</sup>

<sup>1</sup>World Health Organization Regional Office for the Eastern Mediterranean, Cairo, Egypt (Correspondence to: Frank Konings: [koningsf@who.int](mailto:koningsf@who.int))

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The coronavirus disease 2019 (COVID-19) pandemic has pushed the public health laboratory to the forefront of epidemic preparedness and has highlighted the critical role of these laboratories for a robust and timely response. Enormous pressures have been imposed on the laboratories over the last few months to keep up with the increasing demands of testing and “PCR test” (polymerase chain reaction test) has become a common household term. Public health authorities have been pushing for years about the importance of the laboratory, and the need for governments to devote more attention to develop a strong laboratory foundation and networks in the Region.

Laboratories are the nexus of all infectious disease diagnosis and management as well as public health response, ranging from diseases such as HIV/AIDS, tuberculosis and malaria, to emerging infectious diseases such as cholera, Middle East respiratory syndrome and diphtheria. Recently, the microbiology laboratory was also recognized as a pillar of major global initiatives such as control of antimicrobial resistance (AMR). Furthermore, the revised International Health Regulations (IHR, 2005) require countries to be able to identify, investigate and report potential public health emergencies of international concern (PHEICs) (1). A well-governed and organized nationwide health laboratory system serves as a foundation for safe, reliable and timely detection, confirmation and reporting of public health events.

In late 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causing COVID-19 emerged in Wuhan, China. On 30 January 2020, the Director-General of the World Health Organization declared the outbreak a PHEIC and on 11 March a pandemic (2). Globally, the number of confirmed cases is in the millions with large numbers of deaths. The Eastern Mediterranean Region has been heavily affected with the majority of cases and deaths in the Islamic Republic of Iran (3). This novel virus required new diagnostic tests to be developed, validated and made widely available quickly. International shortages of laboratory supplies along with questions about who and how to test are additional challenges discussed even in the mass media. COVID-19 is a real-life check of our laboratory systems that underlines the essential role of laboratories in public health.

The Eastern Mediterranean Region consists of 21 countries and the Occupied Palestinian Territories. The Region is diverse in terms of geography, culture, income, education, political stability and health system development. This diversity is reflected in the countries' laboratory systems which range from basic to advanced. Countries experiencing protracted emergencies face additional difficulties due to loss of infrastructure and resources while embargoes complicate international procurement and specimen referral of select countries.

As an important component of the IHR (2005) monitoring and evaluation framework (4), the joint external evaluation (JEE) provides peer-to-peer expert external evaluations of IHR capacities, including for laboratories. A 2018 analysis of 14 JEEs completed in the Region indicated intermediate to high mean scores for their national laboratory systems (5). Biosafety and biosecurity as well as laboratory quality systems had low and intermediate mean scores, respectively, highlighting the need for more investments in these areas. For example, most of the countries are facing an ongoing challenge in validating their Class 2 Biosafety Cabinets (BSC Class II) and are struggling with the implementation of laboratory quality management systems. The sparsity of national laboratory policies is another challenge: in 2020, only eight countries in the Region have developed such policy. Bacteriology laboratory capacities in the Region are especially poor, negatively impacting AMR surveillance and response efforts. Overall, there are not enough sufficiently trained human resources for the laboratory. Those who want to become laboratory leaders have very limited educational options. Countries struggle to navigate the abundance of new laboratory technologies on the market. Finally, there is a lack of reference laboratories that are based in and support the Region.

Interactions between laboratories in the Region and globally are crucial for infectious disease surveillance and control. Disease-specific laboratory networks, especially the global influenza surveillance and response system, have facilitated establishing laboratory capacities for the detection of several epidemic diseases (6), including COVID-19. The optimal performance of such disease-

specific networks requires a well-established nationwide health laboratory system capable that can scale up rapidly the testing during outbreaks. While much attention has been paid to national-level laboratories, there is a lack of decentralization of supporting laboratory infrastructure at the sub-national level.

For the laboratory foundation to be developed, it is not enough to focus only on the physical structure of the laboratory, equipment and technical capacity. A comprehensive strategy to build a solid system with adequate governance, financial and human resources, as well as strong evaluation and monitoring systems ensures quality and safe services. In October 2016, the 63rd session of the Regional Committee for the Eastern Mediterranean Region endorsed the Strategic Framework for Strengthening Health Laboratory Services, 2016–2020 (resolution EM/RC63/R.4) (7). The strategic framework helps address the challenges in the Region through its six strategic goals that emphasize regulatory frameworks, quality, workforce, biosafety and biosecurity, networking and rational use of laboratory services. 2020 will be the final year of the strategy and while progress has been made, such as increasing the number of laboratory policies from two to eight, the five-year time frame may have been too ambitious to fully implement it. In particular, the normative work, such as policies and implementing quality systems, requires long-term commitment and investment because there is no 'quick fix'. An extension of timeline and alignment with national action plans for health security (NAPHS) may accelerate implementation of IHR core capacities.

Improving our national health laboratory systems takes time, effort, dedication, perseverance and adequate funding, but we will be able to reap the benefits during emergencies such as the COVID-19 outbreak. Below are the six goals of the Strategic Framework for Strengthening Health Laboratory Services and their current priorities:

### Regulatory frameworks

The development of a national laboratory policy is a step towards strengthening a country's laboratory services, including for COVID-19. It offers a long-term vision, signals political commitment, empowers the government, and can be used to advocate for funding (8).

### Quality

Managing the COVID-19 pandemic requires reliable test results. Implementation of laboratory quality management system (LQMS) and, where possible, work

towards accreditation to ensure that quality is the cornerstone of any laboratory aiming for accuracy in all tests it performs.

### Workforce

Laboratory workers are at the heart of COVID-19 testing. Increasing the attractiveness of a career in health laboratories stimulates the recruitment and retention of the best staff. The Global Laboratory Leadership Programme will give more attention to the next generation of laboratory leaders (9).

### Biosafety and biosecurity

A practical, risk- and evidence-based approach to biosafety and biosecurity keeps laboratory staff and the public safe while working with pathogens, including COVID-19. A cadre of professionals certified to validate BSC Class II urgently needs to be trained in the Region.

### Networking

An expanded regional roster of laboratory experts allows us to make optimal use of regional resources for COVID-19 laboratory support. Such experts need training, orientation and field exposure. The Region is in dire need to have regional reference laboratories and centers for excellence. WHO would encourage laboratories with expertise that could benefit others to apply to become collaborating centres.

### Rational use of laboratory services

Already there is an abundance of new COVID-19 diagnostics (10). Molecular techniques and sequencing start to play a bigger role. Periodic review and sharing of experiences allow countries to be aware of emerging laboratory technologies and their potential use in the laboratory, in the field or at the point-of-care. This ensures timely introductions that take into account country contexts.

The importance of laboratories captures the attention each time there is a large emergency but this quickly wanes when the crisis is over. We need to seize this opportunity to convey that success depends on investments in laboratory systems and preparedness rather than ad-hoc procurement of test kits only. A well-organized health laboratory system with a clear vision and adequate numbers of trained and committed staff is necessary. Health laboratory services need to remain a priority at the national level and well financed to ensure their operations.

## References

1. World Health Organization. World Health Assembly resolution WHA58.3. Geneva: World Health Organization; 2005 (<http://www.who.int/csr/ihr/WHA58-en.pdf>, accessed 30 April 2020).
2. World Health Organization. Coronavirus disease (COVID-2019) press briefings. Geneva: World Health Organization; 2020 (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/media-resources/press-briefings>, accessed 30 April 2020).
3. World Health Organization. Coronavirus disease (COVID-2019) situation reports. Geneva: World Health Organization; 2020 (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>, accessed 30 April 2020).
4. International Health Regulations (2005) IHR Monitoring and Evaluation Framework: Geneva: World Health Organization; 2018.

(<https://www.who.int/ihr/publications/WHO-WHE-CPI-2018.51/en/>, accessed 30 April 2020).

5. Samhoury D, Ijaz K, Rashidian A, Chungong S, Flahault A, Babich SM, et al. Analysis of Joint External Evaluations in the WHO Eastern Mediterranean Region. *East Mediterr Health J.* 2018;24(5):477–487 <https://doi.org/10.26719/2018.24.5.477>
6. Squires RC, Reading PC, Sullivan SG, Barr IG, Konings F. Influenza virus detection: driving change in public health laboratories in the Western Pacific Region. *Western Pac Surveill Response J.* 2018 Winter;9(5 Suppl 1):68–70.
7. World Health Organization. Regional Office for the Eastern Mediterranean (WHO/EMRO). Strategic Framework for Strengthening Health Laboratory Services 2016–2020. Cairo: WHO/EMRO; 2020 ([http://applications.emro.who.int/dsaf/EMROPUB\\_2017\\_EN\\_19612.pdf](http://applications.emro.who.int/dsaf/EMROPUB_2017_EN_19612.pdf), accessed 30 April 2020).
8. Brown CS, Zwetyenga J, Berdieva M, Volkova T, Cojocaru R, Costic N, et al. New policy formulation methodology paves the way for sustainable laboratory systems in Europe. *WHO Public Health Panorama.* 2015;1(1):41–47.
9. Albetkova A, Balish A, Becker S, Chaignat E, Cognat S, deBattisti C, et al; Supporting the development of strong laboratory leaders for global health security: the Global Laboratory Leadership Programme (GLLP). *WER, Special Issue*, 24 May 2019, 14–17.
10. Foundation for Innovative New Diagnostics. SARS-CoV-2 Diagnostic Pipeline. 2020. (<https://www.finddx.org/covid-19/pipeline/>, accessed 30 April 2020).

# Controlling the spread of COVID-19 in Sudan with limited resources: a unique community-engaged approach

Gasmelseed Ahmed,<sup>1</sup> Yassir Mohamed,<sup>2</sup> Razi Adulhameed,<sup>3</sup> Majdi Ishag<sup>4</sup> and Ahamed Elzubair<sup>5</sup>

<sup>1</sup>Almoosa Specialist Hospital, Al Mubarratz, Saudi Arabia. <sup>2</sup>Prince Sultan Military Medical City, Riyadh, Saudi Arabia. <sup>3</sup>King Saud University Medical City, Riyadh, Saudi Arabia. <sup>4</sup>King Abdulaziz Medical City, Al-Ahsa, Saudi Arabia. <sup>5</sup>Alwatania University, Khartoum, Sudan. (Correspondence to: Gasmelseed Y. Ahmed: [g.yousif@almoosahospital.com.sa](mailto:g.yousif@almoosahospital.com.sa)).

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## Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It spreads by droplets and from contaminated solid surfaces. (1-2). Since December 2019, there had been a series of unexplained cases of pneumonia reported in Wuhan, China, and on 12 January 2020, the World Health Organization (WHO) named this new virus as the 2019 novel coronavirus (2019-nCoV) (3). SARS-CoV-2 is a coronavirus belongs to the  $\beta$ -coronavirus cluster, it is the third zoonotic coronavirus disease after SARS and the Middle East respiratory syndrome (MERS) (4).

Responsibility for health involves the joint effort of the individual, the community and the state, and emphasis has shifted from health care for the people to health care by the people (5). This initiative was adopted to suit the inadequate medical resources in Sudan through engaging the community under medical supervision. These are societal actions based on donated locations for infected peoples and dormitories for care providers; controlling the infection as soon as discovered by isolating certain cases at home, others in quarantine, and transfer critical cases to hospitals; avoiding gatherings even for religious activities; closing borders; modifying workflow; remote schooling and online college classes. Moreover, access to health information from reliable sites included, but not limited to, the Sudanese diaspora's websites for health education and global updates.

Known preventive measures such as respiratory hygiene, cough etiquette (covering the nose and mouth when coughing), wearing a mask, frequent hand washing, cleaning and disinfection of surfaces, social distancing, avoiding social gatherings and handshaking, and refraining from touching the face, go simultaneously with the initiative. The two success pillars are medical volunteers working together and supervision of non-medical volunteers. The initiative was shared with the minister of health who supported the idea and referred it to the ministry's officials. It has not as yet been adopted as national policy, but discussions with local communities are suggested, and accordingly pilot operations in some areas with support of local health officials have commenced, as follows:

## Volunteer health personnel within the neighbourhood

Licensed health care personnel are assigned to provide hotline communication between health practitioners trained in community outreach and a control room in the nearest Ministry of Health (MoH) facility, in order to decide and supervise isolation in the neighborhood and guide local non-medical volunteers. In addition, they perform a therapeutic and educational role for isolated individuals and their families with continuous evaluation of cases that require hospitalization. The initiative is subject to ongoing evaluation for identification of logistic obstacles and amendments as required.

## Neighbourhood non-medical volunteers

Non-medical volunteers supervise the donation of a house or a commercial site for isolation and urge the community to interact positively with instructors, as well as assist in health education and facilitate the tasks of the health care providers. They also prevent gatherings inside the neighbourhood, with the exception of funerals, but with the lowest possible number of attendees and done in the quickest time possible. Other duties include managing social and physical distancing in the neighbourhood and public places such as central markets; advise travellers and drivers on the importance of using hand sanitizer, cleaning surfaces and opening windows for ventilation, while also providing them with educational materials, and establishing fixed washing units for soap, water and sanitizer in taxis.

## Home isolation

The health team decides when isolation is required based on the policies of the Ministry of Health, and educate isolated persons via telephone on the safety of their families, friends and neighbours, and deliver tissues, masks, soap and disinfectants for two weeks.

## Neighbourhood quarantine isolation

Procedures for neighbourhood quarantine isolation in-



clude the location of a building on one of the outskirts of the neighbourhood, such as a house, school, club or a commercial complex. The selected building should be well ventilated, comfortable and have basic facilities such as water, electricity, toilets and supervised waste disposal measures. Volunteers are assigned to provide food and water in accordance with quarantine standards, and organize transportation in case a patient needs to be hospitalized. The quarantine area is equipped for measuring vital signs, with the health officer and the team using preventative measures such as wearing masks, using disinfectants, ventilating the rooms and all other infection control procedures. Required personal protective equipment (PPE) are partially supplied by the MoH, and the remainder by donation.

In conclusion, this initiative provides a basis for

infection control guidelines in low and middle-income countries. However, the initiative is limited by the lack of similar evidence-based experience for comparison and the shortage of trained staff. Still, the initiative offers a turning point in promoting an atmosphere of cooperation within the community and its application in social behavior for public health practice. Currently, an evaluation of the efficacy of this initiative is underway.

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## References

1. Okba1 NMA, Müller MA, Li W, Wang C, GeurtsvanKessel CH, Corman VM, et al. Severe acute respiratory syndrome coronavirus 2 – specific antibody responses in coronavirus disease 2019 patients. *Emerg Infect Dis.* 2020 Jul doi:10.3201/eid2607.200841
2. Hui DS, Azhar EI, Madani TA, Ntoumi F, Kock R, Dar O, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health. The latest 2019 novel coronavirus outbreak in Wuhan, China. *Int J Infect Dis.* 2020 Feb;91:264-266. doi:10.1016/j.ijid.2020.01.009
3. Wang W, Tang J, Wei F. Updated understanding of the outbreak of 2019 novel coronavirus (2019-nCoV) in Wuhan, China. *J Med Virol.* January 2020;92:441-447. doi:10.1002/jmv.25689
4. Chen Y, Liu Q, Guo D. Emerging coronaviruses: genome structure, replication, and pathogenesis. *J Med Virol.* 2020; 92: 418-423. doi: 10.1002/jmv.25681.
5. Park's textbook of preventive and social medicine. K. Park. 20th edition (2017) Jabalpur: Banarsidas Bhanot Publishers.

# Rising cancer rates in the Arab World: now is the time for action

Mostafa Ahmed Arafa,<sup>1,3</sup> Danny Munther Rabah<sup>1,2</sup> and Karim Hamda Farhat<sup>1</sup>

<sup>1</sup>Cancer Research Chair, College of Medicine, King Saud University, Riyadh, Saudi Arabia. <sup>2</sup>Surgery Department, College of Medicine, King Saud University, Riyadh, Saudi Arabia. <sup>3</sup>High Institute of Public Health, Alexandria University, Alexandria, Egypt. (Correspondence to: Karim Hamda Farhat: Kfarhat@ksu.edu.sa)

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## Introduction

Cancer is a universal public health problem. It is a leading cause of death worldwide, accounting for an estimated 9.6 million deaths in 2018. More than half of all cancers (56.8%) and cancer deaths (64.9%) in 2012 occurred in lower income regions of the world, and these proportions will increase further by 2025 (1,2). Among Arabs, cancer is growing at an alarming pace. The Gulf States and the Eastern Mediterranean Region (EMR) countries show a disturbing rise in the number of cancer patients, Long-term projections show that, by 2030 there would be a 1.8 fold increase in cancer incidence (Table 1). While 80% of countries in the Region have national cancer control policies, only 45% of these programmes are operational (3). In addition, the total research output remains low, particularly studies relating to preventative cancer control policies (4).

The 2016 report by the Statistical, Economic and Social Research and Training Centre for Islamic Countries (5), indicates that more than one and half million new cases of cancer were diagnosed in 2012 (5), and that Islamic countries accounted for 11% of cancer cases globally and 17% in low and middle-income countries (5). Breast cancer is by far the most prevalent cancer, followed by lung cancer, cervical cancer, colorectal cancer, and prostate cancer. In absolute numbers, cancers in Islamic Countries caused 1.02 million deaths in 2012, accounting for 17.4% of the total deaths in low and middle-income countries and 12% of the global cancer deaths (5) (Table 2).

The age standardized incidence rate of the top five cancers in Islamic countries, in addition to the liver and bladder cancer in Egypt, has increased during the past 10 years (6-9). Lung cancer is also the most common

cancer affecting males in the Gulf States as well as Algeria, Jordan, Lebanon, Palestinian Territories, Morocco and Tunisia. It is predicted that there will be 29 576 new cases of lung cancer in 2020, up from 16 596 in 2008 (10). Such increased burden is ascribed to increased cigarette smoking and other tobacco products among young adults (11).

Meanwhile, the general incidence of cancer in Lebanon is among the highest in the EMR and is expected to remain as such over the coming decade, where the number of cases has been increasing by 4–5% annually (9,12). While cancer etiology is multifactorial, a set of known risk factors have been hypothesized as contributing to the dynamics of cancer epidemiology (13). While only 10–30% of all cancers are due to genetic predisposition, lifestyle factors such as smoking, more use of transport and less exercise, unhealthy foods and alcohol consumption have contributed to 70–90% of cancer cases, accentuated by emotional stress and environmental and air pollution in the Arab World (14).

The prevalence of obesity in adults in the EMR is very high, particularly among women, and the prevalence of diabetes mellitus parallels that of obesity. Increases in body mass indexes (BMIs) is expected to increase colorectal, liver and gastric carcinoma, particularly among males, where BMI has a stronger effect on cancer incidence in males than in females, as observed in some counties such as Lebanon (15).

The paucity of cancer research in Arab populations is a loss to the academic community. The variety of environments, lifestyles and ethnic differences provides a spectrum of opportunities, which, if studied adequately, would lead to a much more rapid increase in our understanding of the causes of cancer and our ability to control it. While breast cancer screening programmes

**Table 1 Incidence, mortality and prevalence of cancer globally and in the Eastern Mediterranean Region (in 2002 and projection in 2030) (21)**

	World 2002	World 2030	EMR 2002	EMR 2030
Population census	6 229 629 168	8 206 457 382	492 721 000	649 074 572
Absolute incidence	11 000 000	27 000 000	529 000	1 953 714
Deaths	7 000 000	17 000 000	272 000	1 003 145
Prevalence	25 000 000	75 000 000	1 017 441	3 758 142

**Table 2 Distribution of the most common sites of cancer among men and women in Arab and Islamic countries, 2012 (5).**

Men		Women	
Site	Percentage from the total cancers	Site	Percentage from the total cancers
Lung cancer	23.9%	Breast cancer	49.9%
Prostate cancer	17%	Cervical cancer	18%
Colorectal cancer	12.2%	Colorectal cancer	7.3%
Liver cancer	10.9%	Ovarian cancer	5%
Urinary bladder cancer	7.3%	Stomach cancer	2.5%
<b>Total % of all cancers</b>	<b>71.3%</b>		<b>82.7%</b>

are the only adopted programme in most Arab countries, an earlier survey showed a very low rates of breast cancer screening adherence among women in Saudi Arabia, a country with free health services, which indicates that social and psychological barriers to breast cancer screening exist (16).

## The World Health Organization Cancer Control Strategy

According to the World Health Organization (WHO), cancer has become a health priority in the EMR. The aim of the WHO Cancer Control Strategy is to strengthen and accelerate the translation of cancer control knowledge into public health action. The focus is placed on the reduction of cancer cases and the improvement of the quality of life of cancer patients and their families.

However, the largest obstacle to tackling the global cancer incidence and mortality rate in the EMR is the lack of accurate and well-defined data, including a lack of a clear and well-documented public health policy for all noncommunicable diseases, including cancer; and lack of political support to develop legislation and regulation to build up and enhance the viability of cancer registries (17).

While most of Arab countries have population-based cancer registries, not all cancers are well documented and data on cancer mortality are limited; for example, no solid evidence exists regarding the true prevalence

and incidence of oral cancers in most Arab countries due to the lack of population-based studies (18). In addition, according to the latest cancer incidence report from the Gulf Centre for Cancer Control and Prevention (19), and other studies (20), most cancers among nationals from the Gulf States were diagnosed at late stages and affected a much younger population. A variety of factors are at play, including geographic barriers that make it difficult to access care, lack of medical infrastructure and trained professionals to provide quality care, as well as a lack of awareness or insufficient understanding of the biology of cancer.

## Plan of action in the Islamic and Arab World

Prevention and control measures should be targeting modifiable risk factors through primary and secondary prevention, early detection and protection of the population's health and well-being. This could be approached through the adoption of national screening programmes for the most prevalent cancers found in Arab countries, or through shared decision-making policy, where patients are supported to consider options and achieve informed preferences, e.g. shared decision-making practice for early detection of cancer prostate. Ultimately, there is a need for a public health approach, improvement of regional and national cancer registries, as well as health education campaigns addressing the barriers to cancer screening.

## References

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancer in 185 countries. *CA Cancer J Clin* 2018 Nov;68(6):394-424. doi: 10.3322/caac.21492.
2. World Health Organization. Cancer – fact sheet. Geneva: World Health Organization; 2018 (<http://www.who.int/news-room/fact-sheets/detail/cancer>).
3. World Health Organization. Cancer control: a global snapshot in 2015. Geneva: World Health Organization; 2015 ([www.who.int/cancer/Cancer\\_Control\\_Snapshot\\_in\\_2015.pdf?ua=1](http://www.who.int/cancer/Cancer_Control_Snapshot_in_2015.pdf?ua=1)).
4. Hamadeh RR, Borgan SM, Sibai AM. A review of publications from seven countries between 2000–2013. *Sultan Qaboos Univ Med J*. 2017 May;17(2):e147–e154.
5. OIC countries account for 11% of the world cancer cases. *Arab News*, 18 March 2018 (<http://www.arabnews.com/node/963066/world>. March 2018).
6. Al-Gahtani S, Abozaid S, Al-Nami E, Merie L, Al-Yousef A, Shoukri MM. Breast and ovarian cancer in young women of the Arabian Gulf Region: relationship to age. *Open J Epidemiol*. 2016;6:173-182.

7. Ibrahim AS, Khaled HM, Mikhail NNH, Baraka H, Kamel H. Cancer Incidence in Egypt: results of the national population-based cancer registry program. *J Cancer Epidemiol.* 2014;2014:1-18 doi:10.1155/2014/437971
8. Abdel-Razeq H, Attiga F, Mansour A. Cancer care in Jordan. *Hematol Oncol Stem Cell Ther.* 2015 Jun;8(2):64-70. doi: 10.1016/j.hemonc.2015.02.001
9. Cancer trends in Lebanon & projection to 2020. (<https://www.syndicateofhospitals.org.lb/Content/uploads/SyndicateMagazinePdfs/82178-11.pdf>).
10. 30 000 people a year to get lung cancer in the Middle East by 2020. *The National*, 6 March 2017 (<https://www.thenational.ae/uae/30-000-people-a-year-to-get-lung-cancer-in-the-middle-east-by-2020-1.57481>).
11. Maziak W. The global epidemic of water pipe smoking. *Addict Behav.* 2011;36:1-5.
12. Shamseddine A, Saleh A, Charafeddine M, Seoud M, Mukherji D, Temraz S, et al. Cancer trends in Lebanon: a review of incidence rates for the period of 2003–2008 and projections until 2018. *Popul. Health Metrics.* 2014;12(1):4. doi: 10.1186/1478-7954-12-4.
13. Danaei G, Vander Hoorn S, Lopez AD, Murray CJ, Ezzati M; Comparative Risk Assessment Collaborating Group (Cancers). Causes of cancer in the world: comparative risk assessment of nine behavioral and environmental risk factors. *Lancet.* 2005 Nov 19;366(9499):1784-93.
14. Wu S, Powers S, Zhu W, Hannun YA. Substantial contribution of extrinsic risk factors to cancer development. *Nature.* 2016;529(7584):43-47.
15. Charafeddine MA, Olson SH, Mukherji D, Temraz SN, Abou-Alfa GK, Shamseddine AI. Proportion of cancer in a Middle Eastern country attributable to established risk factors. *BMC Cancer* 2017;17(1):337. doi: 10.1186/s12885-017-3304-7.
16. El Bcheraoui C, Basulaiman M, Wilson S, Daoud F, Tuffaha M, AlMazroa MA, et al. Breast cancer screening in Saudi Arabia, free but almost no takers. *PLoS One.* 2015; 10(3): e0119051. doi: 10.1371/journal.pone.0119051.
17. World Health Organization. Cancer Control Programme. (<http://www.who.int/cancer/en/>).
18. Al-Jaber A, Al-Nasser L, El-Metwally A. Epidemiology of oral cancer in Arab countries. *Saudi Med J.* 2016 Mar;37(3):249–255 doi: 10.15537/smj.2016.3.11388
19. Saudi Health Council. Cancer Incidence Report, Saudi Arabia 2014. Riyadh: Saudi Health Council; 2017 (<https://nhic.gov.sa/eServices/Documents/2014.pdf>)
20. Rabah D, Arafa MA. Prostate cancer screening in a Saudi population: an explanatory trial study. Rabah D, Arafa MA. Prostate cancer screening in a Saudi population: an explanatory trial study. *Prostate Cancer Prostatic Dis.* 2010;13(2):191-4
21. Khatib O, Aljurf M. Cancer prevention and control in the Eastern Mediterranean Region: the need for a public health approach. *Hematol Oncol Stem Cell Ther.* 2008 Jan-Mar;1(1):44-52.



## Current situation of COVID-19 in northern Cyprus

Nazife Sultanoglu,<sup>1,3</sup> Buket Baddal,<sup>1,3</sup> Kaya Suer<sup>2</sup> and Tamer Sanlidag<sup>3,4</sup>

<sup>1</sup>Department of Medical Microbiology and Clinical Microbiology, Faculty of Medicine, Near East University, Nicosia, Cyprus. <sup>2</sup>Department of Clinical Microbiology and Infectious Diseases, Faculty of Medicine, Near East University, Nicosia, Cyprus. <sup>3</sup>DESAM Institute, Near East University, Nicosia, Cyprus. <sup>4</sup>Department of Medical Microbiology, Faculty of Medicine, Celal Bayar University, Manisa, Turkey. (Correspondence to: Nazife Sultanoglu: nazife.sultanoglu@neu.edu.tr).

### Abstract

**Background:** The public health burden of the novel coronavirus disease 2019 (COVID-19) is expected to increase and urgent strict measures by decision-makers is critical for the containment of the novel coronavirus (SARS-CoV-2) outbreak worldwide.

**Aims:** This study aimed to give a real-time analysis of COVID-19 presence in northern Cyprus.

**Methods:** All official SARS-CoV-2 positive cases were tracked and reported in terms of the origin, nationality, and transmission routes. Preventive measures taken after the first reported case were analyzed for their effectiveness as control strategies.

**Results:** The index case of SARS-CoV-2 in northern Cyprus was identified as a female German tourist. First local case had travel history from the United Kingdom after which local transmission occurred. Rapid and strict containment measures have currently delayed a peak in observed cases.

**Conclusions:** Rapid implementation of social-distancing measures, good hygiene measures and travel/gathering bans in northern Cyprus has been effective in controlling the outbreak.

Keywords: SARS-CoV-2, COVID-19, Cyprus, surveillance, control measures

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### Introduction

As of 11 March 2020, the World Health Organization (WHO) announced that the global spread of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) had become unstoppable and reached the required epidemiological characteristics to be declared as a pandemic (1). As of 4 May 2020, it has been confirmed that 3 435 894 people have been infected with SARS-CoV-2, out of which 239 604 deaths have occurred. Without a doubt, one of the most affected countries has been China where the pandemic emerged in Wuhan, one of the largest cities in Hubei province, and from there spread throughout the country, with 84 400 confirmed cases of SARS-CoV-2 and 4643 deaths. However, it appears that China has recently started to take control of the SARS-CoV-2 outbreak, with a declining trend of SARS-CoV-2 cases, but the number of cases of SARS-CoV-2 continues to rise in other countries. According to the WHO Coronavirus Disease 2019 (COVID-19) Situation Report on 4 May 2020, 206 299 confirmed cases and 7971 deaths had occurred in the Eastern Mediterranean Region (2). Cyprus is the third largest island in the Mediterranean with a population of approximately 375 000 in the north, the majority of whom are Turkish Cypriots (3,4).

### Methods

All official SARS-CoV-2 positive cases were tracked and reported in terms of the origin, nationality, and trans-

mission routes. Preventive measures taken after the first reported case were analyzed for their effectiveness as control strategies.

### Results

The first case of SARS-CoV-2 was identified as a female German tourist on 9 March 2020, who had arrived in northern Cyprus on 8 March 2020. As a result, people who were found to have had close contact with, or tourists who had travelled on the same plane as the first patient, were exposed to SARS-CoV-2 and were quarantined in three different hotels. Shortly after the identification of the first positive case of SARS-CoV-2, precautions were enacted in northern Cyprus, which continue to be amended for the benefit of the local population (5-7). Below are the important precautions taken by the Council of Ministers with regard to the current SARS-CoV-2 outbreak in northern Cyprus to prevent further transmission. The Decisions of the Council of Ministers announced that:

- All civil workers in the public sector except for police, fire brigade, civil aviation, finance, and health workers are considered on administrative leave.
- In the private sector, all shops including casinos, nightclubs, betting offices, entertainment centres, etc., except for businesses that provide services within the

framework of meeting basic needs such as pharmacies, gas stations, bakeries, and markets, are closed.

- Only northern Cyprus citizens and persons who have legal permission to reside in the country can enter northern Cyprus through sea, air and land border gates; entries to northern Cyprus by all other country citizens are banned.
- Regardless of which country they come from, northern Cyprus citizens and legal residents who enter the country through sea, air and land gates will be monitored and quarantined at home for 14 days. For those who do not comply with this requirement, legal action will be initiated under the Communicable Diseases Law No. 45/2018.
- Gathering in associations, unions, locales and performing collective worship are banned.
- To encourage citizens to remain in their homes, a full curfew from 21.00 to 6.00 hours is in force.
- Northern Cyprus citizens studying abroad were repatriated using charter flights, and students were quarantined for 14 days in hotels. After the 14-day quarantine period, all quarantined individuals were screened using a rapid antibody detection test. Individuals with a negative rapid test result were required to self-isolate in their homes for a further 7 days. Those with a positive rapid test result went through further confirmatory screening by polymerase chain reaction (PCR) test. These individuals were sent home if they had a negative PCR result and asked to self-isolate in their homes for a further 7 days, or were quarantined further in the case of a positive PCR result.
- After the identification of the first SARS-CoV-2 cases in Karpasia, 3 villages in Karpasia are quarantined (full curfew) and only controlled entry and exit are allowed in these villages (correct as of 27 March 2020)
- Mandatory use of face masks in public areas has been implemented by the government since 24 April 2020 (8-13).

In addition, Burhan Nalbantoglu State Hospital located in Nicosia has been fully transformed into a pandemic hospital, except for dialysis and oncology departments. Health workers will work in shifts for two weeks and will be accommodated in hotels and dormitories so as not to expose their families to the risk of infection (14).

Moreover, the 1102 Call Centre, as well as three mobile telephone numbers, were announced by the Ministry of Health as SARS-CoV-2 reporting lines. The 1102 number can be reached immediately from both landline phones and GSM operators, with more call operators commissioned to work in the call centre, where 5 calls can be taken at the same time and 10 people can be put on hold. The system has been designed to respond to callers in both Turkish and English. All citizens will be able to reach the call centre 24 hours a day, 7 days a week (15).

Although all precautions were taken rapidly, the number of SARS-CoV-2 cases identified in northern Cyprus has increased after the identification of the first case and the situation as of 4 May 2020 is summarized in Table 1. The number of cases per day after the first case (index case) was detected between 9 March 2020 and 4 May 2020 are shown in Figure 1. An increasing trend was observed after the first case was diagnosed. However, since the precautions were taken on time, the identified cases were from the same group of German tourists, since it is likely that transmission occurred in between them before the precautions were taken.

## Conclusion

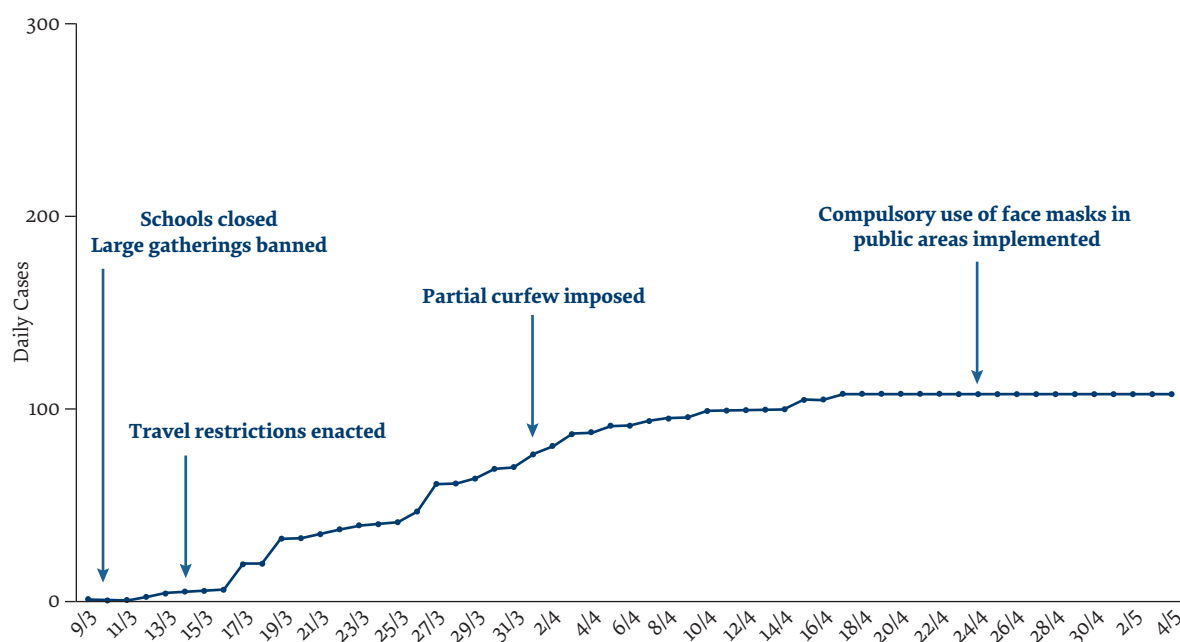
It is believed that as a result of the precautions that were implemented rapidly, the transmission from the German tourist group to the northern Cyprus population was prevented. No new COVID-19 cases have been detected in the country since 17 April 2020. The first SARS-CoV-2 cases involving northern Cyprus citizens had either travelled from the United Kingdom or had close contact with people who had arrived from the United Kingdom, while other cases were linked to a bus driver who had transported the German tourist group. This suggests that SARS-CoV-2 entered northern Cyprus through imported cases from Germany and the United Kingdom (9,16–20). The clinical presentations at illness onset of the COVID-19 patients diagnosed in northern Cyprus were mild to severe fever, fatigue and headache (19).

As of 4 May 2020, only four COVID-19 related deaths have occurred in northern Cyprus. First patient was a 73-year-old German citizen who had chronic obstructive pulmonary disease and hypertension and was hospitalized on 20 March 2020, and subsequently transferred to an intensive care unit on 25 March 2020.

**Table 1 SARS-CoV-2 cases identified in the northern Cyprus from 9 March to 4 May 2020 (25,26)**

<b>Total number of tests performed in northern Cyprus:</b>	15 428
<b>Total number of positive cases:</b>	108
<b>Nationality:</b>	Northern Cyprus citizens: 76    German citizens: 31    Turkmenistan citizen: 1
<b>Discharged patients:</b>	29 (German citizens) 1 (Turkmenistan citizen) 73 (Northern Cyprus citizens)
<b>Ongoing treatment:</b>	1 Northern Cyprus citizen
<b>Covid-19 related deaths:</b>	2 German citizens 2 northern Cyprus citizens

Figure 1 COVID-19 surveillance in northern Cyprus between 9 March and 4 May 2020



On 28 March, it was announced that this patient had died due to COVID-19-related respiratory failure and multiple organ failure.

The second patient was a German tourist, an 83-year-old female patient who also had diabetes and hypertension, and was hospitalized on 20 March 2020. She was taken into the intensive care unit on 24 March, 2020 and the death occurred on 1 April 2020. Apart from these 2 deaths, two Turkish Cypriot citizens also died due to COVID-19 - a 74-year-old male who had hypertension, diabetes and ischemic heart disease co-morbidities, and a 54-year-old male who had an underlying diabetic condition (5-7,21-24). Recently, 29 German citizens aged 65 and over from the original tourist group were discharged and sent back safely to their country. As of 4 May 2020, 103 patients have completed their treatment

and recovered, with only one patient currently under treatment for COVID-19. There are no patients in the intensive care unit.

We firmly believe that northern Cyprus represents a 'good model' for other countries in the world with regard to dealing with the current COVID-19 pandemic. These stated precautions, as well as good hygiene practice, could also be used in other countries to control the further transmission of SARS-CoV-2. In addition to the precautions taken, official TV channels, universities and associations are continually sharing informative videos and information to increase awareness of the current outbreak and the role of each individual in northern Cyprus in preventing further transmission.

**Funding:** None.

**Competing interests:** None declared.

## Situation actuelle de la COVID-19 dans la partie nord de Chypre

### Résumé

**Contexte :** La charge de morbidité de la maladie à nouveau coronavirus 2019 (COVID-19) devrait augmenter. De ce fait, des mesures strictes et urgentes prises par les décideurs sont essentielles pour endiguer la flambée épidémique de nouveau coronavirus (SARS-CoV-2) dans le monde.

**Objectifs :** La présente étude visait à fournir une analyse en temps réel de la présence de la COVID-19 dans le nord de Chypre.

**Méthodes :** Tous les cas positifs officiels au SARS-CoV-2 ont été suivis et signalés en termes d'origine, de nationalité et de voies de transmission. Les mesures préventives prises après le premier cas notifié ont été analysées pour établir leur efficacité en tant que stratégies de lutte.

**Résultats :** Le cas indicateur de SARS-CoV-2 dans la partie nord de Chypre a été identifié comme étant une touriste allemande. Le premier cas local avait des antécédents de voyage en provenance du Royaume-Uni, ce qui a ensuite entraîné une transmission locale. Des mesures de confinement rapides et strictes ont actuellement retardé un pic dans le nombre des cas observés.

**Conclusions :** La mise en œuvre rapide de mesures de distanciation sociale, de bonnes mesures d'hygiène et l'interdiction de voyages/rassemblements dans la partie nord de Chypre ont été efficaces pour endiguer la flambée.

## الحالة الراهنة لكوفيد-19 في شمال قبرص

نظيف سلطانوجلو، بوكت بادال، كايا سوار، تامر سانليداج

### الخلاصة

الخلفية: من المتوقع أن يزداد العبء الصحي العام لمرض فيروس كورونا المستجد 2019 (كوفيد-19)، ومن المهم أن يتخذ صانعو القرارات تدابير صارمة وعاجلة لاحتواء فاشية الفيروس التاجي المستجد (فيروس كورونا سارس-2) في جميع أنحاء العالم.

الأهداف: هدفت هذه الدراسة إلى تقديم تحليل آني لوجود فيروس كوفيد-19 في شمال قبرص.

طرق البحث: تُتبع جميع الحالات الإيجابية لفيروس كورونا سارس-2 الرسمية وأبلغ عنها من حيث المنشأ والجنسية وطرق انتقال العدوى للمصابين. وحُللت التدابير الوقائية المتخذة بعد الإبلاغ عن الحالة الأولى من حيث فعاليتها كاستراتيجيات للمكافحة.

النتائج: حُدثت الحالة الدالة لمتلازمة «فيروس كورونا سارس-2» في شمال قبرص وكانت لسائحة ألمانية. وكان لأول حالة محلية تاريخ سفر إلى المملكة المتحدة وبعدها حدثت العدوى محلياً. وقد أدت تدابير الاحتواء الصارمة والسريعة في الوقت الآني إلى تأخير حدوث الذروة في الحالات الملاحظة.

الاستنتاجات: إن التنفيذ السريع لتدابير التباعد الاجتماعي (البديني) وتدابير النظافة الصحية الجيدة وحظر السفر والتجمع في شمال قبرص كان فعالاً في مكافحة فاشية المرض.

## References

1. World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. Geneva: World Health Organization; 2020. (<https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>, accessed 31 March 2020).
2. World Health Organization. Coronavirus disease (COVID-19) Situation Report - 105. Geneva: World Health Organization; 2020.
3. Klot N, Mansfield Y. The political landscape of partition: the case of Cyprus. *Polit. Geogr.* 1997;16(6):495-521.
4. TRNC State Planning Organization. Main site [online] (<http://www.devplan.org/>, accessed: 4 April 2020).
5. Turkish Republic of Northern Cyprus Ministry of Health. "It is important that our people protect themselves and take individual measures without panicking during this process." Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/123665/Halkimizin-bu-s252re231te-panik-yapmadan-kendini-koruması-ve-bireysel-olarak-al-ması-gereken-246nlemler-246nem-taşımaktadır>, accessed 4 April 2020).
6. Turkish Republic of Northern Cyprus Ministry of Health. "The general health of the German patient is good, her treatment continues and is under follow-up." Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/123702/Alman-hastanın-genel-sağlık-durumu-iyi-olup-tedavisi-devam-etmektedir-ve-takip-altındadır>, accessed: 4 April 2020).
7. Turkish Republic of Northern Cyprus Ministry of Health. Important explanation of the Ministry of Health. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/123979/SAĞLIK-BAKANLIĞI-214NEM-LI-A199IKLAMA>, accessed 4 April 2020).
8. Turkish Republic of Northern Cyprus Ministry of Health, "Minister Pilli: 'With the statement of WHO, we immediately started preparations for a possible Corona virus outbreak,'" Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/123618/Bakan-Pilli-DS214'n252n-a231ıklaması-ile-birlikte-olası160Korona-vir252s-salgını-na-y246nelik-hazırlıkları160hemen-başladık>, accessed 4 April 2020).
9. Turkish Republic of Northern Cyprus Ministry of Health. Ministry of Health Important Announcement. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124060/Sağlık-Bakanlığı-214nemli-Duyuru>, accessed 4 April 2020).
10. Turkish Republic of Northern Cyprus Ministry of Health, Council of Ministers decisions on Corona Virus. Nicosia: Ministry of Health; 2020 (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124142/Korona-Vir252s-ile-ilgili-Bakan-lar-Kurulu-kararları>, accessed 4 April 2020).
11. Turkish Republic of Northern Cyprus Ministry of Health, "Minister Pilli: 'It is a legal obligation for every person coming to our country to keep themselves in isolation for 14 days from the date of entering TRNC.'" Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124235/Bakan-Pilli-220lkemize-gelecek-her-kışının-KKTC'ye-giriş-yaptığı-tarihten-14-g252n-s252re-ile-kendilerini-evlerinde-izolasyon-altında-tutmaları-bir-yasal-zorunluluktur>, accessed 4 April 2020).
12. Turkish Republic of Northern Cyprus Ministry of Health. Announcement of the Ministry of Health. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/125343/Sağlık-Bakanlığı-Duyuru>, accessed 4 April 2020).



13. "It is mandatory to wear a mask from today." Havadis Newspaper- Cyprus News, 5 May 2020 (<https://www.havadiskibris.com/bugunden-itibaren-maske-takmak-zorunlu/>, accessed 5 May 2020).
14. Turkish Republic of Northern Cyprus Ministry of Health. "Pilli: 'Nalbantoglu turns into Pandemi Hospital.'" Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/125541/Pilli-‘Nalbantoglu-Pandemi160Hastanesi’ne-d246n25252y2or>, accessed 4 April 2020).
15. Turkish Republic of Northern Cyprus Ministry of Health. Call Center Numbered 1102 Commissioned. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124147/1102-Numarali-199agrı-Merkezi-Devreye-Girdi>, accessed 4 April 2020).
16. [16] Turkish Republic of Northern Cyprus Ministry of Health. Ministry of Health Description. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124007/Sağlık-Bakanlığı-A23ııklama>, accessed 4 April 2020).
17. Turkish Republic of Northern Cyprus Ministry of Health. The number of cases increased to 6 in the TRNC! Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124245/KKTC’de-vaka-sayısı-6’ya-23ııktı>, accessed 4 April 2020).
18. Turkish Republic of Northern Cyprus Ministry of Health. Important Notice from the TRNC Ministry of Health. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124273/Sağlık-Bakanlığı’ndan-214nemli-Duyuru-Important-Notice-from-the-TRNC-Ministry-of-Health>, accessed 4 April 2020).
19. Turkish Republic of Northern Cyprus Ministry of Health. Ministry of Health Statement - Number of Cases increased to 20. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124484/Sağlık-Bakanlığı-A23ııklama>, accessed 4 April 2020).
20. Turkish Republic of Northern Cyprus Ministry of Health. 12 German Tourists and 1 TRNC Citizen Positive. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/124662/12-Alman-Turist-ve-1-KKTC-Vatandaşı-Pozitif>, accessed 4 April 2020).
21. Turkish Republic of Northern Cyprus Ministry of Health. To the knowledge of the public! Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/125477/Kamuoyunun-bilgisine>, accessed 4 April 2020).
22. Turkish Republic of Northern Cyprus Ministry of Health, "Explanation of the Ministry of Health - 2nd death. Nicosia: Ministry of Health; 2020. (<https://saglik.gov.ct.tr/Haberler/ArtMID/31973/ArticleID/125802/SAĞLIK-BAKANLIĞI-ACIKLAMA>, accessed 4 April 2020).
23. "Third death in TRNC due to Corona virus." Havadis Newspaper, Cyprus News, 5 May 2020 (<https://www.havadiskibris.com/kktcde-corona-virus-nedeniyle-3uncu-olum/>, accessed 5 May 2020).
24. Postası K. 4th death in TRNC due to coronavirus. Kibripostasi, 5 May 2020. ([https://www.kibrispostasi.com/c35-KIBRIS\\_HABERLERI/n319959-kktcde-koronavirusten-dolayi-4-olum](https://www.kibrispostasi.com/c35-KIBRIS_HABERLERI/n319959-kktcde-koronavirusten-dolayi-4-olum), accessed 5 May 2020).
25. Turkish Republic of Northern Cyprus Ministry of Health, "Minister Pilli: '1419 tests in total, no positive cases,'" 2020. [Online]. Available: <https://saglik.gov.ct.tr/Haberler/DUYURULAR/ArtMID/32470/ArticleID/129374/Bakan-Pilli-Toplam-1419-test-yapıldı-pozitif-vaka-yok>. [Accessed: 09-Jun-2020].
26. H. Kıbrıs, "Another coronavirus case in TRNC!," 2020. [Online]. Available: <https://haberkibris.com/kktcde-bir-kiside-daha-korona-virus-vakasi-2315-2020-03-26.html>. [Accessed: 09-Jun-2020]

# Knowledge, attitudes, and practices of Sudanese residents towards COVID-19

Ahmed Hezima,<sup>1</sup> Abdulmalek Aljafari,<sup>1</sup> Abdulmoiz Aljafari,<sup>1</sup> Abdulkader Mohammad<sup>1</sup> and Ibrahim Adel<sup>1</sup>

<sup>1</sup>Alneelain University, Khartoum, Sudan (Correspondence to: Abdulmalek Aljafari: [abdulmalekaljafari@gmail.com](mailto:abdulmalekaljafari@gmail.com)).

## Abstract

**Background:** Coronavirus disease 2019 (COVID-19) is a severe acute respiratory infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Sufficient knowledge, positive attitudes, and correct practices are crucial for the prevention of COVID-19.

**Aims:** This study aimed at assessing the knowledge, attitudes and practices of a sample of Sudanese residents towards COVID-19.

**Methods:** A cross-sectional community-based survey was conducted on 812 participants, including both sexes and aged 18 years and above, with the exclusion of health care workers. Considerable care was taken to include people with different education levels.

**Results:** Among the survey respondents ( $n=812$ ), 45.8% were women, 40.4% held a bachelor's degree, 5.7% were uneducated, and 51.1% were aged 18–25 years. The overall correct rate of the knowledge questionnaire was 78.2%; 66.9% agreed that religious gatherings and events should be cancelled to prevent the spread of COVID-19; 34.1% of respondents wore medical masks; and 57.9% avoided shaking hands in recent days.

**Conclusion:** This study showed that sampled Sudanese residents have incomplete knowledge and poor practices towards COVID-19. However, we found that women and people aged 18–25 years were more knowledgeable and had more positive attitudes towards COVID-19. We hope that concerned authorities will establish awareness programmes to improve the ability to combat this disease.

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## Introduction

Coronavirus disease 2019 (COVID-19) is a potentially severe acute respiratory infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This novel coronavirus was firstly identified as the cause of an outbreak of pneumonia of unknown cause in Wuhan City, Hubei Province, China, in December 2019 (1). According to the World Health Organization (WHO), novel Coronavirus has been recorded in 202 countries. In response to this serious situation, WHO declared a public health emergency of international concern on 30 January 2020 and formally declaring it a pandemic on 11 March 2020 (2). Globally, 754 948 cases have been reported as of 31 March 2020 (3). In Sudan, the Ministry of Health confirmed 7 cases from different age groups, 2 of which were fatal. There were also more than 99 suspected cases that are in isolation centres. The first case was announced on 13 March 2020. All confirmed cases are male travelers coming from outside Sudan. These cases arrived from different countries prior to the closure of Khartoum airport on 16 March 2020. Both deaths were patients aged over 55 years old. No cases of infection have been recorded in children (4).

The clinical presentation of the confirmed and suspected cases presented with symptoms of respiratory infection with symptom severity ranging from a mild

common cold-like illness, to a severe viral pneumonia leading to acute respiratory distress syndrome that is potentially fatal. Symptoms included fever, cough, and shortness of breath. Other symptoms, such as malaise and respiratory distress, have also been described. In addition, some of those who tested positive for COVID-19 were asymptomatic, whereby symptoms may develop from 2 days to 2 weeks following exposure to the virus (5,6).

Transmission of COVID-19 is believed to occur via respiratory droplets from coughing and sneezing, as with other respiratory pathogens, including influenza and rhinovirus. WHO officials project that the outbreak is containable if that pattern holds. No vaccine is currently available for SARS-CoV-2. Avoidance is the principal method of deterrence. General measures for prevention of viral respiratory infections include washing hands with water, use of a hand sanitizer, and avoiding touching the mouth, nose and eyes, especially if hands are unwashed. Also, avoidance of close contact with infected people, isolation for those who are infected, coughing and sneezing on a disposable tissue, and regular cleaning and disinfecting of surfaces that could be frequently touched is important for disease prevention (7).

This research was conducted in March 2020, a period where COVID-19 was new to Sudan and the situation was unclear. This could have affected the level of knowledge,

attitudes, and practices of the Sudanese population towards the virus. Strong social bonds in the Sudanese community encourage frequent visits between families and neighbours, and the importance of handshaking in the culture may affect the practices of participants in this study. However, the effective infection prevention and control practices demands awareness and compliance among the populations at all levels. A poor level of knowledge has been implicated in the rapid spread of infection in societies, and vice versa. Therefore, the aim of this study was to assess the knowledge, attitudes and practices of Sudanese residents towards COVID-19 in March 2020.

## Methods

### Study setting

This study was conducted in Khartoum, Sudan, which has an estimated overall population of 5 million people (2008 census) (8). Although the questionnaire was distributed to local residents, residents of other states were also eligible to participate in the online questionnaire. Due to recent policies that restricted transportation between Sudanese states, the manual distribution of the questionnaire was eventually confined to Khartoum.

### Study design and population

This was a cross-sectional, descriptive, community-based study conducted to gather information related to the knowledge, attitude, and practices towards COVID-19 among Sudanese residents in March 2020. A total of 812 participants completed the survey questionnaire. Sudanese nationals of both sexes and aged 18 years or above and who had agreed to participate were included and considered appropriate for the study; health care workers were excluded. Considerable care was taken to include people with different educational levels (i.e., no formal education, high school or below, undergraduate students, Bachelor's degree, Master's degree and above) by distributing both manual and online questionnaires to cover a wider segment of society.

Participants for this study were self-recruited via social media networking sites (an online soft copy using Google Forms to complete the questionnaire was made available through the popular social networking sites Facebook, Twitter, Whatsapp and Telegram). In addition, convenience sampling technique was used via manual distribution. However, It was not feasible to conduct a community-based survey throughout Sudan due to the policies that restricted movement between Sudanese states during this period. Therefore, distribution of the questionnaire was divided between manual distribution, which covered Khartoum, and online, which did not restrict participation from other states. Manual distribution of the questionnaire was also used to include sectors of the community who might not have access to social media.

Researchers were distributed across different areas in Khartoum, including residential areas, main roads, and local markets to include individuals from different sectors

and backgrounds. Participants were randomly selected. An interview was conducted and the questionnaires were filled by the researchers after reading every question to each individual participant. Handling the questionnaires with participants was avoided as a protective measure. Researchers were committed to preventive measures, such as wearing medical masks and disposable gloves.

The total number of respondents was 812 after excluding those who refused to take part in the study. The sample size was calculated for cases from the equation  $n = z^2 pq/d^2$ , where  $n$  = sample size,  $z$  = level of confidence = 1.96 (95% CI),  $P$  = prevalence. Since similar studies in Sudan on this topic are lacking, we assumed 50% prevalence of having inadequate knowledge, attitudes, and practice. Therefore,  $P = 0.5$ ,  $q = 1 - p = 0.5$ ,  $d$  = desired margin of error = 0.05. Thus, the required sample size was estimated as  $(1.96)^2 (0.5) (0.5) / (0.05)^2 = 384$  participants.

The online questionnaire was available from 5 to 26 March 2020 and the manual distribution was conducted during the same period. The responses to online questionnaires began to exceed manual responses when the sample size reached 384, therefore the number of manual participants was increased by researchers to compensate. On 26 March, when the total sample reached 812, the online survey portal and manual distribution were closed.

### Data collection

Following informed consent, data were collected via a 23-item structured, Arabic language, close ended and self-administered questionnaire online, while a hardcopy of the questionnaire was used by researchers to record answers from respondents who were physically present. The questionnaire was self-invented and underwent pilot survey. The questionnaire consisted of two parts: demographics and KAP, in addition to the consent question. Demographic variables included age, sex, and education level. The questionnaire had 23 questions: 4 regarding clinical presentations (K1–K3 and K9) and 5 regarding transmission routes, prevention, and control (K4–K8) of COVID-19 (Table 1). These questions were answered on an agree/disagree basis with an additional “I don't know” option. A correct answer was assigned 1 point and an incorrect/unknown answer was assigned 0 points. The total knowledge score ranged from 0 to 9, with a higher score denoting a better knowledge towards COVID-19.

Attitudes towards COVID-19 were measured by 6 questions (A1–A6) about the country lockdown approval and the cancellation of religious gatherings, as well as the shutdown of schools, universities, and closing the borders of the country (Table 3). The assessment of respondents' practices was composed of 4 behaviours (P1–P4, Table 4): avoiding going to a crowded place, wearing a medical mask, avoiding handshaking, and recently washing hands.

### Statistical analysis

The analysis of data was done using SPSS, version 27.0. To calculate the frequencies of correct knowledge answers and various attitudes and practices, descriptive

**Table 1 Knowledge of Sudanese residents towards COVID-19**

Question	Correct rate, % of the total sample
K1. The main clinical symptoms of COVID-19 are fever, dry cough, and body aches?	88.1
K2. Unlike the common cold, sneezing and runny nose are less common in persons infected with the SARS-CoV-2 virus?	67.1
K3. All infected individuals are symptomatic?	15.8
K4. The disease can be transmitted from asymptomatic individuals?	62.3
K5. Avoiding crowded places can prevent the infection by SARS-CoV-2?	95.5
K6. Wearing medical masks and washing hands can prevent the infection by SARS-CoV-2?	95.1
K7. SARS-CoV-2 can be transmitted through respiratory droplets?	87.9
K8. Touching contaminated surfaces can facilitate the transmission of SARS-CoV-2?	94.9
K9. Elderly and those who have chronic illnesses are more likely to be severe cases?	96.7

statistics were used. Independent samples, t test and one-way analysis of variance (ANOVA) were used to compare knowledge score, attitudes and practices of different participants according to demographic characteristics. For each attitude question, the percentage of respondents with positive responses was calculated. The statistical significance level was set at  $P < 0.05$ .

## Results

A total of 812 individuals participated in this study of whom 440 (54.2%) were male and 372 (45.8%) were female. Nearly half of the participants (51.1%) were aged 18–25 years. The majority of participants (40.4%) were Bachelor degree holders and only 5.7% had no formal education. Among the total number of participants, 544 (67%) were recruited through online distribution and 268 (33%) were recruited manually.

Responses to COVID-19 knowledge questions showed that out of the 9 questions, the mean score was 7.03 (SD: 1.3, range: 0–9), suggesting an overall 78.2% ( $7.03/9 \times 100$ ) correct rate on this knowledge test. The correct answer

rates of the 9 questions on the COVID-19 knowledge questionnaire were 15.8–96.7% (Table 1). There were significant differences in knowledge scores across demographics (Table 2). Female participants were found to be more knowledgeable than male participants ( $P = 0.001$ ). Participants aged 18–25 years were more knowledgeable than those in other age groups (26–35 years, 36–45 years, 46–55 years, and >55 years,  $P < 0.05$ ) participants with no formal education were the least knowledgeable, with a mean score of 6.1 and an overall correct rate of 67.7% ( $6.1/9 \times 100$ ).

The vast majority of participants (93.4%) believe that COVID-19 is a serious threat to public health. Rates of reporting “disagree” and “neutral” were 3.1% and 3.4%, respectively. Respondents reporting “disagree” and “neutral” had significantly lower knowledge scores than those reporting “agree” ( $P < 0.001$ ). Nearly all participants (96.7%) agreed that suspected and infected patients should be isolated and restricted from social contact. About two-thirds of participants (66.9%) agreed that religious gatherings and events should be cancelled to help control the outbreak of COVID-19 (Table 3). The attitude towards

**Table 2 Demographic characteristics of participants and knowledge score of COVID-19 by demographic variables**

Education	Number of participants (%)	Knowledge score mean (± standard deviation)	P
Sex			
Male	440(54.2)	6.9 (± 1.3)	0.001
Female	372(45.8)	7.2 (± 1.1)	
Age-group (years)			
18-25	415(51.1)	7.2 (± 0.9)	<0.001
26-35	179(22.0)	6.6 (± 1.5)	
36-45	94(11.6)	6.8 (± 1.6)	
46-55	87(10.7)	6.7 (± 1.4)	
>55	37(4.6)	6.9 (± 1.4)	
Education			
No formal education	46(5.7)	6.1 (± 2.0)	<0.001
High school or below	183(22.5)	7.1 (± 1.1)	
Undergraduate student	190(23.4)	7.0 (± 1.1)	
Bachelor's degree	328(40.4)	7.1 (± 1.2)	
Master's degree and above	65(8.0)	6.8 (± 1.4)	



**Table 3 Attitudes of Sudanese residents towards COVID-19 (n=812)**

Question	No. of positive responses	%
A1. Do you agree that COVID-19 is a serious threat to public health?	759	93.4
A2. Do you agree that suspected and infected patients should be isolated and restricted from social contact?	786	96.7
A3. Do you agree that religious gatherings and events should be cancelled temporarily to prevent the spread of SARS-CoV-2?	544	66.9
A4. Do you agree that universities and schools should be closed temporarily to prevent the spread of SARS-CoV-2?	766	94.3
A5. Do you agree that your country should close their borders with other countries that have an outbreak of COVID-19?	781	96.1
A6. Do you agree with the country lockdown to combat COVID-19?	714	87.9

cancelling religious gatherings significantly differed across genders, age-groups, and knowledge scores. Female (vs. male,  $P < 0.001$ ), participants aged 18–25 (vs. 46–55,  $P = 0.005$ ), and higher knowledge score ( $P < 0.001$ ) had a more positive attitude towards cancelling religious gatherings and events. In addition, positive attitudes towards country lockdown, closing schools and universities, and closing borders with other countries that have an outbreak of COVID-19 showed significant association with higher knowledge score ( $P < 0.001$ ).

Responses to practice questions showed that 34.1% of respondents wore masks, 57.9% avoided shaking hands, 65.4% had not visited crowded places and 86.0% had been frequently washing their hands recently (Table 4). The rates of practices significantly differed across gender and age groups. Female (vs. male) was significantly associated with wearing masks ( $P < 0.001$ ), avoiding crowded places ( $P < 0.001$ ), and avoiding handshaking ( $P < 0.001$ ). Participants aged over 55 years (vs. other age groups) were significantly associated with washing hands ( $P < 0.001$ ) and avoiding handshaking ( $P \leq 0.003$ ). Moreover, higher knowledge scores were significantly associated with washing hands ( $P = 0.001$ ) and avoiding handshaking ( $P = 0.005$ ). Washing hands ( $P = 0.015$ ) and avoiding crowded places ( $P < 0.001$ ) were significantly associated with more positive attitude towards perception of COVID-19 as a serious threat.

The results from online distribution compared to the manually distributed questionnaire did not differ significantly in some parts of the questionnaire. A noticeable difference was in the number of participants with no formal education in the manual questionnaire (12.8%) compared to the online questionnaire (2.4%). A significant difference was noticed in the knowledge correct rate where online respondents had a correct rate of 81.2% and manual respondents had 71.5%. The attitudes towards cancelling religious gatherings

differed significantly among online compared to manual respondents. 73.7% of online respondents and only half (52.7%) of manual respondents agreed that it should be cancelled. In the practices section of the questionnaire, less than half (48.8%) of manual respondents and 61.9% of online respondents avoided handshaking.

## Discussion

Awareness is a very important parameter to be assessed to provide baseline data to assist decision-makers to plan and deliver effective measures to prevent the spread of COVID-19. This study revealed some important aspects of COVID-19 awareness among the Sudanese residents. To the best of our knowledge, this is the first study in examining the KAP towards COVID-19 among the Sudanese residents. Our Participants were predominantly males and had intermediate educational levels. The overall correct rate was 78.2% in the Knowledge part of the questionnaire. This result is not satisfactory and does not reflect a high level of awareness. The disease did not yet reach the stage of outbreak in Sudan. As a result, there might be a matter of disregard in some segments of the society towards the disease.

Respondents in the manual questionnaire had a lower knowledge score than online respondents and they were also less educated. Education may have a direct effect on improving the knowledge, attitudes, and practices of the society, as educated people are more likely to be aware of the danger of the disease. Educated individuals may also be more likely to participate in the online questionnaire, as some of the respondents to the manual questionnaire could have been illiterate.

There were significant differences in knowledge scores across demographics. Gender showed an effect on awareness towards COVID-19, where female participants were found to be more knowledgeable than

**Table 4 Practices of Sudanese residents towards COVID-19 (n=812)**

Question	Yes n(%)	No n(%)
P1. Have you been wearing medical masks when leaving your house in recent days?	277(34.1)	535(65.9)
P2. Have you been frequently washing your hands in recent days?	698(86.0)	114(14.0)
P3. Did you go to any crowded place in recent days?	281(34.6)	531(65.4)
P4. Have you been avoiding handshaking with others in recent days?	470(57.9)	342(42.1)



male participants. This can be related to their innate fear for their children and family, which drives them to read and learn more about the disease. Age and level of education significantly affected the level of awareness towards COVID-19. Participants aged 18–25 years were more knowledgeable than those in other age groups. One reason for this may be related to their greater interest and access to social media, which played a major role in spreading awareness about COVID-19. Participants with no formal education were the least knowledgeable among educational levels, with a mean score of 6.1 and an overall correct rate of 67.7% (6.1/9\*100). This may be due to their preoccupation with their livelihoods and that they are less likely to have access social media.

Despite the relatively low knowledge towards COVID-19, the vast majority of participants (93.4%) believe that it is a serious threat to public health. This can be explained by the very high number of cases and deaths that increase every day around the world. About two-thirds of participants (66.9%) agreed that religious gatherings and events should be cancelled, a percentage that is unsatisfactory, considering the role of gatherings in spreading the disease. The reason for this could be people's beliefs and emotional attachment to the places of worship. Only 34.1% of respondents wore masks. This may not be literally a lack of awareness as it is due to the inability of society to pay for it, and above all being in a country with poor economic status. While 57.9% avoided shaking hands, the rest are still handshaking, as avoiding handshaking is unacceptable in the Sudanese culture. 65.4% of participants had not visited crowded places and 86% have been frequently washing their hands recently. The poor practices, in general, among Sudanese residents can also be related to the many myths in Sudan, such as local herbs and hot climates being protective against the disease. Therefore, people do not follow the instructions on this regard as serious as they should. A similar study using an online survey was conducted in April 2020 in three Middle Eastern countries (Jordan, Saudi Arabia and Kuwait), showed

an overall COVID-19 knowledge with a mean score of 66.1%, 15.3% of the participants did not go to crowded places, and 50.1% wore a mask while leaving home (9). Another study conducted in Egypt in April 2020, showed a mean knowledge score of 16.39 out of 23 (71.2%) (10).

Apparently, the Sudanese population seems to have a higher level of knowledge than other nearby Arab countries. Participants from Jordan, Saudi Arabia, and Kuwait wore a mask more frequently than Sudanese residents did. This might be attributed to the economic state of Sudan and the inability of the government to provide enough protective medical equipment to their residents.

### Limitations

This study was limited by the fact that data were only taken from the capital city, Khartoum. Access to the rural and peripheral areas of Sudan could have improved the accuracy of the study.

### Conclusion and recommendations

In summary, this research showed that the Sudanese residents still have incomplete knowledge about COVID-19, which could lead to an outbreak that is very difficult to control. Our findings suggest that women and people aged 18–25 years have had better knowledge towards COVID-19 during this outbreak. On the other hand, participants with no formal education were the least knowledgeable among the population. The study noted an association between education and positive attitudes and appropriate practices towards COVID-19, suggesting that education is helpful in encouraging a positive attitude and maintaining safe practices. Hopefully, In the coming days, the concerned authorities will work to establish awareness programs and put a long-term plan to improve access to education, so that the government and society can combat this disease and such tragedies.

**Funding:** None.

**Competing interests:** None declared.

## Connaissances, attitudes et pratiques vis-à-vis de la COVID-19 dans la population soudanaise

### Résumé :

**Contexte :** La maladie à coronavirus 2019 (COVID-19) est une infection respiratoire aiguë sévère causée par le coronavirus 2 du syndrome respiratoire aigu sévère (SRAS-CoV-2). Des connaissances suffisantes, des attitudes positives et des pratiques correctes sont cruciales pour la prévention de la COVID-19.

**Objectifs :** La présente étude a évalué les connaissances, les attitudes et les pratiques concernant la COVID-19 dans la population soudanaise.

**Méthodes :** Des enquêtes transversales au niveau communautaire ont été menées auprès de 812 participants, hommes et femmes de 18 ans et plus, à l'exclusion des agents de santé. Un soin considérable a été apporté pour inclure des personnes ayant des niveaux d'éducation différents.

**Résultats :** Parmi les personnes ayant répondu à l'enquête (n = 812), 45,8 % étaient des femmes, 40,4 % étaient titulaires d'une licence, 5,7 % n'étaient pas diplômés et 51,1 % étaient âgées de 18 à 25 ans. Le taux correct global du questionnaire sur les connaissances était de 78,2 % ; 66,9 % ont convenu que les rassemblements et les événements religieux devraient être annulés pour empêcher la propagation de la COVID-19 ; 34,1 % des répondants portaient des masques médicaux ; et 57,9 % ont évité de se serrer la main les jours avant l'enquête.

**Conclusion :** La présente étude a montré que les connaissances concernant la COVID-19 sont encore incomplètes dans la population soudanaise et que les pratiques à ce sujet sont mauvaises. Cependant, nous avons constaté que les femmes et les personnes âgées de 18 à 25 ans étaient mieux informées et avaient des attitudes plus positives vis-à-vis de la COVID-19. Nous espérons que les autorités concernées mettront en place des programmes de sensibilisation pour améliorer la capacité de lutte contre cette maladie.

## معلومات واتجاهات وممارسات السكان السودانيين تجاه كوفيد-19

أحمد حزيمه، عبد الملك الجعفري، عبد المعز الجعفري، عبد القادر محمد، إبراهيم عادل

### الخلاصة

الخلفية: إن مرض فيروس كورونا 2019 (كوفيد-19) عدوى تنفسية حادة وخيمة ناجمة عن فيروس كورونا المسبب للمتلازمة التنفسية الحادة الوخيمة 2 (فيروس كورونا سارس-2).

وتُعدُّ المعرفة الكافية، والمواقف الإيجابية، والممارسات الصحيحة أمراً هاماً في الوقاية من كوفيد-19

الأهداف: هدفت هذه الدراسة الى تقييم معلومات ومواقف وممارسات عينة من السكان السودانيين تجاه كوفيد-19

طرق البحث: أجري مسح مجتمعي مقطعي على 812 مشاركاً من كلا الجنسين في سن 18 عاماً فما فوق، باستثناء العاملين في الرعاية الصحية. وأوليت عناية كبيرة لإدماج ذوي المستويات التعليمية المختلفة.

النتائج: من بين الذين استجابوا للمسح (وعددهم 812)، كانت 45.8٪ من النساء، وكان 40.4٪ حاصلين على درجة البكالوريوس، و 5.7٪ غير متعلمين، و 51.1٪ في سن 18-25 عاماً.

وكان المعدل الإجمالي الصحيح لاستبيان المعرفة 78.2٪؛ ووافق 66.9٪ على ضرورة إلغاء التجمعات والمناسبات الدينية لمنع انتشار فيروس كوفيد-19؛ وارتدى 34.1٪ من المستجيبين كمامات طبية؛ وتجنب 57.9٪ مصافحة الأيدي في الأيام الأخيرة.

الاستنتاج: أظهرت الدراسة أن العينة المختارة للسكان السودانيين ليس لديهم معرفة مكتملة وما زالت ممارساتهم سيئة تجاه كوفيد-19. ومع ذلك، وجدنا أن النساء ومن يتراوح سنهم بين 18-25 عاماً كانوا أكثر دراية ومواقفهم إيجابية تجاه كوفيد-19. نأمل أن تنشئ السلطات المعنية برامج توعية لتحسين القدرة على مكافحة هذا المرض.

## References

1. Ren L-L; Wang Y-M; Wu Z-Q; Xiang Z-C; Guo L; Xu T. Identification of a novel coronavirus causing severe pneumonia in human: a descriptive study. Chin Med J (Engl). 2020 May 5;133(9):1015-1024. doi: 10.1097/CM9.0000000000000722.
2. World Health Organization. Coronavirus (COVID-19) events as they happen. Geneva: World Health Organization; 2020 (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>).
3. Coronavirus disease (COVID-19) Situation Dashboard. (<https://experience.arcgis.com/experience/685d0ace521648f8a5beeeeb1b-9125cd>)
4. Federal Ministry of Health (<https://www.fmoh.gov.sd>).
5. Centers for Disease Control and Prevention (CDC). Symptoms of coronavirus disease 2019 (COVID-19) | Atlanta: CDC; 2020 (<https://www.cdc.gov/coronavirus/2019-ncov/about/symptoms.html>).
6. Hui DS, I Azhar E, Madani TA, Ntoumi F, Kock R, Dar O, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health – The latest 2019 novel coronavirus outbreak in Wuhan, China. Vol. 91, Int J Infect Dis. 2020;91:264–6.
7. Cennimo DJ. Coronavirus disease 2019 (COVID-19) treatment & management: approach considerations, medical care, prevention. Medscape online, 2020 (<https://emedicine.medscape.com/article/2500114-treatment#d8>).
8. South Sudan Info Online. Wayback Machine ([https://web.archive.org/web/20130520025735/http://southsudaninfo.net/wp-content/uploads/reference\\_library/reports/5th\\_sudan\\_census26\\_april\\_2009.pdf](https://web.archive.org/web/20130520025735/http://southsudaninfo.net/wp-content/uploads/reference_library/reports/5th_sudan_census26_april_2009.pdf)).
9. Naser AY, Dahmash EZ, Alwafi H, Alsairafi ZK3, Ahmed M; Rajeh A; Alhartani YJ. Knowledge and practices towards COVID-19 during its outbreak: a multinational cross-sectional study. medRxiv preprint doi.org/10.1101/2020.04.13.20063560. ([https://www.researchgate.net/publication/340738054\\_Knowledge\\_and\\_practices\\_towards\\_COVID-19\\_during\\_its\\_outbreak\\_a\\_multinational\\_cross-sectional\\_study](https://www.researchgate.net/publication/340738054_Knowledge_and_practices_towards_COVID-19_during_its_outbreak_a_multinational_cross-sectional_study)).
10. Abdelhafiz A, Mohammed Z, Ibrahim M, Ziady H, Alorabi M, Ayyad M, et al. Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Coronavi

# Women's agency in Egypt: construction and validation of a multidimensional scale in rural Minya

Rania Salem,<sup>1</sup> Yuk Fai Cheong,<sup>2</sup> Stephanie S. Miedema<sup>3</sup> and Kathryn M. Yount<sup>4</sup>

<sup>1</sup>Department of Sociology, University of Toronto Scarborough, Toronto, Ontario, Canada. <sup>2</sup>Department of Psychology, Emory University, Atlanta, Georgia, United States of America. <sup>3</sup>Department of Sociology, Emory University, Atlanta, Georgia, United States of America. <sup>4</sup>Hubert Department of Global Health & Department of Sociology, Emory University, Atlanta, Georgia, United States of America. (Correspondence to: Rania Salem: rania.salem@utoronto.ca).

## Abstract

**Background:** Measurement of women's agency in specific sociocultural conditions, particularly in Middle Eastern settings, has received limited attention, making its usefulness as an outcome or predictor of gender equality unclear.

**Aims:** This study aimed to construct and validate a multidimensional and context-specific scale of women's agency in rural Minya, Egypt.

**Methods:** Using data from 608 ever-married women in 2012, confirmatory and exploratory factor analysis were used to construct a scale measuring women's agency in rural Minya. The scale was validated through exploratory structural equation models.

**Results:** The 21-item model consisted of three factors (decision-making, freedom of movement and gender role attitudes), each corresponding to a previously-theorized domain of women's agency. The three factors were positively correlated, supporting women's agency as a multidimensional, context-specific construct. The strongest correlation was between decision-making and freedom of movement (0.410), and then between freedom of movement and gender attitudes (0.307); the weakest correlation was between decision-making and gender attitudes (0.211). Although we hypothesized that each domain would be positively associated with age, only decision-making was significantly and positively associated with women's age.

**Conclusion:** Similarities between the items used here and a study at the national level in Egypt suggest these indicators could be used in various Egyptian settings to monitor progress on the United Nations Sustainable Development Goal 5 on empowering women and girls, and to assess the effect of policies and programmes. Future research should build on the findings to identify the best observable indicators of women's agency in Egypt and elsewhere.

Keywords: women, agency, empowerment, decision-making, factor analysis, Egypt

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## Introduction

Women's agency and the broader concept of women's empowerment have interested social scientists for decades (1–4). Empowerment is the process by which women claim new enabling resources, such as schooling, employment and extra-familial support. These resources, in turn, may enhance women's agency (1,5,6), or ability to “define their own life-choices and to pursue their own goals, even in the face of opposition from others” (1, page 438). Resources and agency are thus multidimensional domains of the overarching construct of women's empowerment.

Measures of women's agency have been associated in different contexts with contraceptive use (7,8), and improved child health and nutrition (9–12). Therefore, clarifying the dimensions of women's agency in local contexts and standardizing approaches to its measurement are important priorities for policy and research. It is important to measure women's empowerment generally, and women's agency specifically, to monitor progress towards achieving United Nations Sustainable

Development Goal (SDG) 5: to achieve gender equality and empower all women and girls (13). In spite of the need to measure agency effectively for policy and scholarship, its operationalization and measurement have varied, and the choice of items to include has been ad hoc, poorly justified and inadequately described (3).

As conceptualized by existing research, women's agency is multidimensional (1,3,4,14) and context-specific (15). However, some researchers have operationalized agency as unidimensional and constructed measures of agency by summing responses to survey items into a single scale (16). Others have used summary measures of single domains, such as women's decision-making or their contributions to household income, as a proxy for overall agency (17,18). Only a few studies have used advanced statistical methods to examine the latent structure of women's agency (e.g. numbers of factors and relationships between them), while accounting for measurement error and permitting differential weights for observed items (5,6,19–23). Advanced statistical methods, such as factor analysis, allow factor scores for

the multiple domains of agency to be created, which can be analysed in research on the determinants and effects of each domain of women's agency. Such approaches have advantages over single summative score measures of women's agency, which do not account for measurement error and which may hide patterns of association between the domains of agency and other important variables (20). Single summative approaches thus obscure the pathways through which agency and empowerment operate (20).

Problematically, some measures of agency also ignore its context specificity. Prevailing theories of women's empowerment – within which agency is one domain – highlight the relevance of the environment and contextual factors in which women take actions characterized by agency (1). However, emerging evidence suggests that some items that measure women's agency are context-specific while others apply across contexts (19). Still, because of geographical variation in indicators of women's agency (7,24,25), context-appropriate measurement models are needed.

Research has shown how prevailing forms of classic patriarchy in Egypt affect women's agency (26). Women exchange obedience to male guardians for economic support, physical protection, social respectability and eventual authority over junior women. Important household decisions fall to senior men and women are expected to accept their subordination and adopt attitudes that devalue women and elevate men. Women limit their interactions with unrelated men for reasons of sexual purity, a concern also used to justify their restricted physical mobility.

In Egypt, factor analysis has been used to construct scales that capture women's influence in family decisions (27) and to explore the multidimensional nature of women's empowerment (28). More recently, a construct for Egyptian women's agency was psychometrically tested which consisted of three domains: influence in family decision-making (decision-making), freedom of movement in public (freedom of movement), and vocalization of more equitable gender attitudes (gender attitudes) (6). In this study, we aimed to determine how well these three measures capture agency (defined as women's exercise of choice in these three specific domains) in the context of the socially conservative, resource-poor setting of rural Minya, Egypt. In addition, we used factor analysis to explore and confirm a multidimensional and context-specific scale of women's agency in rural Minya. Finally, we assessed the construct validity of the measure by assessing whether women's age was associated in expected ways with each of the three domains of women's agency.

Our examination of the factor structure of women's agency was informed by previous studies of this construct in Egypt (2,6,16,27,28), but it is distinct in its focus on multidimensionality, item selection and retention, and model fit. Based on theory and earlier research (1,3,6,14), we hypothesized that women's agency was a multidimensional construct, and that the domains of women's agency were positively correlated. To assess

the construct validity of the multidimensional measure, we further hypothesized that age would be positively associated with decision-making, because women gain authority with age (26,27). Similarly, we expected a positive association between women's age and freedom of movement, as rural Egyptian women may go more places and are less frequently accompanied as they age (26). Lastly, we anticipated that the oldest and youngest women would have the least equitable gender attitudes, as older women had grown up at a time when gender norms were more patriarchal, and younger women, having less authority in the family, may be less likely to challenge custom (26).

## Methods

### Setting and sample

Our study was conducted in rural Minya (29), a governorate located approximately 250 km south of Cairo. Minya had a population of 4.3 million in 2010, 81.1% of whom lived in rural areas (30). Social conservatism, lack of material resources, limited government investment, and poor infrastructure make Minya a socio-culturally distinct region of Egypt and a useful site to assess the applicability of measurement indicators for women's agency.

Women from rural Minya interviewed in the 2005 Egypt Demographic and Health Survey were eligible to participate in a 2012 follow-up survey (29). In the 2005 Demographic and Health Survey, 1122 ever-married women aged 15–49 years in rural Minya completed the women's questionnaire; of these, 328 from a one-third subset of households completed a module on experiences of intimate partner violence. For the 2012 follow-up survey, we included these 328 women, and randomly selected another 514 households (29), from which we chose one woman per household using the Kish method (31), for a total follow-up sample of 842 women. We were able to find and interview 608 of the 842 selected women, a follow-up response rate of 72%. We conducted the follow-up survey from November 2011 to April 2012 (29). Questionnaire items drew on questions used in previous surveys in Egypt and other resource-poor settings, and were extensively pretested using qualitative and cognitive interviewing methods. Respondents were interviewed by trained female field researchers, who recorded answers using pencil-and-paper questionnaires. As much as possible, interviews were conducted in private, usually in the homes of the respondents.

### Measures of women's agency

Our choice of items to operationalize women's agency was based on theory, empirical research, and preliminary analyses of the 2012 survey data. The 29 items initially included represented one of four domains of women's agency: decision-making, freedom of movement, gender attitudes and political participation or political agency. Four items representing political agency were removed for reasons described in the analysis section. Descriptive statistics for the 25 remaining indicators are presented in Table 1.



**Table 1** Percentage distributions for indicators of women's agency (n = 608 ever-married women aged 22–65 years), rural Minya, Egypt

Domain	Item	Response categories <sup>a,b</sup>		
Decision-making (DM)				
Who in your family has the final say in purchasing the following things?		Someone else	You and someone else	You
Vegetables and fruit	DM_1	12	13	75
Clothes for yourself	DM_2	20	22	57
Any kind of medicine for yourself	DM_3	24	28	48
Toiletries for yourself	DM_4	21	19	60
Large household purchases	DM_5	42	45	13
Who in your family usually makes the following decisions/has the final say in the following matters?		Someone else	You and someone else	You
Health care for yourself	DM_6	19	58	23
Large household purchases <sup>c</sup>	DM_7	30	58	12
Purchases for daily household needs <sup>c</sup>	DM_8	13	42	45
Your visits to your family or relatives	DM_9	20	57	23
Whether or not you will work to earn money	DM_10	26	66	08
Freedom of movement (FM)				
Are you allowed to go to the following places?		Never	Not alone	Alone
Local market to buy things	FM_1	2	23	75
Local health centre or doctor	FM_2	1	25	74
Homes of your friends in the neighbourhood	FM_3	1	22	77
Nearby mosque or church	FM_4	6	25	69
Gender attitudes (GA)				
In your opinion is a husband justified in hitting his wife in the following situations		Yes	Don't know	No
She goes out without telling him	GA_1	57	0	43
She neglects the children	GA_2	46	0	53
She argues/debates with him <sup>c</sup>	GA_3	34	0	66
She refuses to have sex with him	GA_4	54	4	42
She burns the food	GA_5	24	1	75
Please tell me if you agree or disagree with each statement		Agree	Don't know	Disagree
If a wife is working outside the home, then her husband should help her with household chores and raising the children <sup>d</sup>	GA_6	74	6	20
A wife should be allowed to work outside the home if she wants to <sup>c,d</sup>	GA_7	78	7	16
A wife has a right to express her opinion even when she disagrees with what her husband is saying <sup>d</sup>	GA_8	72	10	18
The important decisions of the family should be made only by a husband	GA_9	64	4	32
A wife should tolerate being hit by her husband in order to keep the family together	GA_10	40	7	52
If a family doesn't have enough money to send all the children to school, it is better to send a son to school than a daughter	GA_11	15	8	77

<sup>a</sup>Values shown are percentages.<sup>b</sup>All items coded from 1 to 3, with higher values representing higher levels of women's agency.<sup>c</sup>Items not included in final three-factor model.<sup>d</sup>Reverse coded items (agree = 3, don't know = 2, disagree = 1).

## Analysis

Because of earlier theoretical and empirical support for women's agency as a multidimensional construct (1,20,27), we began with confirmatory factor analysis. We matched many of our items with those used in previous exploratory factor analyses/confirmatory factor analyses and added four items measuring political agency. However, when we ran a confirmatory factor analysis with a four-factor combined model, the results showed poor model fit. On further inspection, one of the four items for political agency showed little variability and was removed. This left three,

possibly too few to represent political agency in a confirmatory factor analysis model (32). Therefore, we removed political agency and ran a three-factor confirmatory factor analysis. The results again showed modest model fit (root mean square error of approximation = 0.067, comparative fit index = 0.915 and Tucker-Lewis index = 0.906), and modification indices suggested significant cross-loadings. Following the recommended approach when the a priori specified confirmatory factor analysis model does not fit (32), we ran an exploratory factor analysis, excluding the four items for political agency.

In the first step of the exploratory factor analysis, we



examined the frequency distributions of the remaining 25 items. We estimated all measurement models using Mplus 7 (33) with mean and variance-adjusted weighted least squares estimators, appropriate for estimating exploratory factor analysis models with ordinal data. For ordinal items, the weighted least squares estimator computes a polychoric correlation matrix and uses it to fit the exploratory factor analysis model. The program calculated standard errors and chi-squared tests of model fit accounting for the survey's complex sampling design, including clustering and unequal probability of selection (33).

Our exploratory factor analysis proceeded sequentially. First, we ran the exploratory factor analysis with all 25 items and examined and interpreted the scree plots, model fit indices and factor pattern loadings after geomin (oblique) rotation for models with one to five factors. We chose oblique rotation because, unlike the orthogonal ones such as the varimax rotation, it allowed the factors to be correlated. We expected the women's agency factors identified to be correlated. The geomin rotation, the default approach adopted by Mplus (33), is the preferred approach over other oblique rotation methods when the goal is to search for solutions with smaller cross-loadings and large associations between factors (34). Results of the model fit indices – root mean square error of approximation = 0.048, comparative fit index = 0.967 and Tucker-Lewis index = 0.952 – indicated an excellent fit for the four-factor model. However, it had four items with negative loadings  $\leq -0.300$  on one factor, but positive loadings on others. These negative loadings were inconsistent with existing theory, as all items were expected to load positively on the domains of women's agency.

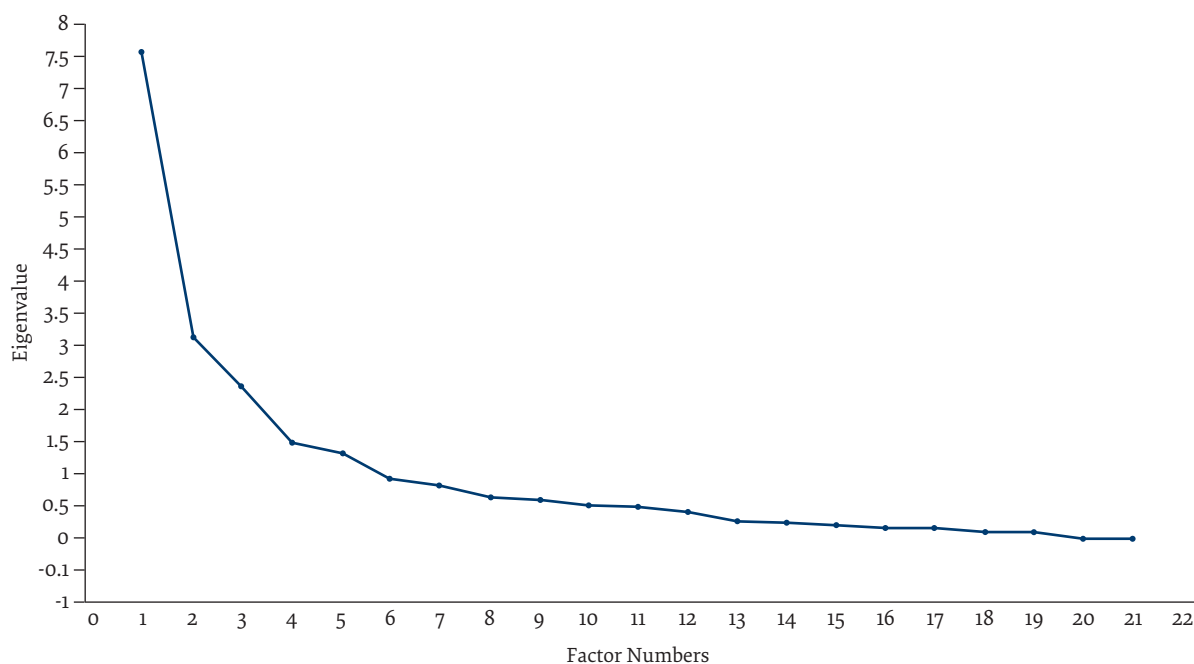
As we wanted to identify the smallest set of items measuring domains of women's agency in rural Minya,

we removed three negatively loading items one at a time, beginning with the most negatively loading item (32,35). The items eliminated included one related to gender attitudes (GA\_3) and two related to decision-making (DM\_7, DM\_8) (Table 1). While it is unclear why they had negative factor loadings, the ordering and phrasing of the questions may have been problematic.

Next, based on methodological precedent and the theoretical perspective that women's agency has multiple correlated but distinct domains, we removed items with cross-loadings (substantive loadings  $\geq 0.300$ ) on more than one factor (35). Beginning with the item with the highest cross-loading relative to its primary factor loading, we removed gender attitudes item GA\_7 (Table 1). We then ran an exploratory factor analysis model with 21 items, comparing the fit of models with one to five factors. Results of the root mean square error of approximation (0.057), comparative fit index (0.964) and Tucker-Lewis index (0.949) indicated good model fit for the three-factor model. While the root mean square error of approximation (0.049), comparative fit index (0.976), and Tucker-Lewis index (0.962) demonstrated a better fit for the four-factor model, the scree test (Figure 1) supported a three-factor solution. Moreover, while the three-factor solution had no items with cross-loadings  $\geq 0.300$ , the four-factor solution had four items with cross-loadings  $\geq 0.300$ . Apart from the cross-loading items, the fourth factor had only two items with factor loadings  $\geq 0.300$ , suggesting a weak factor (32). Based on these results and our goal of identifying the most parsimonious set of items, the three-factor model was more suitable.

In a final step, we explored the construct validity of our measure. We added three categorical covariates for women's age (30–39 years, 40–49 years, 50–65 years, reference 20–29 years) to an exploratory structural

**Figure 1 Scree plot for the final model of women's agency, rural Minya, Egypt**



equation model, specifically an exploratory factor analysis model with covariates, to assess the association of women's age with each of the three domains of women's agency.

## Results

### Descriptive statistics

Table 1 shows descriptive statistics for indicators of women's agency according to each of the final three domains.

### Exploratory factor analysis

Geomin rotated factor loadings for the final three-factor model (available upon request) showed that 10 items had significant ( $P \leq 0.05$ ) geomin rotated factor loadings  $\geq 0.300$  on the first factor. The items loading on it included all eight decision-making items, all with factor loadings  $\geq 0.481$ . Two gender attitude items (GA\_6, GA\_8) also loaded on the first factor, but with lower factor loadings (0.375 and 0.396, respectively) than the decision-making items. Based on the pattern of factor loadings, we called the first factor the decision-making factor. All four freedom of movement items had high factor loadings (0.810–0.904,  $P \leq 0.05$ ) on the second factor (freedom of movement factor). Seven gender attitude items had significant ( $P \leq 0.05$ ) factor loadings on the third factor (gender attitudes factor). The four items measuring women's justification of intimate partner violence (GA\_1, GA\_2, GA\_4, GA\_5) had high factor loadings (0.842–0.949). The three representing patriarchal gender attitudes (GA\_9, GA\_10, GA\_11) had lower factor loadings (0.361–0.454).

Geomin factor correlations between the three domains of women's agency in the final three-factor model (available upon request) showed that all three factors were positively correlated (significant at  $P \leq 0.05$ ). The strongest correlation was between decision-making and freedom of movement (0.410), the next strongest correlation was between freedom of movement and gender attitudes (0.307) and the weakest correlation was between decision-making and gender attitudes (0.211).

### Construct validation

Table 2 shows the associations between women's age and domains of women's agency. Older women reported higher levels of decision-making than younger women (20–29 years). This relationship was significant for women 50–65

years ( $\beta = 0.406$ ,  $P \leq 0.05$ ), and marginally significant for women 40–49 years ( $\beta = 0.257$ ,  $P \leq 0.10$ ). We did not find significant associations between women's age and freedom of movement or gender attitudes.

## Discussion

Our study contributes to previous literature by using exploratory factor analysis to examine the multidimensional measurement of women's agency in a rural Middle Eastern context. It expands on existing efforts to measure women's agency nationally in Egypt (6), testing measurement models in a largely rural, conservative context. Using a set of questionnaire items similar to those used in a national-level analysis (6), three similar domains captured underlying aspects of women's agency: decision-making, freedom of movement and gender attitudes. Each corresponds to a well-theorized domain of agency identified as an important aspect of women's agency in previous studies in Egypt (2,6,16,27,28,36,37). Our analysis reflects the multidimensional nature of women's agency, unlike earlier efforts to capture agency and related constructs in Egyptian women using single summative indices (16). Our analysis also offers greater parsimony than the only other effort to use factor analysis to develop a multidimensional construct similar to women's agency in Egypt (28), prior to the national validation study mentioned above (6).

Although the number of factors emerging from the national-level analysis (6) is the same as ours, the underlying structure of women's agency differs. Specifically, two factors in the national analysis (women's gender attitudes and freedom of movement) were not significantly correlated (6), whereas all three factors were positively correlated in our current analysis. This difference may reflect that the national analysis exclusively used attitudes related to gender-based violence rather than attitudes to women's roles and rights (6). The difference in the contribution of these attitudes to the latent structure of agency should be investigated further using psychometric testing.

In our exploratory factor analysis, items measuring women's agreement (or not) with patriarchal gender norms (GA\_06 to GA\_11) did not follow anticipated patterns. Whether these items sufficiently represent women's gender attitudes in the context of rural Egypt remains unclear and should be explored in future analyses.

Women's older age, as anticipated, was positively associated with decision-making, but not with freedom of movement and gender attitudes. These findings are best interpreted in light of the patriarchal context in which rural Egyptian women exercise agency; older women have authority over younger ones and more say in household decisions. In contrast, the non-significant association between age and freedom of movement may be because women understood these to relate to actual mobility, and not whether they are allowed to go to various places. We recommend future measures of women's freedom of movement state simply: "if

**Table 2 Exploratory structural equation modelling of associations between women's age and domains of women's agency**

Age (years)	$\beta$ for decision-making (SE)	$\beta$ for freedom of movement (SE)	$\beta$ for gender attitudes (SE)
20–29 (ref)			
30–39	0.165 (0.123)	0.170 (0.149)	–0.017 (0.131)
40–49	0.257† (0.134)	0.095 (0.150)	–0.076 (0.116)
50–65	0.406* (0.157)	–0.166 (0.183)	–0.093 (0.162)

SE: standard error, ref: reference category.

† $P \leq 0.10$ , \* $P \leq 0.05$ .

you wanted to, could you go to the following places ... (never, with permission, without permission)." Finally, and unexpectedly, women's age was not associated with gender attitudes. Future research should explore the relationship between this domain of agency and other covariates, such as higher education.

In addition to modifying the freedom of movement items, the measurement of women's agency in rural Egypt could be improved in other ways. Currently, the measurement model does not capture additional domains of women's agency, such as political agency, which may be appropriate for the rural Egyptian context but was poorly measured with the items we had. Likewise, the items for decision-making may reflect "feminine" or relegated domains of decision-making under classic patriarchy (27), and may not capture the full scope of women's decision-making agency in arenas reserved for men. Qualitative research should develop items to explore these and other emerging domains of women's agency in rural Egypt.

Our results carry implications for research and policy in Egypt and internationally. Although there is some overlap, the items we used to measure women's agency differ somewhat from those used to measure similar constructs in south and south-east Asia (20–22), limiting the possibility for comparative research. However, as many of the items used in our analysis may be found in the women's status modules of various demographic and health surveys (38), our detailed description of item selection and retention may guide efforts to measure women's agency in different national contexts in future research. Our analysis thus

contributes to a growing global conversation about how to measure women's agency and similar constructs (37,39). Policies and programmes also may benefit from our analysis. The domains captured by our measure of agency include examples of factors that might impede women from accessing interventions offered in public spaces (lack of freedom of movement), factors that might be necessary conditions for interventions to succeed (equitable gender attitudes), and factors that could be the target outcomes of interventions (greater decision-making within the household). In the absence of methodologically systematic and theoretically grounded approaches to measuring women's agency, it will be difficult to determine which interventions effectively achieve the broader objective of empowering women and girls and their attainment of gender equality. Sound approaches to measuring women's agency are needed to monitor progress and to assess the impacts of the policies and programmes in which countries are investing in order to achieve SDG 5.

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**Competing interests:** None declared.

## Le pouvoir d'agence des femmes en Égypte : établissement et validation d'une échelle multidimensionnelle dans la région rurale de Minya

### Résumé

**Contexte :** La mesure du pouvoir d'agence des femmes dans des conditions socioculturelles spécifiques, en particulier au Moyen-Orient, n'a fait l'objet que de peu d'attention ; de ce fait, son utilité en tant que résultat ou que facteur prédictif n'est pas claire.

**Objectifs :** La présente étude avait pour objectif d'établir et de valider une échelle multidimensionnelle et spécifique au contexte du pouvoir d'agence des femmes dans la région rurale de Minya en Égypte.

**Méthodes :** Sur la base de données recueillies en 2012 auprès de 608 femmes mariées ou l'ayant été, des analyses factorielles confirmatoire et exploratoire ont été utilisées pour mettre au point une échelle permettant d'évaluer le pouvoir d'agence des femmes dans la région rurale de Minya. L'échelle a été validée à l'aide de modèles d'équations structurelles exploratoires.

**Résultats :** Le modèle constitué de 21 items comprenait trois facteurs (prise de décisions, liberté de mouvement et attitudes sexospécifiques) qui correspondaient chacune à un domaine précédemment théorisé se rapportant au pouvoir d'agence des femmes. Les trois facteurs étaient corrélés positivement, confirmant le pouvoir d'agence des femmes en tant que concept multidimensionnel et spécifique au contexte. La corrélation la plus forte était celle entre la prise de décisions et la liberté de mouvement (0,410), puis entre la liberté de mouvement et les attitudes sexospécifiques (0,307) ; la corrélation la plus faible étant celle entre la prise de décisions et les attitudes sexospécifiques (0,211). Bien que l'on ait émis l'hypothèse que chaque domaine serait positivement associé à l'âge, seule la prise de décisions a été corrélée de manière significative et positive à l'âge des femmes.

**Conclusions :** Les similitudes entre les items utilisés ici et une étude menée au niveau national en Égypte laissent penser que ces indicateurs pourraient être utilisés dans divers contextes égyptiens pour suivre les progrès de la réalisation de l'Objectif 5 du développement durable sur l'autonomisation des femmes et des filles, et évaluer l'impact des politiques et des programmes. Les recherches futures devraient s'appuyer sur ces conclusions pour identifier les meilleurs indicateurs observables du pouvoir d'agence des femmes en Égypte et ailleurs.

## تمكين المرأة في مصر: إنشاء مقياس متعدد الأبعاد والتحقق منه في ريف محافظة المنيا

رانيا سالم، يوك فاي شونج، ستيفاني ميديا، كاثرين يونت

### الخلاصة

**الخلفية:** هناك أبحاث محدودة أُجريت لقياس تمكين المرأة في ظل أوضاع اجتماعية وثقافية محددة، لا سيما في السياقات الشرق أوسطية. **الأهداف:** هدفت هذه الدراسة إلى إنشاء مقياس متعدد الأبعاد ومحدد السياق حول تمكين المرأة في المناطق الريفية بالمنيا، في مصر، والتحقق منه. **طرق البحث:** باستخدام بيانات تعود لعام 2012 مستمدة من 608 سيدة سبق لها الزواج، أُجري تحليل عاملي توكيدي واستكشافي لإنشاء مقياس يتيح قياس تمكين المرأة في ريف المنيا. وتم التحقق من المقياس من خلال نماذج معادلات تركيبيه استكشافية.

**النتائج:** تألف النموذج المكون من 21 بنداً من ثلاثة عوامل (صنع القرار، وحرية التنقل، والمواقف إزاء الدور الجندري)، والتي توافقت مع واحد من مجالات تمكين المرأة سبق وأن وُضعت له نظرية. وظهرت علاقة ارتباطية إيجابية بين العوامل الثلاثة، ما يدعم تمكين المرأة باعتباره مفهوماً متعدد الأبعاد ومحدد السياق. وكانت العلاقة الارتباطية الأقوى بين صنع القرار وحرية التنقل (0,410)، يتبعها العلاقة الارتباطية بين حرية التنقل والمواقف إزاء الدور الجندري (0,307)؛ بينما كانت العلاقة الارتباطية الأضعف بين صنع القرار والمواقف إزاء الدور الجندري (0,211). وبالرغم من وضع افتراض بوجود علاقة ارتباط إيجابية بين عمر المرأة وكل مجال من المجالات الثلاثة على حدة، فقد كان صنع القرار هو العامل الأوضح الذي ارتبط بصورة جوهرية وإيجابية بعمر المرأة.

**الاستنتاج:** توحى أوجه التشابه بين البنود المستخدمة هنا والمستخدمة في دراسة أخرى جرت على المستوى الوطني بأن تلك المؤشرات يمكن استخدامها في سياقات مصرية عديدة لرصد التقدم المحرز بشأن الهدف الخامس من أهداف التنمية المستدامة المتعلقة بتمكين المرأة والفتيات، وكذلك تقييم الأثر المترتب على السياسات والبرامج في هذا المضمار. وينبغي على الأبحاث القادمة البناء على هذه النتائج من أجل تحديد أفضل المؤشرات القابلة للملاحظة حول تمكين المرأة في مصر وفي غيرها من البلدان.

## References

1. Kabeer N. Resources, agency, achievements: reflections on the measurement of women's empowerment. *Dev Change*. 1999;30(3):435–64. <http://doi.org/10.1111/1467-7660.00125>
2. Kishor S. *Autonomy and Egyptian women: Findings from the 1988 Egypt Demographic and Health Survey*. Calverton, Maryland: Macro International; 1995.
3. Malhotra A, Schuler SR. Women's empowerment as a variable in international development. In: Narayan D, editor. *Measuring empowerment: cross-disciplinary perspectives*. Washington (DC): World Bank; 2005:71–88.
4. Mason KO. The status of women: conceptual and methodological issues in demographic studies. *Sociol Forum*. 1986;1:284–300. <http://doi.org/10.2307/684447>
5. Salem R, Cheong YF, Yount KM. Is women's work a pathway to their agency in rural Minya, Egypt? *Soc Indic Res*. 2018;136(2):807–31. <http://doi.org/10.1007/s11205-017-1573-9>
6. Yount KM, VanderEnde KE, Dodell S, Cheong YF. Measurement of women's agency in Egypt: a national validation study. *Soc Indic Res*. 2016;128(3):1171–92. <http://doi.org/10.1007/s11205-015-1074-7>
7. Bogale B, Wondafrash M, Tilahun T, Girma E. Married women's decision making power on modern contraceptive use in urban and rural southern Ethiopia. *BMC Public Health*. 2011;11(1):342–9. <http://doi.org/10.1186/1471-2458-11-342>
8. Leon FR. Predicting contraceptive use from an egalitarian model of women's overall household power vis-a-vis conventional power models and third variables. *J Biosoc Sci*. 2013;45(4):497–515. <http://doi.org/10.1017/S0021932012000624>
9. Smith LC, Ramakrishnan U, Ndiaye A, Haddad L, Martorell R. *The importance of women's status for child nutrition in developing countries*. Washington (DC): International Food Policy Research Institute; 2003.
10. Hossain MB, Phillips JF, Pence B. The effect of women's status on infant and child mortality in four rural areas of Bangladesh. *J Biosoc Sci*. 2007;39(3):355–66. <http://doi.org/10.1017/S002193200600143X>
11. Shroff M, Griffiths P, Adair L, Suchindran C, Bentley M. Maternal autonomy is inversely related to child stunting in Andhra Pradesh, India. *Matern Child Nutr*. 2009;5(1):64–74. <http://doi.org/10.1111/j.1740-8709.2008.00161.x>
12. Shroff M, Griffiths P, Suchindran C, Nagalla B, Vazir S, Bentley ME. Does maternal autonomy influence feeding practices and infant growth in rural India? *Soc Sci Med*. 2011;73(3):447–55. <http://doi.org/10.1016/j.socscimed.2011.05.040>
13. Sustainable Development Goal 5: achieve gender equality and empower all women and girls. New York: United Nations; 2019 (<https://sustainabledevelopment.un.org/sdg5>, accessed 14 January 2020).
14. Mogford, E. When status hurts: dimensions of women's status and domestic abuse in rural Northern India. *Violence Against Women*. 2011;17(7):835–57. <http://doi.org/10.1177/1077801211412545>



15. Smith SN, Fisher SD, Heath A. Opportunities and challenges in the expansion of cross-national survey research. *Int J Soc Res Methodol*. 2011;14(6):485–502. <http://doi.org/10.1080/13645579.2011.611386>
16. Nawar L, Lloyd C, Ibrahim B. Women's autonomy and gender roles in Egyptian families. In: Obermeyer CM, editor. *Family, gender, and population in the Middle East: policies in context*. Cairo: American University in Cairo Press; 1995:147–78.
17. Kantor P. Women's empowerment through home-based work: evidence from India. *Dev Change*. 2003;34(3):425–45. <http://doi.org/10.1111/1467-7660.00313>
18. Upadhyay UD, Hindin MJ. Do higher status and more autonomous women have longer birth intervals? Results from Cebu, Philippines. *Soc Sci Med*. 2005;60(11):2641–55. <http://doi.org/10.1016/j.socscimed.2004.11.032>
19. Miedema SS, Haardörfer R, Girard AW, Yount, KM. Women's empowerment in East Africa: development of a cross-country comparable measure. *World Dev*. 2018;110:453–64. <http://doi.org/10.1016/j.worlddev.2018.05.031>
20. Agarwala R, Lynch SM. Refining the measurement of women's autonomy: an international application of a multi-dimensional construct. *Soc Forces*. 2006;84(4):2077–98. <http://doi.org/10.1353/sof.2006.0079>
21. Ghuman SJ, Lee HJ, Smith HL. Measurement of women's autonomy according to women and their husbands: results from five Asian countries. *Soc Sci Res*. 2006;35(1):1–28. <http://doi.org/10.1016/j.ssresearch.2004.06.001>
22. Steele F, Goldstein H. A multilevel factor model for mixed binary and ordinal indicators of women's status. *Sociol Methods Res*. 2006;35(1):137–53. <http://doi.org/10.1177/0049124106289112>
23. Williams J. *Measuring gender and women's empowerment using confirmatory factor analysis*. Boulder (CO): Population Program, Institute of Behavioral Science, University of Colorado; 2005.
24. Koenig MA, Ahmed S, Hossain MB, Mozumder ABM. Women's status and domestic violence in rural Bangladesh: individual- and community-level effects. *Demography*. 2003;40(2):269–88. <http://doi.org/10.1353/dem.2003.0014>
25. Mistry R, Galal O, Lu M. Women's autonomy and pregnancy care in rural India: a contextual analysis. *Soc Sci Med*. 2009;69(6):926–33. <http://doi.org/10.1016/j.socscimed.2009.07.008>
26. Kandiyoti D. Bargaining with patriarchy. *Gend Soc*. 1988;2(3):274–90. <http://doi.org/10.1177/089124388002003004>
27. Yount KM. Women's family power and gender preference in Minya, Egypt. *J Marriage Fam*. 2005;67(2):410–28. <https://www.jstor.org/stable/3600278>
28. Kishor S. Empowerment of women in Egypt and links to the survival and health of their infants. In: Presser H, Sen G, editors. *Women's empowerment and demographic processes: moving beyond Cairo*. New York: Oxford University Press; 2000.
29. Yount KM, Zureick-Brown S, Salem R. Intimate partner violence and women's economic and non-economic activities in Minya, Egypt. *Demography*. 2014;51(3):1069–99. <http://doi.org/10.1007/s13524-014-0285-x>
30. Egypt human development report 2010. Youth in Egypt: building our future. Cairo: United Nations Development Programme, Institute for National Planning; 2010.
31. Kish L. A procedure for objective respondent selection within the household. *J Am Stat Assoc*. 1949;44(247):380–7. <http://doi.org/10.1080/01621459.1949.10483314>
32. Bandalos DL, Finney SJ. Factor analysis: exploratory and confirmatory. In: Hancock GR, Mueller RO, editors. *The reviewer's guide to quantitative methods in the social sciences*. New York: Routledge; 2010:93–114.
33. Muthén LK, Muthén BO. *Mplus user's guide*, 7th edition. Los Angeles (CA): Muthén & Muthén; 1998–2012.
34. Gaskin CJ, Happell B. On exploratory factor analysis: a review of recent evidence, an assessment of current practice, and recommendations for future use. *Int J Nurs Stud*. 2014;51(3):511–21. <http://doi.org/10.1016/j.ijnurstu.2013.10.005>
35. Fabrigar LR, Wegener DT. *Exploratory factor analysis*. New York (NY): Oxford University Press; 2012.
36. Yount KM, Crandall A, Cheong YF. Women's age at first marriage and long-term economic empowerment in Egypt. *World Dev*. 2018;102:124–34. <http://doi.org/10.1016/j.worlddev.2017.09.013>
37. Govindasamy P, Malhotra A. Women's position and family planning in Egypt. *Stud Fam Plann*. 1996;27(6):328–40.
38. El-Zanaty F, Way A. *Egypt demographic and health survey 2008*. Egypt: Ministry of Health and Population, El-Zanaty and Associates, ORC Macro International; 2009.
39. Ewerling F, Lynch JW, Victora CG, van Eerdewijk A, Tysler M, Barros AJD. The SWPER index for women's empowerment in Africa: development and validation of an index based on survey data. *Lancet Glob Health*. 2017;5(9):e916–23. [https://doi.org/10.1016/S2214-109X\(17\)30292-9](https://doi.org/10.1016/S2214-109X(17)30292-9)



# Explanatory social variables of under-5 mortality caused by injury in Isfahan Province, Islamic Republic of Iran

Zohre Hooshangi,<sup>1</sup> Shayesteh Salehi<sup>2</sup> and Mostafa Amini-Rarani<sup>3</sup>

<sup>1</sup>Social Determinants of Health Research Center, Isfahan University of Medical Sciences, Isfahan, Islamic Republic of Iran; <sup>2</sup>Community Health Research Center, Islamic Azad University, Isfahan (Khorasgan) branch, Isfahan, Islamic Republic of Iran. <sup>3</sup>Health Management and Economics Research Center, Isfahan University of Medical Sciences, Isfahan, Islamic Republic of Iran (Correspondence to: Mostafa Amini-Rarani: m.amini@mng.mui.ac.ir).

## Abstract

**Background:** Injuries are a major cause of disease, long-term disability and death. Injury-related damage accounts for 12% of the burden of disease worldwide. Recently, significant improvements in child health have been achieved in the Islamic Republic of Iran: under-5 mortality was reduced substantially from 1990 to 2013. Nevertheless, injury is still a significant cause of mortality in this age group.

**Aims:** Because of their vulnerability and the high rates of injury-related mortality among children under-5, this study aimed at investigating explanatory social variables of injury-related mortality.

**Methods:** The study was conducted using the Commission on Social Determinants of Health conceptual framework among children aged under-5 years in Isfahan Province. Using the national child mortality surveillance system 1433 under-5 mortalities during 2010–2015 were secondary analysed.

**Results:** We found 403 (28%) cases were related to injury. Most of the deaths occurred in 706 infants (49.2%), among boys (54.8%) and urban residents (78.9%). Multivariate logistic regression showed that mothers' low education level, age 1–5 years', living in a supportive centre and having financial problems increased the odds of under-5 mortality caused by injury (odds ratio > 1, *P*-value ≤ 0.05).

**Conclusion:** Considering the importance and impacts of social factors on injury-related mortality among children, health policy-makers should initially consider the social determinants of health approach in child health programmes to inform interventions aimed at reducing injury-related mortality.

Keywords: child mortality, injury, social determinants of health, Iran

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## Introduction

Today, injuries are one of the major concerns in public health in the category of noncommunicable disease (1); they are a major cause of disease, long-term disability and death in most countries (2). Injury-related conditions account for 12% of the burden of disease and for the high level of unintentional mortality at the global level (3). According to a 2014 World Health Organization report, injuries give rise to more than 5 million deaths annually, i.e. 9% of the world's deaths (4). Further, non-fatal consequences of injuries include hospitalization, temporary or permanent disability, and mental disorders (4).

Although injuries are viewed as a predictable phenomenon (5), they remain a growing problem in developing countries, and are forecast to be the second greatest cause of disability in these countries till 2020. Because of their physiological and developmental limitations and behavioural characteristics, children are one of the most vulnerable groups; injuries are common and have critical importance, especially in developing countries (6). Given their vulnerability to injuries (7) and the high rates of child injury mortality, childhood injuries are a major priority, as well as a public health

issue (8). Childhood injuries not only lead to high rates of mortality but also cause high rates of disability: thousands of children are condemned to spending the rest of their lives with disability (4). In addition to those who die from injuries each year, children who survive may require continuous rehabilitation care that affects all aspects of their life and their family's livelihood.

A 2010 study on assessing the cause of mortality in the Islamic Republic of Iran showed that unintentional injury-related mortalities and traffic-related mortalities accounted for 6.7 and 4.2% of under-5 mortalities respectively (9). Also, the most common causes of children mortality are: traffic accidents (43.0%), closure of the respiratory tract (10.7%), drowning (9.7%), burns (7.3%), and falls (6.8%) (10).

Globally, under-5 mortality was reduced from 90.6 to 42.5 per 1000 live births, and annual under-5 mortality rates were reduced from 12.7 million to 5.9 million in 2015 (11). In the Islamic Republic of Iran, trends show that during recent years, significant improvements have been achieved in child health. According to a 2014 report, under-5 mortality was reduced from 107 000 in 1990 to 25 000 in 2013 (12). Despite this substantial reduction, injury is still one of the significant causes of mortality in this age group.

Currently, health approaches are much wider and biomedical approaches to health and disease have shifted to social context approaches; special attention is also being paid to nonmedical determinants of health. Each of these, including the social determinants, has a significant effect on health, either directly or indirectly, so they are called “the causes of the causes” (13). That is, social determinants of health, such as income, education, occupation, nutrition, social class, the health system and so on, have an important impact on health or ill health. If these are overlooked, it is difficult to achieve the desired health goals and improve health system performance (14). Considering the importance and prevalence of injury-related mortality among children and the increasing trend worldwide (15), and given the role of social-related factors in the recognition, prevention and reduction of such mortality, the current study aimed at investigating the explanatory social variables of under-5 mortality caused by injury in Isfahan Province during 2010–2015.

## Methods

### Data

This study was a cross-sectional secondary analysis of data, which extracted the required data from the national child mortality surveillance system. All under-5 mortalities (1433) in Isfahan Province during 2010–2015 were analysed.

### Setting and population

Isfahan is one of the largest and most important cities in central Asia and is located in the centre of the Islamic Republic of Iran. According to the 2011 Iranian population and housing census, the population of the Isfahan Province is 4 879 312 (50.74% male, 49.26% female); approximately 4.16 million (85.4 %) reside in urban areas, 0.71 million (14.6%) in rural areas and the rest are residents of nomadic areas (16). The majority of men (90.70 %) and women (84.75 %) in the province are literate; around 3.6% of the population are foreigners, mostly from Afghanistan and Iraq.

### Definition of variables

Social variables for the current study were selected based on the Commission on Social Determinants of Health conceptual framework (17). This categorizes the factors that affect the distribution health and well-being in the society in three levels: socioeconomic and political context; structural determinants and socioeconomic status; and intermediary determinants. With regard to the availability of information, we analyzed the relationship between traffic and non-traffic injury-related mortality with certain structural factors, including mother's education, household's financial problems and nationality and certain intermediary factors including biological (age, sex and history of chronic diseases), living conditions, environmental (area of residence) and health system-related factors (physical access to medicine, laboratory,

radiology and ambulance services. Non-traffic injuries include: closure of respiratory tract, poisoning, falling, contact with electricity, drowning, burns, being hit with a hard object, and so on. The age variable was categorized into 3 groups: neonate (< 28 days), infant (< 1 year), and 1–5 years old. Data on household financial problems were collected through a question in the national child mortality surveillance system: households were asked whether or not they have had financial problems.

### Statistical analysis

Data were extracted, prepared and entered into STATA/SE, version 14. Then, data were analysed on 2 levels: descriptive (frequency and percent) and inferential (univariate and multivariate logistic regression). Since the outcome variable (under-5 mortality caused by injury) is binary (whether or not mortality is caused by injury), logistic regression was employed to calculate the odds ratio (OR) for the explanatory variables. To this end, first, univariate logistic regression between under-5 mortality caused by injury and each explanatory variable was calculated. Variables with a statistical significance level  $\leq 0.05$  were included in the multivariate logistic regression. To measure the fitness of the model and its forecasting power, the Pearson  $\chi^2$  test and the pseudo  $R^2$  were used.

### Ethical approval

This study received the required ethics approval from Islamic Azad University of Isfahan (Khorasgan branch) Research Ethics Committee with ethical code No: IR.IAU.NAJAFABAD.REC.1395.9.

## Results

Of the 1433 child mortalities in Isfahan in 2010–2015, 403 (28.1%) were injury-related (traffic and non-traffic) and 1030 (71.8%) were related to other factors. Most of the mothers, 599 (42.2%), had an education level under high school diploma; only 127 (9.4%) attended university (Table 1). The majority of deaths were among boys and infants. The majority of children were living in urban areas. Most of the children were living in 2-parent families, had physical access to medicine and diagnostics centres, were transferred by ambulance and did not have any chronic diseases.

During 2010–2015, the proportion of some causes of injury-related mortality was reduced and for some others it increased (Figure 1). Closure of the respiratory tract showed the highest reduction, 25.1%. However, despite an 8.5% reduction in traffic injuries, such incidents were still among the major causes of mortality. Among the others, drowning accounted for a 7.8% increase and falls for 2.6%.

The univariate logistic regression showed that the relationship between under-5 mortality caused by injury and all the structural and intermediary variables (except for nationality) was statistically significant ( $P$ -value < 0.05). Accordingly, nationality was excluded

**Table 1** Descriptive characteristics of children from the under-5 mortality records in Isfahan (n = 1433) (2010–2015)

Characteristic	No.	%
<b>Structural</b>		
<b>Maternal education</b>		
Illiterate	185	13.7
Below high school diploma	599	44.2
High school Diploma	440	32.5
University degree	127	9.4
<b>Household's financial problems</b>		
Yes	384	40.2
No	571	59.7
<b>Nationality</b>		
Iranian	1340	93.5
Foreign	93	6.4
<b>Intermediary</b>		
<b>Age</b>		
Neonate (< 28 days)	170	11.8
Infant (< 1 year)	706	49.2
1–5 years	557	38.8
<b>Sex</b>		
Male	786	54.8
Female	647	45.1
<b>History of chronic diseases</b>		
Yes	453	38.4
No	726	61.5
<b>Residence</b>		
Urban	1131	78.9
Rural	295	20.6
Nomadic	7	0.5
<b>Child's living status</b>		
Living with 2 parents	1250	87.2
Living with mother	91	6.3
Living with father	33	2.3
Living with relatives	18	1.2
Living in supportive centres	19	1.3
Other	22	1.5
<b>Physical access to medicine</b>		
Yes	713	65.3
No	379	34.7
<b>Physical access to laboratory or radiology</b>		
Yes	698	65.9
No	361	34.1
<b>Physical access to ambulance</b>		
Yes	720	65.0
No	385	35.0

in the multivariate logistic regression model. Table 2 shows the multivariate logistic regression as the final model between under-5 mortality caused by injury and the selected explanatory variables. The OR for injury-

related mortality in children of mothers with education less than diploma level was 2.01 compared with children of mothers with a university degree, i.e. education below diploma level among mothers doubled the odds of injury-related mortality in children. Having financial problems increased the odds of under-5 mortality caused by injury to 1.42.

For children aged 1–59 months, the OR was 1.87 compared with neonates (Table 2). The odds of mortality caused by injury was 1.38 times higher in boys than in girls. Chronic disease was a protective factor against injury-related mortality, i.e. children with a chronic disease were less likely (OR 0.7) to die from injury than children with no history of chronic disease. The OR for injury-related mortality was 0.06 for urban and 0.14 for rural areas, i.e. children living in nomadic areas had a much greater risk of mortality. Living with a single parent or with other relatives or growing up in care centres increased the odds of injury-related mortality (OR 1.17, 1.36 and 1.58, respectively), compared with situations where children live in a 2-parent family. Children who were not living with their either or both parents had a higher risk of injury-related mortality (Table 2). Physical access to medicine, laboratory/radiology and ambulance services reduced injury-related under-5 mortality (OR 0.14, 0.26 and 0.28 respectively).

To estimate goodness of fit, the Pearson  $\chi^2$  test was used. Our results showed that the explanatory variables we employed were highly illustrative of injury-related mortality. In the logistic regression, pseudo  $R^2$  showed that the explanatory variables explained 33% of variance variation for injury-related mortality.

## Discussion

Generally, our study showed that certain structural and intermediary factors were risk factors for under-5 mortality caused by injury. Other factors, including residence in an urban area, physical access to health care services and history of chronic disease, were protective.

The findings of the current study are, to some extent, both consistent and inconsistent with those of other studies. The odds of injury-related mortality in boys was 36% higher than in girls. Studies conducted in the Islamic Republic of Iran (18,19) and Egypt (20) have also shown that the proportion of deaths is higher in boys. In our study, children aged 1–5 years have higher odds ratio for death than neonates; conversely, in an Iranian study, children aged 1–11 months had the highest odds ratio for death (19). Our findings showed that the odds of injury-related mortality was higher in children living in a nomadic population than those living in urban and rural areas. It appears that factors such as lack of medical equipment and treatment facilities, insecure environment, inappropriate roads, high mobility and parents' unawareness have a role in the greater risk of injury-related mortality in nomadic populations. Delbarpoor et al. found that children living in rural areas had a higher risk of injury-related mortality (19). In Bangladesh, Chowdhury and Huda also showed

**Table 2 Multivariate logistic regression model between under-5 mortality caused by injury and selected explanatory variables, Isfahan (2010–2015)**

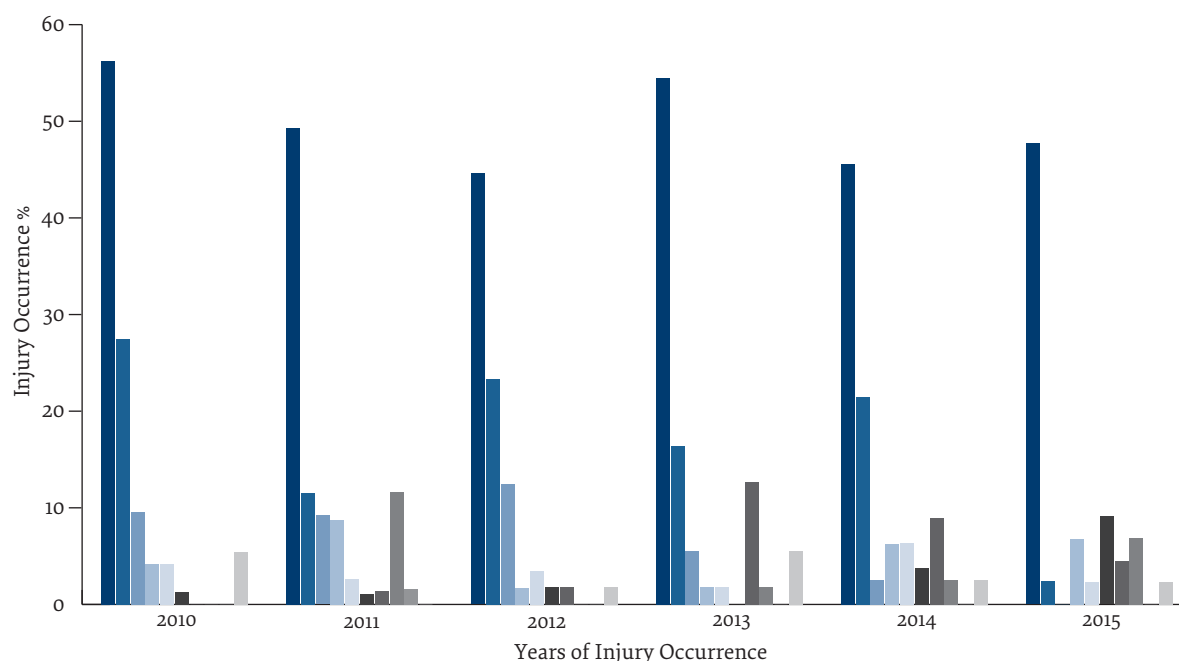
Characteristic	Coefficient	SE	OR	P-value	95% CI
<b>Structural</b>					
<b>Maternal education</b>					
Illiterate	0.243	0.563	1.27	0.186	0.412–3.450
Below high school diploma	0.702	0.458	2.01	0.012	1.831–4.563
High school diploma	0.522	0.456	1.68	0.252	0.685–4.125
University degree <sup>a</sup>	–	–	1	–	–
<b>Household's financial problems</b>					
Yes	0.427	0.269	1.42	0.012	1.093–2.141
No <sup>a</sup>	–	–	1	–	–
<b>Intermediary</b>					
<b>Age</b>					
Neonate <sup>a</sup> (< 28 days)	–	–	1	–	–
Infant (< 1 year)	0.454	0.525	1.35	0.512	0.554–4.350
1–5 years	0.735	0.510	1.87	< 0.001	1.45–5.416
<b>Sex</b>					
Male	0.322	0.254	1.38	0.024	1.152–2.254
Female <sup>a</sup>	–	–	1	–	–
<b>History of chronic disease</b>					
Yes	–0.652	0.384	0.07	< 0.001	0.032–0.146
No <sup>a</sup>	–	–	1	–	–
<b>Residence</b>					
Urban	–0.726	0.426	0.06	0.010	0.011–0.510
Rural	–0.537	0.284	0.14	0.018	0.019–0.646
Nomadic <sup>a</sup>	–	–	1	–	–
<b>Child's living status</b>					
Living with 2 parents <sup>a</sup>	–	–	1	–	–
Living with mother	0.151	0.116	1.17	< 0.001	0.392–3.263
Living with father and other relatives	0.478	0.347	1.36	< 0.001	0.094–4.575
Living in supportive centres and other places	0.562	0.422	1.58	< 0.001	0.424–2.613
<b>Physical access to medicine</b>					
Yes	0.445–	0.380	0.14	< 0.001	0.045–0.460
No <sup>a</sup>	–	–	1	–	–
<b>Physical access to laboratory or radiology</b>					
Yes	0.036–	0.025	0.26	0.026	0.022–0.779
No <sup>a</sup>	–	–	1	–	1
<b>Physical access to ambulance</b>					
Yes	0.317–	0.249	0.28	< 0.001	0.173–0.464
No <sup>a</sup>	–	–	1	–	–
<b>Coefficient of determination</b>			Pseudo R <sup>2</sup> = 0.330		
<b>Likelihood ratio</b>			$\chi^2$ = 223.00; P < 0.001		
<b>Pearson's goodness of fit test</b>			Pearson $\chi^2$ = 582.91; P < 0.001		

SE = standard error; OR = odds ratio; CI = confidence interval.

<sup>a</sup>Reference category.<sup>d</sup>Kruskal–Wallis test was used to compare differences for continuous variables and the Pearson chi-squared was used for categorical variables.

that under-5 mortality was higher in rural than in urban areas (21,22), which is consistent with our findings. It is worth noting that children living in urban areas are more exposed to traffic-related injury than those living in rural

areas or in a nomadic population, but at the same time they have better access to health care services. Therefore, despite the higher prevalence of traffic injuries among children living in urban areas, because of more access to

**Figure 1** Distribution of cause of death according to type of injury in children under-5 years in Isfahan (2010–2015)

Injury type	2010	2011	2012	2013	2014	2015
Traffic injury	56.2	49.3	44.6	54.5	45.6	47.7
Closure of respiratory tract	27.5	11.5	23.3	16.4	21.5	2.4
Poisoning	9.6	9.2	12.5	5.5	2.5	0
Falling	4.2	8.7	1.7	1.8	6.3	6.8
Contact with hot water	4.2	2.6	3.5	1.8	6.4	2.3
Drowning	1.3	1.1	1.8	0	3.8	9.1
Complications and misadventure	0	1.4	1.8	12.7	8.9	4.5
Collision with stationary object	0	11.6	0	1.8	2.5	6.9
Contact with electricity	0	1.6	0	0	0	0
Other injury factor	5.4	0	1.8	5.5	2.5	2.3

health care services, their chance of survival is higher.

Our results showed that children not living with both parents, had higher odds of injury-related mortality. It can be concluded that living with a single parent because of work pressures (23,24) or depression (25) reduces the protective power of the parent and therefore increases injury-related mortality.

Mother's education is one of the social determinants of injury-related mortality. As we observed, children whose mother's education was under diploma level had higher odds of injury-related mortality. Studies conducted in the Islamic Republic of Iran (18,19,26), India (27) and Sudan (28) showed that a higher level of education among mothers associated with a lower rate of injury-related mortality. It should be noted that mother's education, directly and indirectly, improves health, i.e. an educated mother, in comparison with an uneducated mother, is more aware of benefits of healthy behaviour and has greater knowledge, both of which affect a child's access to preventive and health care services (15).

The household's access to health care services (physical access to medicine, laboratory, radiology and ambulance) is among those social factors of health which directly affect injury-related mortality. In Nepal, Kravdal

showed that using health care services can reduce injury-related mortality among children (29). To explain this issue it can be said that as access to health care services and facilities improves, the opportunity to use them increases, which consequently prevents undesired health outcomes, including injury-related mortality.

This study showed that financial problems increase the odds of injury-related mortality. The findings of other studies conducted in the Islamic Republic of Iran (30–32), Bangladesh (22) Sudan (28) and the Czech Republic (33) are also consistent with our findings. Children living in wealthy families are likely to be healthier (physical, mental and social health) than those who are not. Income poverty, through poor access to health care services, food insecurity, inappropriate housing conditions, residence in disadvantaged areas, etc., negatively affect the health situation and result in high mortality.

In regard to the protective effect of having chronic disease on injury-related mortality, it is likely that, because of their physical, mental or developmental problems, children with chronic disease are more carefully protected by their parents and engage in physical activities less often. Thus, such children are less likely to be at risk of injury.



## Conclusion

As to the importance and effects of social factors on injury-related mortality in children, the social determinants of health approach needs to be taken into account in health policy-making for children. Specifically, more attention should be paid to education, household income, sex and children's

living status to reduce child injury-related mortality. This may be achieved through intersectoral collaboration.

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**Competing interests:** None declared.

## Variables sociales explicatives de la mortalité des moins de 5 ans due à des traumatismes dans la province d'Ispahan (République islamique d'Iran)

### Résumé

**Contexte :** Les traumatismes constituent une cause majeure de morbidité, d'incapacité à long terme et de mortalité. Les dommages liés aux traumatismes représentent 12 % de la charge de morbidité dans le monde. Récemment, des améliorations significatives en matière de la santé infanto-juvénile ont été réalisées en République islamique d'Iran : la mortalité des moins de 5 ans a considérablement diminué entre 1990 et 2013. Néanmoins, les traumatismes continuent d'être une cause majeure de mortalité pour ce groupe d'âge.

**Objectifs :** Du fait de la vulnérabilité des enfants de moins de 5 ans et des taux élevés de mortalité liée à des traumatismes dans ce groupe d'âge, la présente étude visait à examiner certaines variables sociales explicatives de la mortalité due à des traumatismes.

**Méthodes :** La présente étude a été menée selon le cadre conceptuel « Commission des déterminants sociaux de la santé » auprès d'enfants de moins de 5 ans dans la province d'Ispahan. Selon le système national de surveillance de la mortalité infanto-juvénile, 1 433 décès d'enfants de moins de 5 ans survenus entre 2010 et 2015 ont fait l'objet d'une analyse secondaire.

**Résultats :** Les résultats ont montré que 403 cas (28 %) étaient liés à un traumatisme. La plupart des décès concernaient des nourrissons (706, soit 49,2 %), des enfants de sexe masculin (54,8 %) et des citadins (78,9 %). L'analyse de régression logistique multivariée a montré que le faible niveau d'instruction des mères, l'âge compris entre 1 et 5 ans, le fait de vivre dans un centre de soutien et les problèmes financiers augmentaient le risque de mortalité due à des traumatismes chez les moins de 5 ans (odds ratio > 1,  $p \leq 0,05$ ).

**Conclusion :** Compte tenu de l'importance et de l'impact des facteurs sociaux sur la mortalité liée aux traumatismes chez les enfants, les responsables de l'élaboration des politiques de santé devraient initialement prendre en compte l'approche des déterminants sociaux de la santé dans les programmes de santé de l'enfant afin d'orienter les interventions visant à réduire cette mortalité.

## متغيرات اجتماعية تفسر وفيات الأطفال دون سن الخامسة الناجمة عن الإصابات في إقليم إصفهان، جمهورية إيران الإسلامية

زهره هوشنكي، شايسته صالحی، مصطفى أميني راراني

### الخلاصة

**الخلفية:** تُعدُّ الإصابات واحدة من الأسباب الرئيسية التي تؤدي إلى المرض، والإعاقة الممتدة الأجل، والوفاة. ويُعدُّ الضرر المرتبط بالإصابات مسؤولاً عن 12٪ من العبء الناجم عن المرض في العالم أجمع. وقد طرأت مؤخراً تحسينات ملحوظة على صحة الطفل في جمهورية إيران الإسلامية: فقد انخفضت وفيات الأطفال دون سن الخامسة بصورة جوهرية بين عامي 1990 و2013. وبالرغم من ذلك، فما زالت الإصابات سبباً رئيسياً للوفاة في صفوف الأطفال في تلك الفئة العمرية.

**الأهداف:** نظراً لشدة تأثير الأطفال دون سن الخامسة وارتفاع معدلات الوفاة الناجمة عن الإصابة بينهم، عمدت هذه الدراسة إلى استقصاء بعض المتغيرات الاجتماعية المختارة التي تفسر الوفيات الناجمة عن الإصابات.

**طرق البحث:** أُجريت الدراسة باستخدام الإطار المفاهيمي للجنة المعنية بالمحددات الاجتماعية للصحة في صفوف الأطفال دون سن الخامسة في إقليم إصفهان. وباستخدام نظام الترصد الوطني لوفيات الأطفال، أُجري تحليل ثانوي لوفيات بلغ عددها 1433 وفاة في صفوف الأطفال دون سن الخامسة في الفترة بين عامي 2010 و2015.

**النتائج:** توصل الباحثون إلى أن 403 حالة (28٪) اقترنت بإصابات. ووقعت معظم الوفيات بين 706 رضيعاً (2، 49٪) وبين الصبيان (8، 54)، والأطفال المقيمين في المناطق الحضرية (9، 78٪). وأظهر تحليل الانحدار اللوجستي المتعدد المتغيرات أن انخفاض المستوى التعليمي لدى أمهات

الأطفال الذين تتراوح أعمارهم بين سنة وخمس سنوات، واللواتي يعيشن في مراكز الدعم ويعانين من مشكلات مالية زاد من فرص حدوث وفيات الأطفال دون سن الخامسة جراء الإصابات ( $OR > 1, P \leq 0,05$ ).

**الاستنتاج:** بالنظر إلى أهمية العوامل الاجتماعية وتأثيراتها على حدوث الوفاة الناجمة عن الإصابات في صفوف الأطفال، يتعين على راسمي السياسات الصحية النظر مبدئياً في المحددات الاجتماعية للصحة في برامج صحة الطفل للاسترشاد بها في التدخلات الرامية إلى الحد من الوفيات الناجمة عن الإصابات.

## References

1. Vos T, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet*. 2017 Sep 16;390(10100):1211–59. doi:10.1016/S0140-6736(17)32154-2.
2. Sridharan L, Crandall M. Injury and health among children in vulnerable families. *J Trauma Acute Care Surg* 2011;1;70(6):1539–45. doi:10.1097/TA.0b013e3182190b94
3. Khazaei S, Mazharmanesh S, Khazaei Z, Goodarzi E, Mirmoini R, Mohammadian-Hafshejani A, et al. An epidemiological study on the incidence of accidents in the Hamadan province during 2009 to 2014. *Pajouhan Scientific J*. 2016;14(2).
4. Injuries and violence: the facts. Geneva: World Health Organization; 2014.
5. Amirzadeh F, Tabatabaiee SH. The incidence rate and causes of accidents among the students of Shiraz guidance schools. *J Kerman University of Medical Sciences*. 2007;14(1):55–60.
6. Peden M. World report on child injury prevention. Geneva: World Health Organization; 2008.
7. Esmaeili Z, Vaezzadeh N. Injury patterns in children under 15 years of natural disasters in the province 1999–2000. *J Mazandaran University of Medical Sciences*. 2001;10(29):1–7.
8. Thein M, Lee B, Bun P. Childhood injuries in Singapore: a community nationwide study. *Singapore Med J*. 2005;46(3):116–21. PMID:15735875
9. Child poverty in perspective: An overview of child well-being in rich countries. Florence: UNICEF Innocenti Research Centre; 2007 (Report Card 7).
10. Rashidian A, Khosravi A, Khabiri R, Khodayari-Moez E, Elahi E, Arab M, et al. Islamic Republic of Iran's multiple indicator demographic and health survey (IrMIDHS) 2010. Tehran: Ministry of Health and Medical Education; 2012:83–6.
11. Alkema L, Chou D, Hogan D, Zhang S, Moller A-B, Gemmill A, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *Lancet* 2016;387(10017):462–74. doi:10.1016/S0140-6736(15)00838-7
12. You D, Hug L, Chen Y. Levels and trends in child mortality: report 2014. New York: United Nations Children's Fund; 2014.
13. Marmot M. Status syndrome. *Significance*. 2004;1(4):150–4. <https://doi.org/10.1111/j.1740-9713.2004.00058.x>
14. De Camargo Jr KR. Closing the gap in a generation: health equity through action on the social determinants of health. *Global Public Health*. 2010;6(1):102–5. doi:10.1080/17441692.2010.514617
15. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012;380(9859):2224–60. doi:10.1016/S0140-6736(12)61766-8
16. The Statistical Report of the Islamic Republic of Iran. Tehran: Iranian Authority for General Department of Public Statistics and Statistical Center of Iran; 2011 ([https://nnt.sci.org.ir/sites/Apps/yearbook/Lists/year\\_book\\_req/Item/newifs.aspx](https://nnt.sci.org.ir/sites/Apps/yearbook/Lists/year_book_req/Item/newifs.aspx); accessed 28 July 2018)
17. Solar O, Irwin A. A conceptual framework for action on the social determinants of health. *Social Determinants of Health Discussion Paper 2 (Policy and Practice)*. Geneva: World health Organization; 2010.
18. Rahbar M, Ahmadi M, Lornejad H, Habibelahi A, Sanaei-Shoar T, Mesdeaghinia A. Mortality causes in children 1–59 months in Iran. *Iran J Public Health*. 2013;42(Suppl. 1):93.
19. Delbarpoor AS, Tajedini F, Ehdaievan F, Moghimi DB, Farsar AR, Torkaman NS. Review of injuries leading to death in children aged 1 to 59 months in the area covered by Shahid Beheshti University of Medical Sciences from March 2011–March 2013. *Safety Promot Inj Prev*. 2013;1(4):205–11.
20. Kamal NN. Home unintentional non-fatal injury among children under 5 years of age in a rural area, El Minia Governorate, Egypt. *J Community Health*. 2013;38(5):873–9. doi:10.1007/s10900-013-9692-y.
21. Chowdhury AH. Determinants of under-five mortality in Bangladesh. *Open J Stat*. 2013;3(03):213.
22. Huda TM, Tahsina T, Arifeen SE, Dibley MJ. The importance of intersectoral factors in promoting equity-oriented universal health coverage: a multilevel analysis of social determinants affecting neonatal infant and under-five mortality in Bangladesh. *Glob Health Action*. 2016;9(1):29741. doi:10.3402/gha.v9.29741
23. Perry-Jenkins M, Gillman S. Parental job experiences and children's well-being: The case of two-parent and single-mother working-class families. *J Fam Econ Issues*. 2000;21(2):123–47.

24. Reyes VS. The lived experiences of single Latina mothers and the multiple roles they manage [thesis]. Ann Arbor: Capella University; 2015.
25. Cairney J, Boyle M, Offord DR, Racine Y. Stress, social support and depression in single and married mothers. *Soc Psychiatry Psychiatr Epidemiol.* 2003;38(8):442–9. doi:10.1007/s00127-003-0661-0
26. Barak M, Sadeghieh Ahari S, Amani F, Asadi G, Rahimi G, Khadem E. Causatives and risk factors for deaths among infants under 1 year old in Ardabil slums during 2008–2009. *J Ardabil University of Medical Sciences.* 2012;12(5):40–7.
27. Singh A, Kumar A, Kumar A. Determinants of neonatal mortality in rural India, 2007–2008. *PeerJ.* 2013;1:e75. doi:10.7717/peerj.75
28. Mahfouz MS, Surur AA, Ajak DAA, Eldawi EA. Level and determinants of infant and child mortality in Malakal Town-southern Sudan. *Sudanese L Public Health.* 2009 Apr 1;4(2):250–5.
29. Kravdal Ø. Child mortality in India: Exploring the community-level effect of education. Oslo: Health Economics Research Programme, Oslo University; 2009.
30. Hasaniha M, Khodabandeloo M, Eskandari F, Mazloomzadeh S. Evaluation of socioeconomic factors in injured children at Mousavi and Valiasr hospitals of Zanjan. *Community Health.* 2016;2(3):165–71.
31. Rarani MA, Rashidian A, Khosravi A, Arab M, Abbasian E, Morasae EK. Changes in socio-economic inequality in neonatal mortality in Iran between 1995–2000 and 2005–2010: an Oaxaca decomposition analysis. *Int J Health Policy Manag.* 2017;6(4):219. doi:10.15171/ijhpm.2016.127
32. Sajjadi H, Vameghi M, Madani S. Social equity and health of children in Iran. *Social Welfare.* 2010;9(35):89–137.
33. Velemínský M, Průchová D, Vitošová A, Lavičková M, Stránský P. The relationship between family socioeconomic condition and childhood injury frequency in selected locations in the Czech Republic. *Med Sci Monit.* 2012;18(3):PH19–27. doi:10.12659/msm.882508

# Validation of the Arabic version of the Childhood Illness Attitudes Scales

Walid AlQerem<sup>1</sup>, Jonathan Ling<sup>2</sup> and Wassan Jarrar<sup>1</sup>

<sup>1</sup>Faculty of Pharmacy, Al-Zaytoonah Private University of Jordan, Amman, Jordan. <sup>2</sup>School of Nursing and Health Sciences, University of Sunderland, Sunderland, United Kingdom (Correspondence to: W. AlQerem: waleed.qirim@zuj.edu.jo).

## Abstract

**Background:** Excessive health anxiety can lead to significant disorders such as hypochondriasis. In children, assessment of the severity of health anxiety has been performed using the Childhood Illness Attitudes Scales (CIAS); however, no validated Arabic version of this tool exists.

**Aims:** This study developed and validated an Arabic version of the CIAS questionnaire in Jordan in 2017 to provide a tool to measure the severity of health anxiety in the Arabic-speaking world.

**Methods:** The CIAS was translated from English to Arabic then back-translated by a different translator and the 2 versions were compared before cognitive interviews were conducted. The final version of the questionnaire was circulated to 597 children. Of these, 200 were asked to retake the questionnaire after 10–15 days to evaluate test–retest reliability. Confirmatory factor analysis (CFA) on the 4-factor model suggested by the original questionnaire version was performed. Internal consistency and test–retest reliability were evaluated.

**Results:** The CFA showed good fit (goodness of fit index = 0.92) with the 4-factor model of fears, help seeking, treatment experience, and symptom effects. Test–retest reliability was high and the model had good discriminant validity and internal consistency.

**Conclusions:** The Arabic version of the CIAS provides a suitable tool to investigate the prevalence and severity of childhood anxiety in the Middle East.

Keywords: Arabic, Childhood Illness Attitudes Scales, confirmatory factor analysis, health anxiety, Jordan

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## Introduction

Health anxiety is an experience that we undergo when we misinterpret benign bodily sensations as being indicative of having a serious disease (1). The severity of this experience differs among individuals (2). Mild, occasional health anxiety is normal as it motivates one to seek clinical assistance when experiencing ambiguous bodily changes; such sensations usually soon fade away when medical staff give reassurance that there is no serious disease (1). Being convinced of having a serious disease despite medical reassurance of having good health is a feature of excessive health anxiety. Severe health anxiety can lead to clinically significant disorders such as hypochondriasis, disease phobia (3–5) and panic attacks (5). Sometimes, severe health anxiety can interfere with daily activities such as schoolwork (6) or social activities (7). Health anxiety can also lead to overutilization of healthcare services and therefore increase healthcare costs (8). Somatization accounts for 15–20% of yearly healthcare expenditure in the United States of America (9). This includes the cost of emergency room visits, hospitalization, unnecessary diagnostic expenses, and invasive procedures (10).

The prevalence of excessive health anxiety has been assessed in several studies. Most of these studies

concentrated on assessing the severity of health anxiety in adults or adolescents (11,12). Few studies have focused on children, and although some work has shown that children might experience fears related to health issues or death (13,14), the prevalence of such health anxiety conditions in children is not well understood (15,16). However, some studies estimated that the prevalence of health anxiety in primary care paediatric settings was 25–50% of visits (17) and was more common in girls (7).

Although it has been shown that frequencies of illness anxiety disorder are similar across countries and cultures (18), the prevalence of the condition in Jordan has not yet been evaluated, or its burden on the health sector. Thus, adaptation of a validated tool to measure the prevalence and burden of health anxiety is urgently required.

In order to apply treatments that are available for excessive health anxiety, an assessment of the severity and prevalence of such health anxiety conditions should be performed. Such assessment of the severity of health anxiety can be performed using questionnaires such as the Illness Attitudes Scales (IAS) (19). In previous work, assessment of the severity of health anxiety was performed in Canadian children aged 8–15 years, using the Childhood Illness Attitude Scales (CIAS), a simplified



form of the IAS adapted to suit school-aged children (15,16). The CIAS measures fears, beliefs and attitudes associated with health anxiety and abnormal illness behaviour in childhood.

The aim of this study was to develop an Arabic version of the CIAS and to examine its validity in a large sample of schoolchildren aged 10–16 years in Jordan. The validated questionnaire can then be applied to different parts of the Arabic-speaking world throughout the Middle East and North Africa. This Arabic version of the CIAS will allow researchers and health authorities to examine childhood health anxiety and develop an understanding of potential solutions, in regions where this was hitherto impossible. Furthermore, given comparable psychometric properties, this Arabic version will also allow researchers to make comparisons with data collected using the original English version of the CIAS from other regions.

## Methods

### Participants

The original sample included 310 boys and 347 girls aged 10–16 years from 2 schools in Amman, Jordan. Of these, 60 children participated in cognitive interviews, with the remaining 597 completing the questionnaire. The mean age of the participants was 13.55 (standard deviation 2.02) years. The principals of the 2 schools were approached to obtain their approval. We circulated the parental consent form to the children with the help of teachers who agreed to participate. All children who returned a signed consent form and completed the questionnaire were included in the study. Ethical approval for the research was obtained from Al-Zaytoonah University Research Ethics Committee.

### CIAS

The CIAS (16) is a 35-item self-report questionnaire (Appendix 1) that was formulated based on the IAS questionnaire (19). The CIAS uses simplified words and phrases to be more suitable for children. The appropriateness and clearness of the simplified questions were confirmed in a pilot study that interviewed children and received their feedback (16). The questionnaire was validated by evaluating the correlations between CIAS total scores obtained from 200 children and other self-report measures including Fear Survey Schedule for Children-Revised (20), Childhood Anxiety Sensitivity Index (21) and Children's Depression Inventory (22). The CIAS contains 4 factors that explore fears, help seeking, treatment experience and symptom effects, and these were confirmed by applying exploratory factor analysis (EFA) (15).

Thirty-three items of the questionnaire were rated on a 3-point Likert scale (1 = none of the time, 2 = sometimes, 3 = a lot of the time). Items 29–31 measured the frequency of various treatment experiences (1 = 0 times, 2 = 1 or 2 times, 3 =  $\geq 3$  times). Thirty-three of the 35 items were used in scoring while the remaining 2 questions were open ended and provided additional information about the patients' medical history.

### Data collection

The CIAS was translated from English to Arabic then back-translated by a different translator, and the 2 versions were compared. A school was approached in Amman to obtain data. Initially, 60 cognitive interviews were conducted with 60 children aged 9–16 years after obtaining their parents' approval, and confirming that all questions were clear and could be understood by the children. The translated questionnaire is shown in Appendix 2. A parental consent form was circulated to an additional 680 children and 597 parents' approved that their children's participation in the study. Of the 597 children, 200 were asked to retake the questionnaire after 10–15 days.

Several methods for determining the appropriate sample size for conducting a confirmatory factor analysis (CFA) and EFA have been proposed. However, Myers et al. (23) found that data from 500 individuals provide sufficient power for 99.9% of samples. Therefore, we aimed to collect data from at least 500 participants.

### Statistical analysis

The items were treated as ordinals and the normality of scores on each subscale of each model was assessed by calculating kurtosis values. Normality was assumed when kurtosis was between  $-2$  and  $+2$  (24).

The suitability of the data for factor analysis was evaluated using the Kaiser–Meyer–Olkin value and Bartlett's Test of Sphericity. CFA on the 4-factor model was conducted using AMOS version 22 and SPSS version 20. Item loadings were examined and goodness of fit evaluated by calculating minimum discrepancy (CMIN/DF), goodness of fit index (GFI), Tucker–Lewis index (TLI), comparative fit index (CFI) and root mean square error of approximation (RMSEA). Acceptable values are  $< 5$  for CMIN/DF,  $< 0.05$  for RMSEA and  $> 0.9$  for GFI, CFI and TLI (25). A cutoff of 0.3 was used to determine if items loaded on a factor, and the correlations between the factors were evaluated using Pearson's correlation to examine discriminant validity.

EFA was conducted using principal-components analysis to evaluate a suitable model for the data after determining that the 4-factor model that included 33 items was unsuitable for our data. To determine the appropriate number of factors to extract, parallel analysis (Eigenvalue Monte Carlo Simulation) was conducted using O'Connor's SPSS syntax (26), and scree plots.

A pattern matrix was generated using oblimin rotation, which was chosen because the correlation between factors 1 and 4 exceeded the cutoff point of 0.32 ( $r = 0.35$ ). Any communality below 0.4 was excluded. The factor correlation matrix was evaluated to determine discriminant validity. Internal consistency for each subscale was evaluated by calculating Cronbach's  $\alpha$  and the final model was re-evaluated using CFA with the maximum likelihood method. Finally, test–retest reliability was measured using Pearson's correlation.

The ceiling and floor effects were evaluated by calculating the percentage of participants that had

the highest or lowest possible scores; the effect was considered present when the subjects that achieved these scores exceeded 15% (27).

## Results

The Kaiser–Meyer–Olkin test result was 0.9 and Bartlett's Test of Sphericity was significant [ $\chi^2$  (496) = 18 145.56,  $P < 0.01$ ], which indicated the suitability of the data for factor analysis. When examining the communalities, Item 8 (Do you try not to have habits that may be bad for you?) and Item 15 (When your doctor tells you that you are not sick, do you not believe him/her?) had low communality ( $< 0.2$ ) and were excluded from the analysis. EFA was rerun after excluding Items 8 and 15. Scree plots were examined and suggested 4 factors (Figure 1); as four eigenvalues are present left of the “elbow” of the graph.

The 4-factor model was confirmed when conducting parallel analysis. The 4-factor model included fears, help seeking, treatment experience and symptom effects. The communalities of the items included in the 4-factor model were all  $> 0.4$  (Table 1) and the lowest loading was 0.65 (Item 3 in the Fear subscale: Does the thought of being sick scare you? (Table 2). Cronbach's  $\alpha$  values were examined and the lowest was 0.85 for treatment experience. Removing any further items would not improve the reliability. Subscale names, item numbers, factor loadings, communalities, and Cronbach's  $\alpha$ , means, standard deviations and kurtosis for the 4-factor model are shown in Tables 1 and 2. Cronbach's  $\alpha$  indicated good internal consistency. Correlations between the 4 factors were examined using Pearson correlations and all were low, which indicated good discriminant validity. The kurtosis for the 4 subscales was between  $-2$  and  $2$ , which indicated normality.

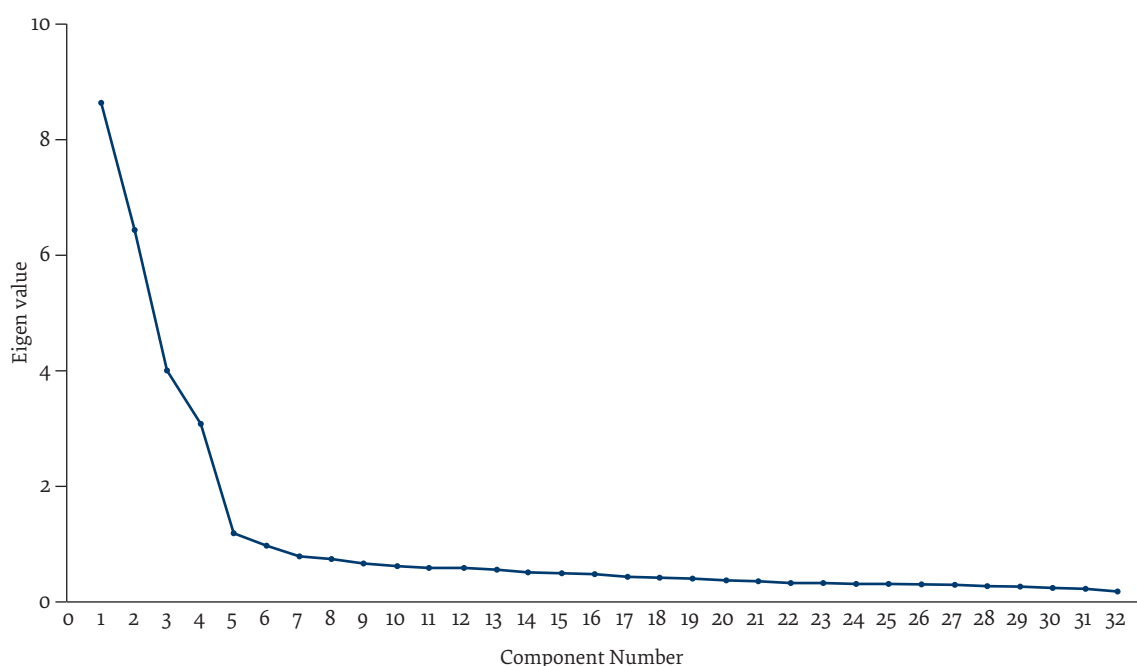
CFA of the suggested 4-factor model including the 31 remaining items with 5-error covariance in the same factors yielded acceptable model fit indicators (CMIN/DF = 2.58, GFI = 0.9, CFI = 0.96, TLI = 0.96 and RMSEA = 0.049). Test–retest reliability was tested by Pearson's correlations and all the items were highly correlated (all  $> 0.7$ , with most  $> 0.8$ ).

The ceiling and floor effects were evaluated by calculating the percentage of subjects that had the highest or lowest possible scores, and none of the factors exceeded the 15% cutoff point (27).

## Discussion

This study formulated and validated an Arabic form of the CIAS Questionnaire (16). The results of the EFA resembled the original 4-factor model suggested by Wright et al. (15). These factors consist of fear of illness, death, disease and pain, and help seeking that evaluated seeking treatment and avoiding unhealthy foods, symptom effects and treatment experience that were present in the original IAS study (19). Symptom effects measure the troublesome effects of symptoms on daily activity. However, there were some differences between the Arabic version of the CIAS and the English version of Wright et al.: Items 11, 15 and 25 had loading issues in their designated factor in the study of Wright et al. and therefore were excluded from the model. We included treatment experience (Items 11 and 15) and symptom effects (Item 25) in our final model. We excluded Item 8 because of low communalities, although Wright et al. found this item loaded on the factor treatment experience, so it was removed in the final model to improve reliability. This was reasonable considering that Item 8 (Do you try not to have habits that may be bad for you?)

Figure 1 Scree plot results indicating 4 eigenvalues left to the “elbow” of the graph



**Table 1 CIAS subscale names, item numbers, communalities, and Cronbach's  $\alpha$ , means, SD and kurtosis for the 4-factor model.**

Subscale (Item nos.)	Communalities min–max	Cronbach's $\alpha$	Mean (SD)	Kurtosis
Fear (1–4, 7, 16–23)	0.45–0.83	0.96	2 (0.638)	–1.27
Help seeking (5, 6, 9, 10, 12–14, 26, 27)	0.62–0.79	0.95	2.04 (0.689)	–1.38
Symptom effects (24, 25, 33–35)	0.66–0.89	0.92	2.01 (0.641)	–0.88
Treatment experience (11, 15, 29–31)	0.56–0.7	0.85	2.02 (0.637)	–0.99

**Table 2 The final model factors' loadings, item-total correlations, Cronbach's  $\alpha$  if items deleted**

Questions	Factor loadings	Corrected item- total correlation	Cronbach's $\alpha$ if item deleted
<b>Fear</b>			
Q1: Do you worry about your health?	0.72	0.67	0.96
Q2: Are you worried that you might get really sick in the future?	0.89	0.87	0.95
Q3: Does the thought of being sick scare you?	0.66	0.62	0.96
Q4: If you have pain, do you worry that it may be caused by a bad sickness?	0.91	0.89	0.95
Q7: If pain lasts for a week or more, do you believe that you have a bad sickness?	0.82	0.78	0.95
Q16: If a doctor tells you what he/she found, do you soon begin to believe that you might have another sickness?	0.83	0.79	0.95
Q17: Are you afraid of news that reminds you of death?	0.83	0.80	0.95
Q18: Does the thought of dying scare you?	0.76	0.73	0.95
Q19: Are you afraid that you might die soon?	0.88	0.85	0.95
Q20: Are you afraid that you might have cancer?	0.74	0.71	0.96
Q21: Are you afraid that you have something wrong with your heart?	0.83	0.79	0.95
Q22: Are you afraid that you have another bad sickness?	0.77	0.73	0.95
Q23: When you read or hear about a sickness, do you think that you might have that sickness?	0.90	0.87	0.95
<b>Help seeking</b>			
Q5: If pain lasts for a week or more, do you tell your mom or dad?	0.79	0.73	0.95
Q6: If pain lasts for a week or more, do you ask your mom or dad if you can go to the doctor?	0.80	0.75	0.95
Q9: Do you try not to eat foods that may not be good for you (such as junk food)?	0.87	0.83	0.94
Q10: Do you check your body to find out if there is something wrong?	0.86	0.81	0.94
Q12: When you feel sick, do you tell your mom or dad?	0.85	0.81	0.94
Q13: When you feel sick, do you ask your mom or dad if you can go to the doctor?	0.87	0.83	0.94
Q14: Do you ask your mom or dad for medicine?	0.89	0.85	0.94
Q26: When you have a strange feeling in your body, do you tell your mom or dad?	0.85	0.81	0.94
Q27: When you have a strange feeling in your body, do you ask your mom or dad if you can go to the doctor?	0.82	0.77	0.95
<b>Symptoms effects</b>			
Q24: When you have a strange feeling in your body, do you find it hard to think about something else?	0.82	0.72	0.91
Q25: When you have a strange feeling in your body, do you worry about it?	0.88	0.81	0.89
Q33: Do strange feelings in your body stop you from going to school?	0.81	0.71	0.91
Q34: Do strange feelings in your body stop you from enjoying yourself?	0.94	0.90	0.88
Q35: Do strange feelings in your body stop you from keeping your mind on what you are doing?	0.88	0.80	0.90
<b>Treatment experience</b>			
Q11: Do you believe that you are really sick, but the doctors do not know why?	0.84	0.71	0.81
Q15: When your doctor tells you that you are not sick, do you not believe him/her?	0.74	0.61	0.83
Q29: How many times have you seen your doctor in the last year?	0.78	0.64	0.83
Q30: How many doctors have you seen in the past year?	0.79	0.68	0.82
Q31: How often have you been treated (had to take medicine or had surgery) during the past year?	0.81	0.67	0.82

asks about habits rather than previous experience with doctors, unlike the remaining items in this factor. Cultural differences may lie behind these differences found between our study and Wright et al., in addition to design differences including a substantially larger sample size. Furthermore, we performed cognitive interviews to ensure that the questions were clear for children. We believe that the questions were clear because we found high internal consistency and test-retest reliability.

Future work may include confirming diagnostic credibility of the Arabic version of the CIAS by evaluating the scores of children with confirmed diagnoses of health anxiety or hypochondriasis and comparing them to a control group. This could address a limitation found in this study, which is not evaluating the scores of the Arabic version of the CIAS for different health conditions.

Different studies with adults have confirmed that there are correlations between different medical conditions and health anxiety including, for example, chronic pain (28) and cardiovascular disease (29). Therefore, the Arabic version of CIAS can be used to measure health anxiety in different diseases.

Evaluating health anxiety could also be important when treating different health conditions. For example, it has been shown that patients with high health anxiety react differently to pain when compared to patients with low health anxiety (30). This is manifested in differences in pain appraisal, pain preoccupation, coping strategies, self-identity, and suicidal ideation. In addition, patients with health anxiety may fail to engage in protective strategies (31), which may have an impact on the success of management of their condition. Therefore, using the

Arabic version of CIAS could help in the management of different diseases and future work may include measuring the benefit of detection and management of health anxiety when managing different conditions. As this tool can be used for screening different patients, particularly those who are reporting contradicting symptoms, this could save healthcare costs.

Finally, the Arabic version of the CIAS can be used to compare the prevalence of health-related anxiety in Arabic-speaking countries, which has hitherto not been possible. It will also now be possible to make comparisons between health-related anxiety with data collected using the English language version of the scale.

A limitation of this study was that the children enrolled were only from schools from Amman. However, Amman is the largest city in Jordan; almost half of the Jordanian population lives there (4 million inhabitants) (32), and many come from different parts of the country for work, which makes Amman a good representation of Jordan.

## Conclusion

This validated Arabic version of the CIAS questionnaire (15) could be used to evaluate health anxiety in children by examining the overall scores and the scores of the different subscales, which could aid in diagnosis and management of health anxiety in children across the Arabic-speaking world.

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**Competing interests:** None declared.

## Validation de la version arabe de l'échelle d'attitude à l'égard de la maladie chez l'enfant

### Résumé

**Contexte :** Une anxiété excessive en matière de santé peut entraîner des troubles importants tels que l'hypochondrie. Chez l'enfant, l'évaluation de la gravité de l'anxiété liée à la santé a été réalisée à l'aide de l'échelle d'attitude à l'égard de la maladie chez l'enfant ; cependant, aucune version arabe validée de cet outil n'existe.

**Objectifs :** La présente étude a mis au point et a validé une version arabe du questionnaire des échelles d'attitude à l'égard de la maladie chez l'enfant en Jordanie en 2017 afin de fournir un outil permettant de mesurer la gravité de l'anxiété liée à la santé dans le monde arabophone.

**Méthodes :** Le questionnaire susmentionné a été traduit de l'anglais vers l'arabe. Il a ensuite fait l'objet d'une rétro-translation par un autre traducteur et les deux versions ont été comparées avant la réalisation des entretiens cognitifs. La version finale du questionnaire a été distribuée à 597 enfants. Parmi ceux-ci, 200 ont été invités à répondre de nouveau au questionnaire après 10 à 15 jours pour évaluer la fiabilité test-retest. Une analyse factorielle confirmatoire sur le modèle à quatre facteurs basé sur la version originale du questionnaire a été réalisée. La cohérence interne et la fidélité test-retest ont été évaluées.

**Résultats :** L'analyse factorielle confirmatoire a montré un bon ajustement (indice d'ajustement = 0,92) avec le modèle à quatre facteurs des peurs, de la recherche d'aide, de l'expérience du traitement et des effets des symptômes. La fiabilité test-retest était élevée et le modèle avait une bonne validité discriminante et une bonne cohérence interne.

**Conclusions :** La version arabe de l'Échelle d'attitude à l'égard de la maladie chez l'enfant fournit un outil approprié pour enquêter sur la prévalence et la gravité de l'anxiété infantile au Moyen-Orient.



## التحقق من موثوقية النسخة العربية لمقاييس اتجاهات أمراض الطفولة

وليد الكريم، جوناثان لينج، واسان جرار

### الخلاصة

الخلفية: يمكن أن يؤدي القلق الصحي المفرط إلى اضطرابات كبيرة مثل التوهم المرضي. أجري، في الأطفال، تقييم لشدة القلق الصحي بمقاييس اتجاهات أمراض الطفولة؛ مع أنه لا تتوفر نسخة عربية مصدق عليها لهذه الأداة.

الأهداف: هدفت هذه الدراسة إلى إعداد نسخة عربية لاستبيان حول مقاييس اتجاهات أمراض الطفولة في الأردن في عام 2017، وأثبتت موثوقيتها كأداة لقياس شدة القلق الصحي في العالم العربي.

طرق البحث: تُرجم استبيان مقاييس اتجاهات أمراض الطفولة من الإنجليزية إلى العربية، ثم أعيدت ترجمتها من مترجم مختلف وقورنت النسختان قبل إجراء المقابلات المعرفية. وُعُمِّمت الصيغة النهائية للاستبيان على 597 طفلاً. وطلب من 200 طفل منهم إعادة الاستبيان بعد 10-15 يومًا لتقييم موثوقية الاختبار - وإعادة الاختبار. أُجري تحليل عامل التأكيد على نموذج العوامل الأربعة المقترحة في الإصدار الأصلي للاستبيان. قِيم الاتساق الداخلي وموثوقية الاختبار - وإعادة الاختبار.

النتائج: أظهر تحليل عامل التأكيد توافقًا جيدًا (مؤشر جودة الملاءمة = 0,92) مع نموذج مكون من أربعة عوامل من المخاوف، والمساعدة في البحث، وتجربة العلاج، وتأثيرات الأعراض. كانت موثوقية الاختبار - وإعادة الاختبار عالية وكان للنموذج صلاحية تمييز جيدة وتناسق داخلي.

الاستنتاجات: تعد النسخة العربية من «استبيان مقاييس اتجاهات أمراض الطفولة» أداة مناسبة لاستقصاء انتشار قلق الطفولة وشدها في الشرق الأوسط.

## References

1. Asmundson GJG, Abramowitz JS, Richter AA, Whedon M. Health anxiety: current perspectives and future directions. *Curr Psychiatry Rep.* 2010 Aug;12(4):306-12. <http://dx.doi.org/10.1007/s11920-010-0123-9> PMID:20549396
2. Taylor S, Asmundson GJ. Etiology of hypochondriasis: a preliminary behavioral-genetic investigation. *Int J Genet Gene Ther.* 2012;2:1-5. <http://dx.doi.org/10.5348/ijgg-2011-1-SR-1>
3. Barsky AJ, Klerman GL. Overview: hypochondriasis, bodily complaints, and somatic styles. *Am J Psychiatry.* 1983 Mar;140(3):273-83. <http://dx.doi.org/10.1176/ajp.140.3.273> PMID:6338747
4. Salkovskis PM, Warwick HMC. Morbid preoccupations, health anxiety and reassurance: a cognitive-behavioural approach to hypochondriasis. *Behav Res Ther.* 1986;24(5):597-602. [http://dx.doi.org/10.1016/0005-7967\(86\)90041-0](http://dx.doi.org/10.1016/0005-7967(86)90041-0) PMID:3753387
5. Deacon BJ, Abramowitz JS. Is hypochondriasis related to obsessive-compulsive disorder, panic disorder, or both? An empirical evaluation. *J Cogn Psychother.* 2008;22(2):115-27. <http://dx.doi.org/10.1891/0889-8391.22.2.115> PMID:3753387
6. Austin JK, Smith MS, Risinger MW, McNelis AM. Childhood epilepsy and asthma: comparison of quality of life. *Epilepsia.* 1994 May-Jun;35(3):608-15. PMID:8026407
7. Fritz GK, Fritsch S, Hagino O. Somatoform disorders in children and adolescents: a review of the past 10 years. *J Am Acad Child Adolesc Psychiatry.* 1997 Oct;36(10):1329-38. <http://dx.doi.org/10.1097/00004583-199710000-00014> PMID:9334545
8. Puri PR, Dimsdale JE. Healthcare utilization and poor reassurance: potential predictors of somatoform disorders. *Psychiatr Clin North Am.* 2011 Sep;34(3):525-44. <http://dx.doi.org/10.1016/j.psc.2011.05.011> PMID:21889677
9. Houtveen JH, van Broeckhuysen-Kloth S, Lintmeijer LL, Bühring MEF, Geenen R. Intensive multidisciplinary treatment of severe somatoform disorder. *J Nerv Ment Dis.* 2015 Feb;203(2):141-8. <http://dx.doi.org/10.1097/NMD.0000000000000250> PMID:25594786
10. Ibeziako P, Bujoreanu S. Approach to psychosomatic illness in adolescents. *Curr Opin Pediatr.* 2011 Aug;23(4):384-9. <http://dx.doi.org/10.1097/MOP.0b013e3283483f1c> PMID:21670681
11. Weck F, Bleichhardt G, Hiller W. The factor structure of the illness attitude scales in a German population. *Int J Behav Med.* 2009;16(2):164-71. <http://dx.doi.org/10.1007/s12529-009-9043-7> PMID:19319692
12. Eminson M, Benjamin S, Shortall A, Woods T, Faragher B. Physical symptoms and illness attitudes in adolescents: an epidemiological study. *J Child Psychol Psychiatry Allied Discip.* 1996 Jul;37(5):519-28. <http://dx.doi.org/10.1111/j.1469-7610.1996.tb01438.x> PMID:8807432
13. Muris P, Merckelbach H, Mayer B, Prins E. How serious are common childhood fears? *Behav Res Ther.* 2000 Mar;38(3):217-28. PMID:10665156
14. Muris P, Merckelbach H, Gadet BMV. Fears, worries, and scary dreams in 4- to 12-year-old children: their content, developmental pattern, and origins. *J Clin Child Psychol.* 2000 Mar;29(1):43-52. [http://dx.doi.org/10.1207/S15374424jccp2901\\_5](http://dx.doi.org/10.1207/S15374424jccp2901_5) PMID:10693031
15. Wright KD, Asmundson GJG. Brief report: factor structure of the Childhood Illness Attitude Scales (CIAS). *J Pediatr Psychol.* 2005 Mar;30(2):213-8. <http://dx.doi.org/10.1093/jpepsy/jsio09> PMID:15681316

16. Wright KD, Asmundson GJG. Health anxiety in children: development and psychometric properties of the Childhood Illness Attitude Scales. *Cogn Behav Ther*. 2003;32(4):194–202. <http://dx.doi.org/10.1080/16506070310014691> PMID:16291551
17. Malas N, Ortiz-Aguayo R, Giles L, Ibeziako P. Pediatric somatic symptom disorders. *Curr Psychiatry Rep*. 2017 Feb;19(2):11. <http://dx.doi.org/10.1007/s11920-017-0760-3> PMID:28188588
18. Andresen JM, Woolfolk RL, Allen LA, Fragoso MA, Youngerman NL, Patrick-Miller TJ et al. Physical symptoms and psychosocial correlates of somatization in pediatric primary care. *Clin Pediatr (Phila)*. 2011 Oct;50(10):904–9. <http://dx.doi.org/10.1177/0009922811406717> PMID:21576182
19. Kellner R. Abridged manual of the illness attitude scales. University of New Mexico, Department of Psychiatry, School of Medicine; 1987.
20. Ollendick TH. Reliability and validity of the revised fear survey schedule for children (FSSC-R). *Behav Res Ther*. 1983;21(6):685–92. [https://doi.org/10.1016/0005-7967\(83\)90087-6](https://doi.org/10.1016/0005-7967(83)90087-6)
21. Silverman WK, Fleisig W, Rabian B, Peterson RA. Childhood Anxiety Sensitivity Index. *J Clin Child Psychol*. 1991;20(2):162–8. [http://dx.doi.org/10.1207/s15374424jccp2002\\_7](http://dx.doi.org/10.1207/s15374424jccp2002_7)
22. Kovacs M. Children's depression inventory manual. Toronto: Multi Health Systems; 1992.
23. Myers ND, Ahn S, Jin Y. Sample size and power estimates for a confirmatory factor analytic model in exercise and sport: a monte carlo approach. *Res Q Exerc Sport*. 2011 Sep;82(3):412–23. <http://dx.doi.org/10.1080/02701367.2011.10599773> PMID:21957699
24. George D, Paul Mallery W. SPSS for Windows step by step a simple guide and reference. 17.0 update. Allyn & Bacon; 2010.
25. Simon Moss. Fit indices for structural equation modeling [website]. Sicotests; 2016 (<http://www.sicotests.com/psyarticle.asp?id=277>, accessed 7 January 2020).
26. O'Connor BP. SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behav Res Methods, Instruments, Comput*. 2000 Aug;32(3):396–402. <http://dx.doi.org/10.3758/BF03200807> PMID:11029811
27. McHorney CA, Tarlov AR. Individual-patient monitoring in clinical practice: are available health status surveys adequate? *Qual Life Res*. 1995 Aug;4(4):293–307. PMID:7550178
28. Rode S, Salkovskis P, Dowd H, Hanna M. Health anxiety levels in chronic pain clinic attenders. *J Psychosom Res*. 2006 Feb;60(2):155–61. <http://dx.doi.org/10.1016/j.jpsychores.2005.07.005> PMID:16439268
29. Steca P, Monzani D, Greco A, Franzelli C, Magrin ME, Miglioretti M et al. Stability and change of lifestyle profiles in cardiovascular patients after their first acute coronary event. *PLoS One*. 2017 Aug 29;12(8):e0183905. <http://dx.doi.org/10.1371/journal.pone.0183905> PMID:28850579
30. Tang NKY, Salkovskis PM, Hodges A, Soong E, Hanna MH, Hester J. Chronic pain syndrome associated with health anxiety: a qualitative thematic comparison between pain patients with high and low health anxiety. *Br J Clin Psychol*. 2009 Mar;48(Pt 1):1–20. <http://dx.doi.org/10.1348/014466508X336167> PMID:18724887
31. Hadjistavropoulos HD, Craig KD, Hadjistavropoulos T. Cognitive and behavioral responses to illness information: the role of health anxiety. *Behav Res Ther*. 1998 Feb;36(2):149–64. [http://dx.doi.org/10.1016/S0005-7967\(98\)00014-X](http://dx.doi.org/10.1016/S0005-7967(98)00014-X) PMID:9613022
32. Jordan statistical yearbook. Amman: Department of Statistics; 2016.

## Appendix 1: Original CIAS:

### *Childhood Illness Attitude Scales*

K. D. Wright & G. J. G. Asmundson (2003)

**Directions:** Below are a number of questions. Read each question carefully and put an X on the line in front of the words that best answers the question. There are no right or wrong answers. Remember, find the words that best answers the question.

Question			
1. Do you worry about your health?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
2. Are you worried that you might get really sick in the future?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
3. Does the thought of being sick scare you?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
4. If you have pain, do you worry that it may be caused by a bad sickness?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
5. If pain lasts for a week or more, do you tell your mom or dad?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
6. If pain lasts for a week or more, do you ask your mom or dad if you can go to the doctor?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
7. If pain lasts for a week or more, do you believe that you have a bad sickness?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
8. Do you try not to have habits that may be bad for you, such as smoking, drinking, or drugs?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
9. Do you try not to eat foods that may not be good for you (such as junk food)?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
10. Do you check your body to find out if there is something wrong?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
11. Do you believe that you are really sick, but the doctors do not know why?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
12. When you feel sick, do you tell your mom or dad?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
13. When you feel sick, do you ask your mom or dad if you can go to the doctor?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time
14. Do you ask your mom or dad for medicine?	<input type="checkbox"/> None of the time	<input type="checkbox"/> Sometimes	<input type="checkbox"/> A lot of the time

- |   |   |                                    |  |
|---|---|------------------------------------|--|
| 15. When your doctor tells you that you are not sick, do you not believe him/her?                               | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 16. If a doctor tells you what he/she found, do you soon begin to believe that you might have another sickness? | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 17. Are you afraid of news that reminds you of death?   | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 18. Does the thought of dying scare you?  | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 19. Are you afraid that you might die soon?   | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 20. Are you afraid that you might have cancer?  | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 21. Are you afraid that you have something wrong with your heart?   | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 22. Are you afraid that you have another bad sickness?  | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| Which sickness? _____   |   |                                    |  |
| 23. When you read or hear about a sickness, do you think that you might have that sickness?                     | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 24. When you have a strange feeling in your body, do you find it hard to think about something else?            | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 25. When you have a strange feeling in your body, do you worry about it?  | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 26. When you have a strange feeling in your body, do you tell your mom or dad?                                  | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 27. When you have a strange feeling in your body, do you ask your mom or dad if you can go to the doctor?       | <input type="checkbox"/> None of the time | <input type="checkbox"/> Sometimes | <input type="checkbox"/> A lot of the time |
| 28. Has your doctor told you that you have a sickness?  | <input type="checkbox"/> Yes              | <input type="checkbox"/> No        |  |
| If yes, what sickness? _____  |   |                                    |  |
| 29. How many times have you seen your doctor in the last year?  | <input type="checkbox"/> 0 times          | <input type="checkbox"/> 1-2 times | <input type="checkbox"/> 3 or more times   |
| 30. How many doctors have you seen in the past year?  | <input type="checkbox"/> 0                | <input type="checkbox"/> 1-2       | <input type="checkbox"/> 3 or more         |



31. How often have you been treated (had to take medicine or had surgery) during the past year?      \_\_\_ 0 times      \_\_\_ 1-2 times      \_\_\_ 3 or more times

32. If you have had treatments in the last year, what were they?

\_\_\_\_\_

*The next three questions concern feelings in your body (for example, pain, aches, pressure in your body, breathing problems, being tired etc.)*

33. Do strange feelings in your body stop you from going to school?      \_\_\_ None of the time      \_\_\_ Sometimes      \_\_\_ A lot of the time

34. Do strange feelings in your body stop you from enjoying yourself?      \_\_\_ None of the time      \_\_\_ Sometimes      \_\_\_ A lot of the time

35. Do strange feelings in your body stop you from keeping your mind on what you are doing?      \_\_\_ None of the time      \_\_\_ Sometimes      \_\_\_ A lot of the time

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## Appendix 2: Translated CIAS

• فهل أنت قلق على صحتك؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل أنت قلق من أن تصبح مريضا جدا في المستقبل؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل فكرة أن تكون مريض تخيفك؟	إطلاقا	أحيانا	الكثير من الأوقات
• إذا شعرت بالألم هل تقلق من أن يكون سبب الألم مرض سيء؟	إطلاقا	أحيانا	الكثير من الأوقات
• إذا استمر الألم لأسبوع أو أكثر هل تخبر والدتك أو والدك؟	إطلاقا	أحيانا	الكثير من الأوقات
• إذا استمر الألم لأسبوع أو أكثر هل تطلب من والدتك أو والدك أن يأخذك إلى الطبيب؟	إطلاقا	أحيانا	الكثير من الأوقات
• إذا استمر الألم لأسبوع أو أكثر هل تعتقد أن لديك مرض سيء؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تحاول أن تقلع عن العادات التي يمكن أن تكون سيئة على صحتك مثل التدخين؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تحاول أن تبتعد عن أكل الأغذية التي قد تكون مضرّة بصحتك مثل البيتزا و الهامبرجر و الشاورما؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تتفحص جسدك لترى إن كان هناك شيء غير طبيعي؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تعتقد أنك مريض جدا لكن الأطباء لا يعرفون سبب مرضك؟	إطلاقا	أحيانا	الكثير من الأوقات
• عندما تشعر أنك مريض هل تخبر والدتك أو والدك؟	إطلاقا	أحيانا	الكثير من الأوقات
• عندما تشعر أنك مريض هل تطلب من والدتك أو والدك أن يأخذك إلى الطبيب؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تطلب من والدتك أو والدتك أن يحضر لك الدواء؟	إطلاقا	أحيانا	الكثير من الأوقات
• عندما يخبرك الطبيب أنك لست مريضا هل تصدقه؟	إطلاقا	أحيانا	الكثير من الأوقات
• إذا أخبرك الطبيب تشخيصه هل تبدأ بالإعتقاد أن لديك مرض آخر؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تخاف من الأخبار التي تذكرك بالموت؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل فكرة الموت تخيفك؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تخاف أن تموت قريبا؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تخاف أن تكون مصابا بالسرطان؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تخاف أن تكون مصابا بمرض في القلب؟	إطلاقا	أحيانا	الكثير من الأوقات
• هل تخاف من أن يكون لديك مرض سيء آخر؟ أي مرض؟.....	إطلاقا	أحيانا	الكثير من الأوقات

الكثير من الأوقات	أحيانا	إطلاقا	• عندما تقرأ أو تسمع بمرض ما هل تشعر أنه قد يكون لديك هذا المرض؟
الكثير من الأوقات	أحيانا	إطلاقا	• إذا شعرت أن لديك إحساس غريب في جسدك هل يصعب عليك التفكير في شيء آخر؟
الكثير من الأوقات	أحيانا	إطلاقا	• إذا شعرت بإحساس غريب في جسدك هل تقلق بشأنه؟
الكثير من الأوقات	أحيانا	إطلاقا	• إذا شعرت بإحساس غريب في جسدك هل تخبر والدتك أو والدك؟
الكثير من الأوقات	أحيانا	إطلاقا	• إذا شعرت بإحساس غريب في جسدك هل تطلب من والدتك أو والدك أن يأخذاك إلى الطبيب؟
	نعم	لا	• هل أخبرك الطبيب أنك تعاني من مرض ما؟ إذا كانت الإجابة بالإيجاب فما هو؟ .....
٣ مرات أو أكثر	١-٢ مرة	نهائيا	• كم مرة زرت الطبيب خلال العام الماضي؟
٣ مرات أو أكثر	١-٢ مرة	نهائيا	• كم طبيب زرت في العام الماضي؟
٣ مرات أو أكثر	١-٢ مرة	نهائيا	• كم مرة تم علاجك ( خضعت لعملية أو أخذت دواء ) خلال العام الماضي؟
			• إذا أخذت أي علاجات خلال العام الماضي ماذا كانت؟ .....
			الأسئلة الثلاثة القادمة تتعلق بإحساس في جسدك (مثل الألم أو الجوع أو صعوبة في التنفس) الإحساس بالارهاق (.....)
الكثير من الأوقات	أحيانا	إطلاقا	• هل الإحساس الغريب في جسدك يمنعك من الذهاب الى المدرسة؟
الكثير من الأوقات	أحيانا	إطلاقا	• هل الإحساس الغريب في جسدك يمنعك من الاستمتاع بوقتك؟
الكثير من الأوقات	أحيانا	إطلاقا	• هل الإحساس الغريب في جسدك يمنعك من التركيز فيما تقوم به؟

# Perspectives of Afghan refugee mothers on the experience of caring for a child with cancer: a qualitative analysis

Lida Nikfarid,<sup>1</sup> Maryam Rassouli,<sup>2</sup> Azam Shirinabadi Farahani,<sup>1</sup> Raziye Beykmirza<sup>3</sup> and Tahereh Alsadat Khoubbin Khoshnazar<sup>4</sup>

<sup>1</sup>Department of Pediatric Nursing, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran.

<sup>2</sup>Cancer Research Center, Shahid Beheshti University of Medical Sciences Tehran, Islamic Republic of Iran. <sup>3</sup>Nursing and Midwifery Care Research

Center, School of Nursing & Midwifery, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran. <sup>4</sup>School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Islamic Republic of Iran. (Correspondence to: Maryam Rassouli: Rassouli.m@gmail.com).

## Abstract

**Background:** Cancer in children causes many challenges for the family. When a refugee family experiences it, its impacts may be different and more specific considerations for care may be needed.

**Aims:** This study aimed to explore the experiences of Afghan mothers living in the Islamic Republic of Iran who had a child with cancer.

**Methods:** This was a qualitative study, conducted in 2017, of Afghan refugee women with children diagnosed with cancer and referred to a cancer referral hospital in Tehran; they were selected through purposive sampling. Face-to-face, semi-structured and in-depth interviews were conducted for data collection until data saturation was reached. Conventional content analysis was done. MAXQDA 10 was used for organizing the data.

**Results:** Nine Afghan mothers were interviewed. They were aged 24–44 years and the children were aged 2–9 years. A primary theme called “passive acceptor” was found with five subthemes: chronic suffering, health issues, lack of skills, maladaptive coping and enthusiasm. The mothers were struggling to cope with the challenges of caring for a child with cancer both financially, physically and emotionally.

**Conclusion:** In spite of many issues in common with similar groups in other countries, Afghan mothers appear to need to greater assistance when it comes to seeking help and understanding for the care for their child with cancer, possibly because of cultural barriers to self-empowerment. Tailored care plans are recommended for Afghan refugee mothers in the Islamic Republic of Iran.

Keywords: Refugees, cancer, children, mothers, qualitative research, Iran

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## Introduction

Although the number of children with cancer is growing, the outcomes of the disease have improved as a result of new treatment methods (1,2). However, financial problems, uncertainty, inability to define the illness and its outcomes, and other psychological problems in the family of a child with cancer have been frequently reported as major challenges (3–6). Mothers use different ways to adapt to these challenges, which are affected by internal and external factors (7).

The increasing numbers of immigrant refugees is a global problem that affects many countries, including the Islamic Republic of Iran, where most Afghan refugees migrate. About two million legal Afghan immigrants live in the country (8). Political and economic problems are the most common causes of the immigration of Afghans to the Islamic Republic of Iran over the past 37 years. As well as the immigration-related challenges, such as illiteracy and poverty (especially for illegal immigrants) (9), chronic diseases in children put Afghan refugees under a much greater level of stress (8). The quality of life in such a family, especially for the mother, is reported to be below average (10). No research has been conducted

in the Islamic Republic of Iran on the challenges Afghan immigrant families face when caring for a child with cancer.

Given the large number of immigrants in the country and the moral obligation of receiving countries to provide them with health services, information on the effects on Afghan refugee mothers in the Islamic Republic of Iran of caring for a child with cancer would be useful. Data from such a study would make it possible to plan more comprehensive family-centred care for such families. In addition, it would provide the opportunity to help improve the quality of life of these mothers and, consequently, that of the child with cancer. The purpose of this study therefore was to assess the experience of Afghan mothers while caring for a child with cancer.

## Methods

### Study design and sample

This was a qualitative descriptive study conducted from April to July 2017 to explore the experience of Afghan mothers who had to care for a child with cancer. Conventional content analysis was done (11). The study setting

was a paediatric teaching hospital in Tehran. The participants were purposively selected if they met the following criteria: had a child with a definite diagnosis of cancer (not in the end stage or in intensive care), lived with the spouse, spoke Farsi and had no history of mental illness (self-reported). Participants were met by the research team during their visit to the outpatient department of the hospital or during their child's hospitalization. Since two of the researchers in this study regularly attended the hospital as nursing instructors and knew most of the patients and their families, a good relationship had already been formed between them and the participants.

### Data collection and analysis

Data were collected through semi-structured in-depth interviews. Interviews were recorded and transcribed, and then listened to again to ensure the accuracy of the transcriptions. MAXQDA software, version 10.0 was used to manage the textual data. To analyse the data, a constant comparative method (12) was used which included the following steps based on descriptive content analysis (11). Each interview text was read several times; meaning units (a unit of analysis) were identified from which important points in the texts were extracted in order to consider the implicit and explicit contents of the meaning units (open coding). These codes were then classified under broader titles based on their similarities and differences (grouping and categorizing). This process continued until the main and secondary themes were extracted (abstraction).

In order to evaluate the soundness of our qualitative research, three criteria were used after the analysis – credibility, dependability and transferability (13,14). Credibility of the data could be achieved through the researchers' familiarity with the participants over a long period of time. Credibility was boosted by member checking and peer debriefing. An audit trail, themes,

subthemes and descriptions were used in order to record the participants' experiences, which helped boost dependability. To ensure transferability, the study documents were kept safe and efforts were made to explain the study methodology as extensively as possible in order to ensure the application of this research method to other settings (13,14).

### Ethical considerations

The mothers were informed about the aims of the study and their informed consent obtained. Participants had the right to leave the study at any stage. The ethics committee of Shahid Beheshti University of Medical Sciences approved the study.

### Results

Interviews were conducted with nine mothers aged 24–44 years. Their children were aged 2–9 years. One of the mothers had immigrated to the Islamic Republic of Iran the previous year for treatment; the rest had been living in the country for more than 12 years and their children had been born there. Except for one mother, their spouses were labourers or vendors, who were either illiterate or had elementary education. The types of cancer identified were rhabdomyosarcoma, leukaemia and Wilms tumour.

Results were categorized under one main theme “passive acceptor”, and five secondary themes: chronic suffering; maladaptive coping; health issues; lack of skills and enthusiasm (Table 1).

The participants who appeared as passive acceptors were those who had tried to fight the situation caused by their child's cancer, which had added many problems to their lives. However, they did not have adequate or appropriate coping mechanisms, or social and financial resources to help them through this journey. They found

**Table 1 Themes, subthemes and analytical units**

Main theme	Secondary themes	Subthemes	Meaning of units
Passive acceptor	Chronic suffering	Shadow of previous frightening experiences	Being upset by memories, not willing to go back to Afghanistan
		Multiple problems ahead	Poor economic circumstances, unemployment of the father, fear of husband becoming addicted to drug
		Livelihood difficulties	Living in an uncomfortable house, being far from the basic health care facilities, low income
	Health issues	Lack of self-care	Not having visits for health care, not being familiar with coping methods
		Neglect of own health	Not following up treatment for health problems, forgetting to get medicines prescribed by physicians
	Lack of skills	Inability to manage care of the child	Being dependent on others to follow the care of the child, not having enough information about the care of the child
		Constant fear of making mistakes	Increasing feelings of anxiety when the child needs to be visited, not being able to read the prescriptions on drugs
	Maladaptive coping	Maintaining the current situation	Trying to keep their current state unchanged as it seems safe, avoiding new experiences in life
		Isolation	Not having contacts with other mothers of children with cancer, not trying to join social support systems in hospital
	Enthusiasm	Belief in the effectiveness of the care system and treatment	Having trust in the health care providers, not having any complaints
		Satisfaction with the service	Praying for nurses and doctors, feeling happy when comparing with the care available in Afghanistan, feeling lucky to be in the Islamic Republic of Iran



themselves trying to manage the situation and were happy to be in a better environment compared with their former one where they faced war and social injustice. However, their knowledge and actions were inadequate to lead to positive health outcomes for themselves and their children.

### **Chronic suffering**

The memories of the war in Afghanistan have caused a pattern of chronic suffering in the Afghan women. A 37-year-old mother of a child with a Wilms tumour stated, “I remember the war and the planes that dropped bombs. I was playing with my friend, but we had to run away. I did not have slippers on my feet. We got to our mothers’ tent. We saw that some people were killed. Fear is still in our hearts.”

It would appear that even though these women came to the Islamic Republic of Iran at an early age, they have remained traumatized by their experiences. All the participants had bitter memories of war, death, fear, danger and displacement, as well as poverty, unemployment and loneliness in their adoptive country. The women were struggling with multiple social and financial issues long before the diagnosis of their child’s cancer. Their child’s illness raised many problems not dissimilar to those experienced by mothers of children with cancer in other countries. However, uncertainty, chronic sorrow and feelings of guilt about the sick child, as well as the financial burden, had exhausted these mothers. One mother stated, “Although I know it is not heaven here either, you are still afraid you may lose something again.”

### **Health issues**

Most of the participants, similar to their peers in the Islamic Republic of Iran, suffered from poor health even before the diagnosis of cancer in their child. This situation is the result of being refugees and the changes in their lifestyle due to immigration. However, the new challenge of their child’s cancer had made their health worse in all dimensions. According to one mother, “I cannot sleep. I am stressed out. I say to myself, ‘God, what is going to happen? Are they admitting my child to hospital again?’ When I go to the hospital, I do not care about myself. I do not eat anything”.

Headaches, depression and anxiety were some of the most frequent complaints of the mothers. Poverty, their spouse’s unemployment, lack of access to health care and insurance problems were some of the obstacles mentioned that prevented them from seeking professional help. One mother said, “When I am here I hear from other mothers that we ourselves also need medication to keep our strength up.”

### **Lack of skills**

Most of the participants had found themselves in a situation where they were afraid of making mistakes and being unable to take care of their child. Illiteracy, inaccessibility to social network support, and lack of general knowledge and skills in various areas put them in a

desperate state. The mother of a child with leukaemia stated, “If I take him home and I find he has a fever, can he stay at home? Or must he go to the hospital?” Most of the mothers were facing problems common to all families with a child with cancer, but they did not actively try to seek outside help, and they had insufficient resources to help them cope. Statements such as “Everyone knows that cancer is a disaster” were frequently heard from the mothers who did not have any hope of their child recovering or faith in a happy future.

### **Maladaptive coping**

Mothers were reluctant to actively engage in the child’s treatment because of their lack of skills and knowledge as well as the many challenges they were facing. Therefore, they had passively surrendered to the reality of the disease. They would rather turn to spiritual support as an emotional coping mechanism and avoid problem-oriented coping strategies such as seeking out information or social support. The mothers considered religion as their only refuge and tried to improve the health of their child through prayer. They also believed that sins in their own lives had resulted in divine punishment in the form of their child’s illness: “I thought that it is because of my sins. I thought it might have been the result of my own fault. Because of sinning, God did this to me.” According to the mothers, they did not try to obtain information about the child’s illness, although searching for information is considered a strategy to deal with stress. The mothers reported only a few adaptive coping methods used in their lives after the diagnosis of their child’s disease. Most of the mothers showed signs of chronic depression and maladaptive coping methods, such as constant crying or feelings of isolation.

### **Enthusiasm**

The mothers expressed satisfaction and confidence in the Iranian health system in their various statements. A 28-year-old mother said, “Iran is very good. 80% of the costs are paid by benefactors. In Afghanistan, patients have to cover all the expenses themselves. There is no such a thing as charity there.” The mothers also expressed their satisfaction with the services and the lack of discrimination between them and Iranian patients. One of them pointed out that, “Wherever you go in Iran, they call my child by his name. I like this. It seems that for them, we are the same as others.”

### **Discussion**

We assessed the perception of Afghan immigrant mothers in the Islamic Republic of Iran of their experience of having a child with cancer. Although the results were similar to the findings of other studies conducted on the topic, especially in Middle Eastern countries (5,15,16), there were some differences and thus further research is needed in this regard to understand the reasons for these differences.

The analysis of the data led to the emergence of the main category: passive acceptor. Although submission to God’s will is considered a category in many studies on

mothers with children with cancer (5,15,16), our finding of the acceptance of the child's cancer without trying to actively deal with it is new. Afghan women, according to their cultural and educational background, believe that illnesses and other tragic events come from God and that people have no choice but to accept it. In contrast, Lebanese parents described their experience of having a child with cancer as a battle (17), while in a study on Iranian mothers, the challenge of their child's cancer had forced them develop their capabilities and take an active role in the management of the disease (5). This may support the hypothesis that dealing with the cancer of a child is affected by many cultural factors.

For the secondary theme "chronic suffering", the memories of war and migration were still fixed in the minds of the mother who experienced it. This mentality has adverse effects that have been mentioned in other studies and manifest as psychological disorders (18–21). A far higher prevalence of psychological disorders such as post-traumatic stress disorder has been reported in Afghan refugees in the Islamic Republic of Iran compared with the Iranian population as a whole (22). These memories, which are a constant reminder of the insecurity of life during wartime, have created a permanent sense of suffering for the mothers. Studies conducted on refugee parents have found that they face many difficulties providing shelter and care for their children, a situation which may be made worse by the child's illness (23–25).

In addition, the unfavourable living conditions were a challenge these mothers had to face (18), as well as failure to address their own health issues – a common problem among Afghan refugees, especially among immigrant mothers. Studies show that the number of psychological problems is higher in mothers of immigrant families (26), yet immigrant mothers often refuse to admit their health problems because of a sense of shame (17), which is supported by the results of our study. The mothers also mentioned livelihood challenges as one of their main problems. This is also often reported by people regardless of asylum and immigration status, and was also noted in Syrian immigrant women with a child with cancer (27).

Although in another study, mothers emphasized shock, disbelief and crisis in their lives after receiving the diagnosis of their child's cancer, they all demonstrated different adaptive measures in order to deal with the change in their lives (5). What is striking in our study was the lack of any maternal desire for problem-solving and the recourse to religion as an emotional solution. Mothers showed no inclination to develop new skills, which is a common approach by mothers to manage a crisis in the family. New skills, such as problem-solving and resiliency, would help them to adapt and manage the consequences of the disease for the child and family more effectively. Getting help from peer groups and seeking social support by communicating with family members, relatives and friends are considered to be a coping strategy that is highly recommended (28,29). Afghan mothers in our study, in spite of the presence of other mothers in similar

circumstances, actively tried to isolate themselves and instead turned to prayer as a coping mechanism; this is widespread according to other studies (5,30–32).

The family is considered to be the caretaker and the care provider (33). Mothers suffer because of the burden of care of their child with cancer and this has a negative effect on their health as well as the well-being of their child (34). At the same time, the mother has an important role in improving her child's quality of life (35). In fact, supporting and helping mothers means extending care to the child and offers better chances of recovery. In our study, mothers caring for children with cancer had completely neglected their own health in their devotion to taking care of their children. In addition, mothers were trying to shield their husbands from the realities of the situation in order to avoid tensions because they were worried that their husbands would not be able to cope and might turn to drugs. This finding is similar those in other studies (4,5). For each mother, protecting the husband meant avoiding the occurrence of another crisis, which is rooted in the popular cultural belief of the community: as mentioned by one woman, "Men turn to addiction to get away from household problems, otherwise they might have a stroke". Thus, the strain on mothers is relentless, not only keeping the husband away from issues of the child's cancer but also bearing the burden of care giving.

The lack of skills was another subtheme of the study indicating the inactive role of Afghan mothers in managing their child's cancer at home, looking after their own health or that of others. This could have a cultural basis due to the fact that Afghan women in the Islamic Republic of Iran do not engage in activities that empower their role in the family and society. Traditionally, most Afghan men do not allow their wives to have a job or participate in social activities (36).

One of the findings of our study, which does not concur with findings elsewhere, was the lack of discrimination in health services by medical personnel in the Islamic Republic of Iran. Afghan women have a low level of education and have been the victims of religious extremism, isolation and discrimination (8). A number of studies in the Islamic Republic of Iran, reported that Afghan women had a sense of discrimination at health centres when receiving childbirth services (7). The reason for the difference in our finding may be a difference in communication style between the staff and the mother when it is a question of a child's sickness rather than childbirth. Centres such as Mahak paediatric hospital offer their services to all children with cancer without discrimination. However, lack of complaint by Afghan refugee mothers about medical services differs from studies on the Iranian population (4,37,38), who were likely to complain more.

## Conclusion

Cultural discrimination causes inequalities, misconceptions and promotion of stereotypes in the provision of care and the treatment of patients. Avoidance of discrimination

is essential for equitable treatment of Afghan mothers, who appear to need to greater assistance when it comes to seeking help and understanding for the care for their child with cancer, possibly because of cultural barriers to self-empowerment. Therefore, tailored care plans are required for Afghan refugee mothers in the Islamic Republic of Iran.

Given that the challenges associated with the health of immigrants and refugees are everyday issues in the

Middle East and North Africa, a collaborative effort could be considered to train care providers in care provision for refugees, and an understanding of their disease-coping strategies and culturally based perceptions of their physical and mental health. Such training could help to promote the health of refugee mothers who have a child with cancer.

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**Competing interests:** None declared.

## Point de vue des mères afghanes réfugiées sur l'expérience de prise en charge d'un enfant atteint d'un cancer : une analyse qualitative

### Résumé

**Contexte :** Le cancer de l'enfant entraîne de nombreuses difficultés pour une famille. Lorsque cela touche une famille réfugiée, les conséquences peuvent être différentes et des considérations plus spécifiques en matière de soins peuvent être nécessaires.

**Objectifs :** La présente étude visait à étudier les expériences de mères afghanes vivant en République islamique d'Iran ayant un enfant atteint d'un cancer.

**Méthodes :** Il s'agissait d'une étude qualitative menée en 2017 auprès de femmes afghanes réfugiées ayant un enfant pour lequel un diagnostic de cancer avait été posé et ayant été orientées vers un hôpital de recours à Téhéran ; celles-ci ont été sélectionnées au moyen d'un échantillonnage par choix raisonné. Des entretiens en présentiel, semi-structurés et approfondis ont été menés pour la collecte des données jusqu'à saturation. L'analyse de contenu conventionnelle a été effectuée. Le logiciel MAXQDA 10 a été utilisé pour organiser les données.

**Résultats :** Neuf mères afghanes ont été interrogées. Elles étaient âgées de 24 à 44 ans et les enfants avaient entre 2 et 9 ans. Un thème principal intitulé « acceptation passive » a été défini et complété par cinq sous-thèmes : la souffrance chronique, les problèmes de santé, le manque de compétences, l'inaptitude à faire face et l'enthousiasme. Les mères avaient du mal à faire face aux difficultés financières, physiques et émotionnelles liées à la prise en charge d'un enfant atteint d'un cancer.

**Conclusion :** En dépit de nombreux problèmes communs avec des groupes similaires dans d'autres pays, les mères afghanes semblent avoir besoin d'une assistance plus importante lorsqu'il s'agit de chercher de l'aide et de comprendre la prise en charge dont leur enfant atteint d'un cancer a besoin, peut-être en raison d'obstacles culturels qui empêchent l'autonomisation. Il est recommandé d'élaborer des plans de soins adaptés aux besoins des mères réfugiées afghanes qui vivent en République islamique d'Iran.

### تصورات الأمهات الأفغانيات اللاجئات حول تجربة رعاية طفل مصاب بالسرطان: تحليل كفي

ليدا نكفريد، مريم رسولي، أعظم فرحاني، راضية بيكميرزا، طاهرة خوشنازار

### الخلاصة

**الخلفية:** يتسبب السرطان في تحديات عديدة للأسرة. وعندما تمر أسرة لاجئة بهذا تحدي، فقد تتفاوت الآثار المترتبة عليه، وقد يتطلب ذلك توجيه مزيد من الاعتبارات الخاصة للرعاية.

**الأهداف:** هدفت هذه الدراسة إلى استطلاع تجارب الأمهات الأفغانيات اللواتي يعشن في جمهورية إيران الإسلامية ولديهن طفل مصاب بالسرطان. **طرق البحث:** أجريت دراسة كفيّة في عام 2017 على النساء الأفغانيات اللاجئات ممن لديهن أطفال مشخصين بالسرطان وأُحيلوا إلى مستشفى مرجعي للسرطان في طهران؛ وقد اختيرت النساء وفق أسلوب المعاينة الهادفة. وأجريت مقابلات مباشرة شبه منظمة ومُعَمَّقة بغرض جمع البيانات إلى أن تحقق التشبع بالبيانات. وأجري تحليل تقليدي للمحتوى. واستُخدمت برمجية MAXQDA في إصدارها العاشرة لتنظيم البيانات الناتجة.

**النتائج:** أجريت مقابلات مع تسع أمهات أفغانيات. تراوحت أعمار النساء بين 24 و44 سنة وتراوح أعمار الأطفال بين سنتين و9 سنوات. وتحدّد موضوع أولي حمل عنوان «متلق سلبي» واندرجت تحته خمسة موضوعات فرعية: معاناة مزمنة، ومشاكل صحية، ونقص المهارات، وعدم القدرة على التكيف، والحماس. وكانت الأمهات يعانين مالياً، وبدنياً، ووجدانياً من أجل التكيف مع التحديات الملازمة لرعاية أطفالهن المصابين بالسرطان.

الاستنتاج: بالرغم من وجود أمور عديدة مشتركة مع فئات مماثلة في بلدان أخرى، فقد تبين احتياج الأمهات الأفغانيات إلى مزيد من المساعدة فيما يتعلق بالتأسيـس الدعم والفهم من أجل رعاية أطفالهن المصابين بالسرطان، وهو الأمر الذي ربما تعزى صعوبته إلى وجود عقبات ثقافية تحول دون تمكينهن ذاتياً. ويوصي الباحثون بوضع خطط للرعاية مصممة خصيصاً للأمهات الأفغانيات اللاجئات في جمهورية إيران الإسلامية.

## References

1. Beykmirza R, Nikfarid L, Atashzadeh-Shoorideh F, Nasiri M. Nursing adherence to ethical codes in pediatric oncology wards. *Nursing ethics*. 2017;0969733017730683.
2. Khanali Mojen L, Rassouli M, Eshghi P, Zendedel K, Akbari Sari A, Heravi Karimooi M, et al. Pediatric Palliative Care in Iran: Applying Regionalization of Health Care Systems. *Asian Pacific journal of cancer prevention : APJCP*. 2018;19(5):1303-11.
3. Mojen LK, Rassouli M, Eshghi P, Sari AA, Karimooi MH. Palliative care for children with cancer in the Middle East: A comparative study. *Indian journal of palliative care*. 2017;23(4):379.
4. Nemati S, Rassouli M, Ilkhani M, Baghestani AR. Perceptions of family caregivers of cancer patients about the challenges of caregiving: a qualitative study. *Scandinavian journal of caring sciences*. 2018;32(1):309-16.
5. Nikfarid L, Rassouli M, Borimnejad L, Alavimajd H. Experience of chronic sorrow in mothers of children with cancer: A phenomenological study. *European Journal of Oncology Nursing*. 2017;28:98-106.
6. Sajjadi M, Rassouli M, Abbaszadeh A, Alavi Majd H, Zendehelel K. Psychometric properties of the Persian version of the Mishel's Uncertainty in Illness Scale in patients with cancer. *European journal of oncology nursing : the official journal of European Oncology Nursing Society*. 2014;18(1):52-7.
7. McNeill T, Nicholas D, Beaton J, Montgomery G, MacCulloch R, Gearing R, et al. The coconstruction of couples' roles in parenting children with a chronic health condition. *Qualitative health research*. 2014;24(8):1114-25.
8. Mohammadi S, Gargari SS, Fallahian M, Källestål C, Ziaei S, Essén B. Afghan migrants face more suboptimal care than natives: a maternal near-miss audit study at university hospitals in Tehran, Iran. *BMC pregnancy and childbirth*. 2017;17(1):64.
9. Rezaeian M. A review on the book "Human Geography: People, Place and Culture". *Journal of Rafsanjan University of Medical Sciences*. 2014;13(6):577-8.
10. Link CJ, Fortier MA. The relationship between parent trait anxiety and parent-reported pain, solicitous behaviors, and quality of life impairment in children with cancer. *Journal of pediatric hematology/oncology*. 2016;38(1):58-62.
11. Schreier M. Qualitative content analysis in practice: The SAGE handbook of qualitative data analysis; 2012.
12. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse education today*. 2004;24(2):105-12.
13. Polit DF, Beck CT. *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*: Philadelphia, PA: LippincottWilliams&Wilkins 2013.
14. Lincoln YS, Guba EG. But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Program Evaluation*. 1986;1986(30):73-84.
15. Iranmanesh S, Shamsi A, Dehghan M. Post-traumatic stress symptoms among iranian parents of children during cancer treatment. *Issues in mental health nursing*. 2015;36(4):279-85.
16. Zafarian Moghaddam E, Behnam Vashani H, Reihani T, Namazi Zadegan S. The Effect of Spiritual Support on Caregiver's Stress of Children Aged 8-12 with Leukemia Hospitalized in Doctor Sheikh Hospital in Mashhad. *Future of Medical Education Journal*. 2016;6(2):19-25.
17. Khoury MN, Huijter HA-S, Doumit MAA. Lebanese parents' experiences with a child with cancer. *European Journal of Oncology Nursing*. 2013;17(1):16-21.
18. Alemi Q, James S, Cruz R, Zepeda V, Racadio M. Psychological distress in Afghan refugees: A mixed-method systematic review. *Journal of immigrant and minority health*. 2014;16(6):1247-61.
19. Groen SP, Richters A, Laban CJ, Devillé WL. Cultural identity among Afghan and Iraqi traumatized refugees: Towards a conceptual framework for mental health care professionals. *Culture, Medicine, and Psychiatry*. 2018;42(1):69-91.
20. Panter-Brick C, Grimon MP, Eggerman M. Caregiver—Child mental health: A prospective study in conflict and refugee settings. *Journal of Child Psychology and Psychiatry*. 2014;55(4):313-27.
21. Panter-Brick C, Grimon MP, Kalin M, Eggerman M. Trauma memories, mental health, and resilience: A prospective study of Afghan youth. *Journal of Child Psychology and Psychiatry*. 2015;56(7):814-25.
22. Droždek B, Kamperman AM, Tol WA, Knipscheer JW, Kleber RJ. Seven-year follow-up study of symptoms in asylum seekers and refugees with PTSD treated with trauma-focused groups. *Journal of clinical psychology*. 2014;70(4):376-87.
23. Kebudi R, Bayram I, Yagci-Kupeli B, Kupeli S, Sezgin G, Pekpak E, et al. Refugee children with cancer in Turkey. *The Lancet Oncology*. 2016;17(7):865-7.
24. Pergert P, Ekblad S, Björk O, Enskär K, Andrews T. Resourcing: An approach used by foreign-born parents struggling on in childhood cancer care. *European Journal of Oncology Nursing*. 2016;23:1-7.



25. Soykoek S, Mall V, Nehring I, Henningsen P, Aberl S. Post-traumatic stress disorder in Syrian children of a German refugee camp. *The Lancet*. 2017;389(10072):903-4.
26. Arabiat DH, Altamimi A. Unmet care needs of parents of children with cancer in Jordan: implications for bed-side practice. *Journal of clinical nursing*. 2013;22(3-4):531-9.
27. Silbermann M, Daher M, Kebudi R, Nimri O, Al-Jadiry M, Baider L. Middle eastern conflicts: implications for refugee health in the European Union and middle eastern host countries. *Journal of global oncology*. 2016;2(6):422-30.
28. Compas BE, Bemis H, Gerhardt CA, Dunn MJ, Rodriguez EM, Desjardins L, et al. Mothers and fathers coping with their children's cancer: Individual and interpersonal processes. *Health Psychology*. 2015;34(8):783.
29. Monti JD, Winning A, Watson KH, Williams EK, Gerhardt CA, Compas BE, et al. Maternal and Paternal Influences on Children's Coping with Cancer-Related Stress. *Journal of child and family studies*. 2017;26(7):2016-25.
30. Abu-Raiya H, Hamama L, Fokra F. Contribution of religious coping and social support to the subjective well-being of Israeli muslim parents of children with cancer: a preliminary study. *Health & Social Work*. 2015;40(3):83-91.
31. Hildenbrand AK, Alderfer MA, Deatrick JA, Marsac ML. A mixed methods assessment of coping with pediatric cancer. *Journal of psychosocial oncology*. 2014;32(1):37-58.
32. Hullmann SE, Fedele DA, Molzon ES, Mayes S, Mullins LL. Posttraumatic growth and hope in parents of children with cancer. *Journal of psychosocial oncology*. 2014;32(6):696-707.
33. Conway MF, Pantaleao A, Popp JM. Parents' Experience of Hope When Their Child Has Cancer: Perceived Meaning and the Influence of Health Care Professionals. *Journal of Pediatric Oncology Nursing*. 2017;34(6):427-34.
34. Williams PD, Williams KA, Williams AR. Parental caregiving of children with cancer and family impact, economic burden: Nursing perspectives. *Issues in comprehensive pediatric nursing*. 2014;37(1):39-60.
35. Sulkers E, Tissing WJ, Brinksma A, Roodbol PF, Kamps WA, Stewart RE, et al. Providing care to a child with cancer: a longitudinal study on the course, predictors, and impact of caregiving stress during the first year after diagnosis. *Psycho-Oncology*. 2015;24(3):318-24.
36. Kandiyoti D. Old Dilemmas or New Challenges? The Politics of Gender and Reconstruction in Afghanistan. *Development and Change*. 2007;38(2):169-99.
37. Sajjadi H, Roshanfekar P, Asangari B, Gharai N, Torabi F. Quality of life and satisfaction with services in caregivers of children with cancer. *Iran Journal of Nursing*. 2011;24(72):8-17.
38. Taleghani F, Fathizadeh N, Naseri N. The lived experiences of parents of children diagnosed with cancer in Iran. *European journal of cancer care*. 2012;21(3):340-8.



# آراء أطباء مراكز الرعاية الصحية الأولية في البحرين حول الفحص الإلكتروني للتفاعلات الدوائية في وصفاتهم

ياسين تيم<sup>1</sup>، محمود باهزاد<sup>2</sup>، عبد الله النما<sup>2</sup>، فهد العصفور<sup>2</sup>، محمود عبد الجليل<sup>2</sup>، محمد راضي<sup>2</sup>، أحمد العنزي<sup>2</sup>، خالد الحاجة<sup>1</sup>

<sup>1</sup> دائرة علم الأدوية والعلاجات، كلية الطب والعلوم الطبية، جامعة الخليج العربي، المنامة، مملكة البحرين. <sup>2</sup> طلبة طب بشري، كلية الطب والعلوم الطبية، جامعة الخليج العربي، المنامة، مملكة البحرين. (Correspondence to: Yasin Tayem: yasiniyt@agu.edu.bh)

## الخلاصة

الخلفية: يتوفر برنامج (فاحص) إلكتروني للتحقق من التفاعلات الدوائية في الوصفات الصادرة من المراكز الصحية الأولية في البحرين.

الأهداف: هدفت هذه الدراسة الى التعرف على اراء الأطباء الذين يعملون في هذه المراكز حول نمط استخدامهم لهذا الفاحص.

طرق البحث: خلال هذه الدراسة المستعرضة، وباستخدام استبانة تعبأ ذاتياً، تم جمع البيانات من 18 مركزاً للرعاية الصحية الأولية في البحرين (75%).

النتائج: بلغ عدد المشاركين في الدراسة 126 طبيباً وطبيبة، معظمهم حاصلون على شهادة الاختصاص في طب الأسرة (115، 91.3%) في حين أن الباقين كانوا أطباء عامين (11، 7.8%). وصف معظم الأطباء أكثر من ثلاثين وصفة طبية في مناوبة عمل اعتيادية (411، 92.7%)، أكثر من نصفها احتوى على أكثر من دواء (101، 81.5%). أفاد معظم الأطباء أنهم يقومون بفحص وصفاتهم للتأكد من خلوها من التفاعلات الدوائية عند وصف دوائين أو أكثر (106، 86.9%). رغم أن معظم الأطباء اعتقدوا أن لديهم معرفة كافية بالتفاعلات الدوائية (92، 37%)، أقر حوالي ربعهم بأنهم غير متأكدين من قدرتهم على التصرف حيالها (30، 24%). أضاف معظم الأطباء المستطلعة آراؤهم أنهم استخدموا الفاحص الإلكتروني (104، 83.9%)، ولكن أقر الكثير منهم بأنهم اعتمدوا على ذاكرتهم للتحقق من التفاعلات (53، 43%). ارتبطت مدة الخبرة العملية، وليس التخصص، مع المعرفة بالتفاعلات الدوائية ( $p < 0.001$ ) والقدرة على إدارتها ( $p < 0.001$ ) لدى الأطباء المشاركين.

الاستنتاجات: نستنتج من هذه البيانات أنه بالرغم أن معظم الأطباء استخدموا الفاحص الإلكتروني، إلا أن نسبة كبيرة منهم اعتمدت على المعرفة المسبقة لديهم لفحص الوصفات الطبية. لذلك يجب التأكد من الاستخدام الأمثل للفاحص الإلكتروني من قبل الأطباء لضمان الكشف الفعال والموثوق عن التفاعلات الدوائية.

Keywords: Drug interaction, health centre, pharmacy, prescription, Bahrain

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## المقدمة

إن التأكد من خلو الوصفات الطبية من التفاعلات الدوائية وكيفية التصرف في حال كشفها، يمثل تحدياً يومياً للأطباء. وتُعزى الصعوبة في تحديد التفاعلات الدوائية بشكل كبير إلى زيادة عدد الأدوية التي يتم ترخيصها من جهة، وارتفاع معدلات الإفراط الدوائي من جهة أخرى، وبخاصة بسبب زيادة معدلات العمر في المجتمعات المختلفة. ففي الواقع، أصبح من المستحيل عملياً اعتماد الأطباء على ذاكرتهم للتحقق من التفاعلات الدوائية. على الرغم من أن هذه المشكلة قد تم حلها جزئياً من خلال توفر برامج الكترونية لفحص التفاعلات الدوائية، إلا أنه من غير المؤكد أن هذه البرامج يتم توظيفها من قبل الأطباء على الوجه الأمثل. ومن جهة أخرى، تقوم هذه المدققات بفحص وجود تفاعلات بين الأدوية التي يتم إدخالها إليها، بينما تظل العقاقير الأخرى التي يأخذها المريض والتي لا يتم إدخالها إلى المدقق بدون مراقبة. لذلك، يجب على الأطباء أن يسألوا مرضاهم عن أدوية أخرى يتم أخذها في نفس الفترة، بما في ذلك الأدوية التي تُصرف بدون وصفة طبية مثل تلك المستخلصة من الأعشاب والمكملات الغذائية وغيرها. يتوفر برنامج إلكتروني لفحص التفاعلات الدوائية في المراكز الصحية الأولية في البحرين ولكن لا يُعرف على وجه التحديد ما إذا كان الأطباء يقومون باستخدامها على النحو الأمثل. لذلك هدفت هذه الدراسة، وهي الأولى من نوعها في البحرين، إلى التحقق من هذا الأمر من خلال التعرف على وجهات نظر الأطباء حول نمط استخدامهم لهذا المدقق الإلكتروني.

## طرق البحث

### الموافقة الأخلاقية

مُنحت الموافقة الأخلاقية، قبل تنفيذ هذا البحث، من قِبل لجنة البحوث والأخلاقيات الطبية في جامعة الخليج العربي (رقم الموافقة E020). تم الحصول على الموافقة على إجراء هذه الدراسة في مراكز الرعاية الصحية الأولية من فريق الدعم الفني للبحوث التابع لوزارة الصحة في مملكة البحرين (رقم الموافقة:

يعرّف التفاعل بين دوائين على أنه زيادة أو نقصان في الأثر العلاجي لدواء معين عند وصفه مع دواء آخر، سواء رافق ذلك تغير في تركيز الادوية المتفاعلة في البلازما أم لا (1). يختلف معدل انتشار التفاعلات الدوائية من بلد إلى آخر. في دراسة بحثت معدل حدوث هذه الظاهرة في العيادات الخارجية في الولايات المتحدة الأمريكية، وجد الباحثون أن هذا المعدل وصل إلى 52% (2). واستكشفت دراسة أخرى معدل التفاعلات الدوائية في ستة بلدان أوروبية، وجدت أن 64% من الوصفات الطبية الصادرة من العيادات الخارجية احتوت على تفاعلات دوائية محتملة (3). بالمقارنة مع هذه المعدلات، وقد سجلت الدراسات التي حققت في معدل التفاعلات الدوائية في الوصفات الطبية للمرضى المنومين في المشافي معدلات أعلى بكثير، حيث وصلت إلى 04% في الولايات المتحدة الأمريكية، حسب إحدى الدراسات التي تم تنفيذها لرصد هذه الظاهرة (4).

عوامل الخطورة التي تؤدي إلى حدوث التفاعلات بين الأدوية كثيرة، ولكن أهمها على وجه الخصوص وصف أدوية متعددة في نفس الوصفة، أو ما يسمى بالإفراط الدوائي (5). هذه الظاهرة شائعة جداً في بعض فئات المرضى ولا سيما من كبار السن لأنهم يعانون عادةً من مشاكل طبية متعددة تستلزم وصف مجموعة من الأدوية مع بعضها البعض (5). كذلك تنتشر ظاهرة الإفراط الدوائي بين المرضى الذين يعانون من أمراض لا يُرجى شفاؤها مثل مرض السرطان المنتشر، حيث إن هدف الطبيب في هذه الحالات هو التخفيف من آلام المريض والعمل على تحسين نوعية حياته، الأمر الذي قد يستدعي استخدام أدوية متعددة لتحقيق هذه الغاية. وبالفعل أظهرت دراسة حديثة قامت بفحص الأدوية الموصوفة لمجموعة كبيرة من المرضى المصابين بمرض عضال في آخر أسبوعين من حياتهم أن 61% من الوصفات احتوت على تفاعلات دوائية، في حين أن عامل الخطورة الأساسي الذي ارتبط بمعدل حدوث تلك التفاعلات كان الإفراط الدوائي (6).

### استطلاع آراء المشاركين

طلب من الأطباء الذين وافقوا على المشاركة في الدراسة الإجابة على استبيان مجهول الاسم بعبارة ذاتية. اشتمل الاستبيان على ثلاثة أقسام رئيسية: في القسم الأول (جدول 1)، قام الفريق بجمع معلومات أساسية عن المشاركين، بما في ذلك الجنس، والتخصص، ومدة الخبرة العملية، ومعدل عدد الوصفات الطبية التي يصدرونها خلال مناوبة واحدة، ونسبة الوصفات التي تحتوي على أكثر من دواء. في القسم الثاني (جدول 2)، قام الباحثون بالحصول على معلومات تتعلق بتصورات الأطباء المشاركين حول الفاحص الدوائي المتوفر ضمن نظام «I-Seha». بالنسبة للجزء الثاني من الاستبيان، استخدمنا مقياس Likert مكون من 5 نقاط لتسجيل الإجابات (أعراض بشدة، أعراض، غير متأكد، أوافق، أوافق بشدة). لغرض عرض نتائج هذا القسم، قمنا بجمع الإجابات «أوافق بشدة» و«أوافق» تحت خانة «أوافق» و«أعترض بشدة» و«أعترض» تحت بند «أعترض». قبل البدء بجمع البيانات، تم التأكد من صدق الاستبانة من خلال عرضها على مجموعة من الأطباء العاملين في مراكز الرعاية الصحية الأولية في البحرين.

### التحليل الإحصائي

بعد الانتهاء من جمع البيانات، تم إدخالها إلى برنامج Excel 10 وتم تحليلها باستخدام إحصائيات وصفية بسيطة. أما بخصوص التحليل الإحصائي للعلاقة بين المتغيرات «Association» فقد قمنا باستخدام تحليل Chi-Square.

### النتائج

بلغ عدد الأطباء الذين وافقوا على المشاركة في الدراسة 126 طبيباً: 92 (77٪) إناث، 27 (22٪) ذكور (جدول 1). وكان غالبية المشاركين اختصاصيين في طب الأسرة (115، 91٪) في حين أن الباقين كانوا أطباء عامين (11، 8٪). فيما يتعلق بخبرة العمل السريرية للمشاركين، وجدنا أن 75 منهم (63٪) قد مارسوا مهنة الطب لمدة تقل عن 10 سنوات بينما عمل الباقون أكثر من هذه المدة. وقد أصدر معظم المشاركون أكثر من 30 وصفة طبية في مناوبة العمل الاعتيادية دواء (101، 81٪). احتوى أكثر من نصفها على أكثر من دواء واحد (114، 92٪).

نتائج الدراسة التي توصلنا إليها تتعلق بتصورات الأطباء المشاركين حول استخدام نظام «I-Seha» لفحص خلل الوصفات من التفاعلات الدوائية (جدول 2) واعتقد معظم المشاركين أن لديهم معرفة كافية في التفاعلات بين العقاقير (92، 73٪) بما في ذلك تصنيفها وفقاً لأهميتها من الناحية السريرية. (5، 63٪، 80) أضافت الغالبية العظمى من الأطباء أنهم استفسروا عن أدوية أخرى استخدمها المرضى في نفس الوقت (94.4٪، 119). بالمثل، أفاد معظم المستطلعة آراؤهم أنهم فحصوا وجود تفاعلات دوائية في وصفاتهم التي احتوت على مجموعة من الأدوية (86.9٪، 104). لكنهم أضافوا أنهم اعتمدوا على ذاكرتهم، في نصف عدد الوصفات تقريباً، للتحقق من وجود تفاعلات بين الأدوية (43٪، 53) بينما استخدم 104 من الأطباء (83.9٪) نظام «I-Seha» لهذا الغرض. على الرغم من أن معظم الأطباء اعتقدوا أنهم كانوا قادرين على التعامل مع الحالات التي ظهرت فيها تفاعلات دوائية في وصفاتهم (71٪، 89) إلا أن حوالي ربعهم لم يكونوا متأكدين حول ما إذا كانوا قادرين

لغايات جمع البيانات، قام فريق البحث بإجراء مقابلات شخصية مع المشاركين حيث جرى تزويدهم بمعلومات مفصلة توضح هدف الدراسة وأهميتها. الأطباء الذين وافقوا على المشاركة أبلغوا بأن مشاركتهم مجهولة الاسم وطوعية، وأبلغوا أنهم يستطيعون الانسحاب من الدراسة في أي وقت دون الحاجة إلى تقديم أي مبرر. كما تمت طمأننة المشاركين بأن البيانات التي تم جمعها ستحفظ بأمان لدى الباحث الرئيسي، ولن يتم استخدامها إلا لأغراض البحث، ولن يتم الكشف عنها لأي طرف.

### اعدادات البحث

يحق للأشخاص المقيمين في البحرين الحصول على خدمات الرعاية الصحية الأولية التي توفرها شبكة مكونة من 24 مركزاً موزعة على مختلف محافظات المملكة. وتنقسم وزارة الصحة البلاد إلى خمس محافظات. في كل محافظة يتوفر 4-7 مراكز صحية أولية تقدم خدمات الرعاية الصحية الأساسية للأشخاص الذين يعيشون في تلك المحافظة. بدايةً، يقوم الأطباء في المراكز الصحية بتقييم المرضى بينما يتم إحالة بعضهم - عند الضرورة - إلى المشافي. وتحوي غالبية المراكز الصحية مختبراتها الخاصة، إضافة إلى منشأة الأشعة السينية والصيدلية. كما تقدم بعض المراكز خدمات علاجية إضافية مثل العلاج الطبيعي وبرامج الإقلاع عن التدخين. ويتم إرسال الوصفات الطبية التي توصف داخل المركز الصحي إلكترونياً إلى صيدلية تقع داخل نفس المبنى حيث يتم صرفها للمرضى. الدوام اليومي في المراكز الصحية موزع على 2-3 منوبات عمل، يستمر كل منها ثماني ساعات. خلال كل فترة عمل، يقدم 6-8 أطباء عائلة أو أطباء عامون خدمات صحية أولية للجمهور. لمساعدة الأطباء على التحقق بشكل موثوق من التفاعلات الدوائية في وصفاتهم، وتوفر وزارة الصحة، منذ عام 2014، فاحصاً إلكترونياً ضمن برنامج طبي إلكتروني يسمى «I-Seha». وينبغي على الطبيب المعالج إدخال الأسماء العلمية لجميع الأدوية الموصوفة للمريض، لغايات فحص الوصفات. إذا تم اكتشاف تفاعل دوائي بين أي من الأدوية الموصوفة، يقوم النظام تلقائياً بإخطار الطبيب. ويكون الطبيب هو المسئول عن فحص الوصفة الطبية والتأكد من خلوها من أي تفاعلات دوائية، في حين ينحصر دور الصيدلاني في صرف الأدوية الموصوفة من قبل الطبيب، والاستفسار عن أي خطأ يخص الجرعة أو طريقة حقن الدواء، بينما لا يقوم بالتحقق من وجود التفاعلات من عدمه.

### عينة الدراسة

الدراسة الحالية هي دراسة مستعرضة. ونظراً لأن المجموعة المستهدفة من قبل الباحثين كانت صغيرة نسبياً، فقد قررنا جمع البيانات من جميع المراكز الصحية في البحرين خلال مناوبة واحدة عشوائية، حيث تم توجيه الدعوة للمشاركة بالبحث من جميع الأطباء الذين تواجدوا خلال المناوبة التي تزامنت مع جمع البيانات. وقد وافق على التعاون مع فريق البحث والسماح بجمع البيانات، ما مجموعه 81 مركزاً من أصل 42 مركزاً صحياً أولياً في البحرين، بحيث بلغت نسبة الاستجابة 57٪. وجرى جمع البيانات خلال الفترة من شهر سبتمبر/أيلول إلى ديسمبر/كانون الأول 2017.

جدول ١ خصائص الأطباء المشاركين في الدراسة (العدد=126).

جدول ٢ تصورات الأطباء المشاركين حول الفحص الإلكتروني للتفاعلات الدوائية في وصفاتهم (العدد = ١٢٦).

عدد الاجابات	أعراض بشدة n (%)	أعراض n (%)	غير متأكد n (%)	أوافق n (%)	أوافق بشدة n (%)	
126	0 (0)	11 (8.7)	23 (18.3)	79 (62.7)	13 (10.3)	لدي معرفة كافية بالتفاعلات الدوائية
126	0 (0)	12 (9.5)	34 (27)	65 (51.6)	15 (11.9)	أنا على دراية بتصنيف التفاعلات الدوائية حسب أهميتها السريرية
126	1 (0.8)	3 (2.4)	3 (2.4)	50 (39.7)	69 (54.7)	عند كتابة وصفة طبية، أسأل المريض عن أدوية أخرى يأخذها في نفس الفترة
122	1 (0.8)	6 (4.9)	9 (7.4)	62 (50.8)	44 (36.1)	عند كتابة وصفة طبية، أتحقق من خلوها من التفاعلات الدوائية
125	1 (0.8)	5 (4)	30 (24)	59 (47.2)	30 (24)	إذا اكتشفت وجود تفاعل دوائي في وصفتي، فأنا على ثقة بقدرتي على التعامل معه
123	12 (9.8%)	44 (35.8)	14 (11.4%)	49 (39.8)	4 (3.2)	أنا أعتمد على ذاكرتي للتحقق من وجود تفاعلات دوائية
124	2 (1.6)	11 (8.9%)	7 (5.6)	78 (62.9)	26 (21)	للتحقق من وجود تفاعلات "I-Seha" أعتمد على دوائية
126	23 (18.3)	66 (52.4)	17 (13.5)	15 (11.9)	5 (3.9)	أعتمد على الصيدلاني في فحص التفاعلات الدوائية
124	0 (0)	1 (0.8)	10 (8)	42 (33.9)	71 (57.3)	أود أن أشارك في دورة تدريبية حول التفاعلات الدوائية

الطبيب في كشف ومتابعة التفاعلات الدوائية. وكانت هذه البيانات مفاجئة على نحو خاص لأننا توقعنا أن يكون لدى أطباء الأسرة معرفة سريرية أفضل مقارنةً بالأطباء العامين. فأطباء الأسرة نالوا شهادات الاختصاص بعد قضاء أربع سنوات في هذا التخصص قبل البدء بالعمل في المراكز الصحية الأولية مقارنةً بالأطباء العامين الذين انضموا إلى العمل في هذه المراكز عقب إنهاء سنة الامتياز مباشرةً. وبناءً على ما تقدم، أظهرت هذه النتائج أن الأطباء المبتدئين، بغض النظر عن تخصصهم من عدمه، يحتاجون إلى الإرشاد والمتابعة للتأكد من قدرتهم على التعامل مع التفاعلات الدوائية أثناء ممارسة عملهم. وأظهرت نتائج هذه الدراسة أيضاً أن غالبية المشاركين كتبوا وصفات طبية تحتوي على أدوية متعددة. وبما أن خطر التفاعلات الدوائية يزداد بالتوازي مع الإفراط الدوائي (9)، فإننا نفترض أن خطر حدوث تفاعلات دوائية في وصفاتهم من المتوقع أن تكون عالية تحت هذه الظروف. في هذا السياق، أجرى Castilho وزملاؤه دراسة على مجموعة من المرضى النفسيين المسنين المومنين في المشافي والذين كانوا يتلقون أدوية متعددة. ورصد الباحثون أن معدل التفاعلات الدوائية ازداد بالتوازي مع فترة التنويم بالمشفى حيث ازداد من 6.7% عند الدخول إلى المشفى، إلى 74.5% في منتصف مدة الإقامة وأخيراً وصل إلى 80.8% عند الخروج (10).

اعتقد معظم الأطباء المشاركين أن لديهم معرفة كافية بالتفاعلات الدوائية، بما في ذلك تصنيفها حسب أهميتها من الناحية السريرية. وأضاف معظمهم أنهم قاموا بالفعل بفحص الوصفات الطبية للتأكد من عدم احتوائها على تفاعلات، بل وأضافوا أنهم كانوا على ثقة بقدرتهم على التعامل مع هذه التفاعلات في حال الكشف عن وجودها. ويُعتبر الأطباء مسؤولين عن التحقق من خلوص وصفاتهم من التفاعلات وذلك عند كتابة وصفات طبية تحتوي على أكثر من دواء. لذلك، من أجل الحد من التفاعلات الدوائية في الممارسة السريرية، فمن الأهمية بمكان أن يكون لدى الأطباء معرفة ومهارات كافية لاكتشاف هذه التفاعلات والقدرة على التعامل السليم معها. وقد أجرى الباحث Nabovati وزملاؤه دراسة فحصوا خلالها معرفة الأطباء المقيمين في 8 مستشفيات أكاديمية بالتفاعلات الدوائية. وأفاد الباحثون أن الأطباء الذين وافقوا على المشاركة كانوا قادرين على تصنيف 41% فقط من الأدوية التي تم اختبارهم حول تفاعلاتها مع بعضها البعض، وهي نتيجة أشارت إلى ضعف في المعرفة لدى هؤلاء الأطباء بشأن التفاعلات الدوائية.

على فعل ذلك أم لا. (30، 24%) أظهرت نتائج الدراسة أن غالبية الأطباء أفادوا بأنهم لا يعتمدون على الصيدلاني في عملية فحص الوصفات للتأكد من خلوها من التفاعلات الدوائية (70.7%، 89). ورداً على سؤال ما إذا كانوا يرغبون في المشاركة في دورة تأهيلية لمساعدتهم على التعامل مع التفاعلات الدوائية، رحبت الغالبية العظمى من المشاركين بهذه الفكرة (91.1%، 113).

أظهر التحليل الإحصائي عدم وجود علاقة بين جنس الطبيب، أو كونه طبيب عائلة أو طبيب عام، ومهارته في الكشف عن التفاعلات بين العقاقير الموصوفة. وفي المقابل، أظهرت البيانات أن الأطباء الذين عملوا لأكثر من 10 سنوات كانوا أكثر ثقة بمعرفتهم بالتفاعلات الدوائية ( $p < 0.001$ )، وكانوا أكثر استعداداً للتحقق من خلوص وصفاتهم من التفاعلات ( $p < 0.01$ )، كما أنهم كانوا أكثر قدرة على التعامل مع التفاعلات الدوائية بمجرد التعرف عليها ( $p < 0.001$ ).

## نقاش النتائج

تمثل التفاعلات الدوائية مشكلة عالمية تهدد سلامة المرضى وتزيد بشكل ملحوظ من معدلات الاعتلال والوفيات لديهم (7). عملية فحص الوصفات الدوائية للتأكد من خلوها من التفاعلات الدوائية تعتبر تحدياً يومياً للأطباء لأنها تحتاج إلى وقت طويل خاصةً في ظل تزايد ضغوطات العمل لدى الأطباء العاملين في مراكز الرعاية الصحية الأولية على وجه التحديد. العديد من العوامل ساهمت في زيادة معدلات التفاعلات الدوائية، منها التوسع غير المسبوق في صناعة المستحضرات الدوائية من جهة، وزيادة أعداد المرضى من المسنين وانتشار الإفراط الدوائي من جهة ثانية (8). وقد قمنا في هذه الدراسة باستكشاف آراء الأطباء في مراكز الرعاية الصحية الأولية في البحرين حول نمط استخدامهم نظام «I-Seha»، وهو برنامج إلكتروني مقدّم من وزارة الصحة يحتوي على فاحص يمكن الأطباء من التحقق من خلوص وصفاتهم من التفاعلات الدوائية. وقد كشفت البيانات التي حصلنا عليها من هذه الدراسة أنه على الرغم من أن معظم المشاركين أفادوا باستخدام «I-Seha» لتحديد الأدوية المتفاعلة في وصفاتهم، إلا أن الأطباء لم تتحقق لهم الاستفادة من هذا البرنامج بالشكل المطلوب، بل اعتمدوا على ذاكرتهم لإنجاز هذه المهمة ولو بشكل جزئي.

كشفت النتائج التي توصلنا إليها أن مدة الخبرة العملية للمشاركين، وليس كونهم أطباء عامين أو اختصاصيين في طب الأسرة، ارتبطت ارتباطاً وثيقاً مع ثقة

وقتماً طويلاً. وجدير بالذكر أن المسؤولية عن فحص خلو الوصفات الدوائية من التفاعلات تقع على عاتق الطبيب المعالج وليس الصيدلاني. لذلك أظهرت بيانات هذه الدراسة أن غالبية الأطباء لا يعتمدون على طاقم الصيدلية في كشف التفاعلات في الوصفات التي يصرفونها.

استهدفت هذه الدراسة غالبية المراكز الصحية في البحرين وتمكن الباحثون من إقناع عدد كاف من الأطباء بالمشاركة في هذه الدراسة. ومع ذلك، لم يقم فريق البحث بعقد مجموعات بؤرية مع المشاركين، ويرجع ذلك إلى حد كبير إلى صعوبات لوجستية. على أية حال، المجموعات البؤرية كانت ستكون مفيدة لفهم بعض النتائج التي توصلنا إليها مثل إقرار بعض المشاركين بالاعتماد على ذاكرتهم في رصد التفاعلات في وصفاتهم. إضافة إلى ذلك، استهدفت الدراسة الأطباء العاملين في العيادات الخارجية التابعة لمراكز الصحة الأولية بينما لم تستهدف الدراسة الأطباء العاملين في المشافي، حيث من المتوقع أن يكون معدل التفاعلات الدوائية فيها أعلى بكثير مما هو عليه في العيادات الخارجية.

### الاستنتاجات

كشفت نتائج الدراسة أن معظم الأطباء المشاركين قاموا بفحص وصفاتهم الطبية للتأكد من خلوها من التفاعلات الدوائية باستخدام البرنامج الإلكتروني المتاح، لكنهم اعتمدوا جزئياً على ذاكرتهم لإكمال هذه المهمة. وأظهرت هذه البيانات الحاجة إلى تحسين وعي الأطباء بأهمية الاستخدام الأمثل للبرنامج لضمان كشف موثوق للتفاعلات الدوائية بما يساهم في ضمان سلامة المرضى في نظام الرعاية الصحية الأولية في البحرين.

كما أفاد فريق البحث أن جميع المشاركين تقريباً رحبوا بفكرة حضور دورة تدريبية حول التعرف على التفاعلات الدوائية (11). وتتناهى هذه النتيجة مع البيانات التي جمعناها، والتي أظهرت أن معظم الأطباء رحبوا بفكرة المشاركة في دورة مشابهة.

معظم الأطباء، في العينة التي استهدفتها الدراسة، استفسروا من مرضاهم عن أدوية تناولوها بالتزامن مع أدوية أخرى واستخدموا نظام «I-Seha» لفحص وصفاتهم للكشف عن وجود تفاعلات فيها. ولكننا تفاجأنا أن حوالي 43٪ منهم أضافوا أنهم يعتمدون على ذاكرتهم لفحص التفاعلات في وصفاتهم. وتجعل الزيادة السريعة في عدد الأدوية التي يتم تسويقها الإلمام بكل التفاعلات بين الأدوية أمراً مستحيلاً. لذلك، ظهرت مؤخراً مجموعة من مدققات التفاعلات الدوائية سواء عبر الإنترنت أو برامج إلكترونية لمساعدة الأطباء على مواجهة هذه المشكلة (12). ومع ذلك، فلنحقق هذه البرامج الفائدة المرجوة منها يجب على الطبيب المعالج أن يسأل المريض عن الأدوية الأخرى التي يتناولها في نفس الفترة، وإدخال أسماء جميع الأدوية التي يتناولها المريض سواء في الوصفة نفسها أو في العقاقير التي تصرف بدون وصفة طبية مثل المكملات الغذائية. حيث إن نسبة من الأطباء أفادوا بالاعتماد على ذاكرتهم في فحص التفاعلات الدوائية، ومن الممكن أن يكون الأطباء المشاركين في هذه الدراسة قد اعتمدوا على ذاكرتهم في فحص التفاعلات بين العقاقير الموصوفة خلال الزيارة الحالية والأدوية الأخرى التي يأخذها المرضى من قبل، وذلك دون إدخال تلك الأدوية إلى الفاحص. ونعتقد بوجود أسباب كثيرة تحول دون استفادة الأطباء من الفاحص الإلكتروني، ومنها ضغط العمل الناتج عن العدد الكبير من المرضى الذين يقوم الطبيب بخدمتهم في المناوبات، كما أظهرت نتائج هذه الدراسة. وإضافة إلى ذلك، ففي حالة الكشف عن وجود تفاعلات دوائية في وصفة معينة، ينبغي على الطبيب البحث عن بدائل دوائية أخرى مناسبة، وهذه العملية تتطلب

### شكر وتقدير

نود أن نشكر الأطباء المشاركين على تعاونهم. وشكر خاص للدكتور جميل أحمد لنصيحته بشأن اختيار عينة الدراسة والدكتور عامر المرابحة على تعاونه في التحليل الإحصائي للنتائج.

## Opinions of primary health care centres' doctors in Bahrain on the electronic software for checking drug interactions in their prescriptions

### Abstract

**Background:** An electronic software for checking drug interactions is available at primary health centers in Bahrain. However, it is unclear whether it is optimally utilized by the prescribers.

**Aims:** We aimed to explore physicians' attitudes towards the use of the drug interactions checker.

**Methods:** This was a cross-sectional study. Data was collected from 18 primary healthcare centres in Bahrain (75%). Primary healthcare physicians responded to a self-administered survey, which was comprised of Likert-type questions.

**Results:** The majority of participants ( $n=126$ ) were specialist family physicians (91.3%), while the rest were general practitioners (8.7%). Most physicians wrote more than 30 prescriptions in a typical working shift (92.7%); more than half of them contained a combination of drugs (81.5%). Most physicians checked for interactions when prescribing a drug combination (86.9%). Most doctors believed that they had adequate knowledge of drug interactions (73%). However, around one quarter of them were not sure if they would be able to manage them (24%). Although most physicians used the available electronic software (83.9%), many of them relied on their memory to check for interactions (43%). Duration of practice experience, rather than specialization, was correlated with self-reported knowledge ( $P < 0.001$ ) and ability to manage interactions ( $P < 0.001$ ).

**Conclusions:** Although most physicians used the software, a significant proportion of them depended on their prior knowledge to identify drug interactions. The importance of optimal use of the software to ensure reliable drug interaction management should be emphasized to the physicians.



## Avis des médecins des centres de soins de santé primaires de Bahreïn sur le logiciel électronique de vérification des interactions médicamenteuses présentes dans leurs ordonnances

### Résumé

**Contexte :** Les centres de soins de santé primaires de Bahreïn disposent désormais d'un logiciel électronique de vérification des interactions médicamenteuses. Cependant, on ne sait pas précisément si celui-ci est utilisé de manière optimale par les prescripteurs.

**Objectifs :** La présente étude avait pour objectif d'analyser l'attitude des médecins relativement à l'utilisation de ce vérificateur des interactions médicamenteuses.

**Méthodes :** Il s'agissait d'une étude transversale. Les données ont été collectées auprès de 18 centres de soins de santé primaires à Bahreïn (75 %). Les médecins de ces centres ont répondu à une enquête auto-administrée, comprenant des questions de type Likert.

**Résultats :** La majorité des participants (n=126) étaient des médecins de famille spécialisés (91,3 %), tandis que les autres étaient des médecins généralistes (8,7 %). La plupart des médecins rédigeaient plus de 30 ordonnances au cours d'une journée de travail type (92,7 %) ; dont plus de la moitié comportaient plusieurs médicaments (81,5 %). La majorité des médecins vérifiaient les interactions médicamenteuses lorsqu'ils prescrivaient plusieurs médicaments (86,9 %). La plupart des médecins estimaient qu'ils avaient une connaissance suffisante des interactions médicamenteuses (73 %). Cela dit, près d'un quart d'entre eux n'étaient pas certains d'être en mesure de les gérer (24 %). Bien que la majorité des médecins utilisaient le logiciel électronique mis à leur disposition (83,9 %), un grand nombre d'entre eux se fiaient à leur mémoire pour vérifier les interactions (43 %). Le nombre d'années d'expérience, plutôt que la spécialisation, était corrélée aux connaissances auto-déclarées ( $p < 0,001$ ) et à la capacité à gérer les interactions ( $p < 0,001$ ).

**Conclusions :** Même si majorité des médecins utilisaient le logiciel, une part importante d'entre eux se fiaient aux connaissances acquises pour identifier les interactions médicamenteuses. Les médecins devraient être davantage sensibilisés à l'importance d'une utilisation optimale du logiciel pour garantir une gestion fiable des interactions médicamenteuses.

### References

المراجع

1. MacLeod SM, Sellers EM. Pharmacodynamic and pharmacokinetic drug interactions with coumarin anticoagulants. *Drugs*. 1976;11(6):461-70.
2. Costa AJ. Potential drug interactions in an ambulatory geriatric population. *Fam Pract*. 1991;8:234-6.
3. Bjorkman IK, Fastbom J, Schmidt IK, Bernsten CB. Drug-drug interactions in the elderly. *Ann Pharmacother*. 2002;36:1675-81.
4. Lindblad CI, Artz MB, Pieper CF, Sloane RJ, Hajjar ER, Ruby CM, et al. Potential drug-disease interactions in frail, hospitalized elderly veterans. *Ann Pharmacother*. 2005;39:412-7.
5. Juurlink DN, Mamdani M, Kopp A, Laupacis A, Redelmeier DA. Drug-drug interactions among elderly patients hospitalized for drug toxicity. *JAMA*. 2003;289:1652-8.
6. Frechen S, Zoeller A, Ruberg K, Voltz R, Gaertner J. Drug interactions in dying patients: a retrospective analysis of hospice inpatients in Germany. *Drug Saf*. 2012 Sep 1;35(9):745-58.
7. Montané E, Arellano AL, Sanz Y, Roca J, Farré M. Drug-related deaths in hospital inpatients: A retrospective cohort study. *Br J Clin Pharmacol*. 2017 Nov 17.
8. Salwe KJ, Kalyansundaram D, Bahurupi Y. A Study on Polypharmacy and Potential Drug-Drug Interactions among Elderly Patients Admitted in Department of Medicine of a Tertiary Care Hospital in Puducherry. *J Clin Diagn Res*. 2016 Feb;10(2):FC06-10.
9. Gebretsadik Z, Gebrehans M, Getnet D, Gebrie D, Alema T, Belay YB. Assessment of Drug-Drug Interaction in Ayder Comprehensive Specialized Hospital, Mekelle, Northern Ethiopia: A Retrospective Study. *Biomed Res Int*. 2017;2017:9792363.
10. Castilho ECD, Reis AMM, Borges TL, Siqueira LDC, Miasso AI. Potential drug-drug interactions and polypharmacy in institutionalized elderly patients in a public hospital in Brazil. *J Psychiatr Ment Health Nurs*. 2017 Sep 11.
11. Nabovati E, Vakili-Arki H, Taherzadeh Z, Saberi MR, Abu-Hanna A, Eslami S. A survey of attitudes, practices, and knowledge regarding drug-drug interactions among medical residents in Iran. *Int J Clin Pharm*. 2017 Jun;39(3):560-568.
12. Muhič N, Mrhar A, Brvar M. Comparative analysis of three drug-drug interaction screening systems against probable clinically relevant drug-drug interactions: a prospective cohort study. *Eur J Clin Pharmacol*. 2017 Jul;73(7):875-882.



# Mobile phone use pattern and addiction in relation to depression and anxiety

Dalia El-Sayed Desouky<sup>1,2</sup> and Hany Abu-Zaid<sup>1</sup>

<sup>1</sup>Department of Family and Community Medicine, College of Medicine, Taif University, Taif, Saudi Arabia (Correspondence to: D. El-Sayed Desouky: dalialedesouky1234@gmail.com). <sup>2</sup>Department of Public Health and Community Medicine, Faculty of Medicine, Menoufia University, Menoufia, Egypt.

## Abstract

**Background:** University students with heavy smartphone use are vulnerable to smartphone addiction that could be related to depression and trait anxiety.

**Aims:** To assess gender differences in patterns of smartphone use and addiction in relation to depression and trait anxiety among Saudi university students.

**Methods:** This was a cross-sectional study of 1513 students of Taif University, Saudi Arabia. A self-reported questionnaire was used to collect demographic data and data on pattern of smartphone use. The Problematic Use of Mobile Phones (PUMP) scale was used to determine smartphone addiction. The Arabic validated version of the Taylor Manifest Anxiety Scale and Beck Depression Inventory were used to assess trait anxiety and depression, respectively.

**Results:** A female predominance was found for: prevalence of depression and trait anxiety, PUMP scores, duration of daily mobile use and number of daily calls. A significant positive correlation was found between PUMP score and depression and trait anxiety scores, duration of owning a smartphone, and average duration of each daily call. The PUMP scores were significantly higher in 6th year students, those from the theoretical college, single students, and students who used a smartphone for > 4 hours/day.

**Conclusions:** Smartphone addiction is a major problem among Saudi university students, and it is associated with depression and trait anxiety. Future studies should aim to establish the best interventions to protect university students from the negative effects of smartphones.

Keywords: addiction, anxiety, depression, smartphone, university students.

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## Introduction

Smartphones, as well as being telephones, act as internet browsers, social networking facilitators, cameras and multimedia players (1). Overuse of smartphones is associated with adverse effects on daily lives (2), leading to sleep, education, relationship and work problems; stress, loneliness, aggression, hostility and reduced quality of life (3); and adverse effects on physical (4) and mental (5,6) health.

Smartphones enable university students to know the latest advances in communications technology, and to make rapid contact with their friends and families (6). College students with heavy smartphone use are vulnerable to smartphone addiction (7–10), which is defined as “the excessive uncontrolled use of the smartphone despite the awareness of the consequences, with the presence of withdrawal symptoms in any attempt to control” (11). A systematic review has found that severity of depression and anxiety is directly related to smartphone addiction (5), and the same finding has been demonstrated in previous studies of university students (6,9).

According to a study done by United Nations Conference on Trade and Development (UNCTAD), Saudi

Arabia ranked first in the world for the highest proportion of mobile phone users (12), with a smartphone distribution rate of 86.1% in 2015 (10). A few recent Saudi studies have addressed smartphone addiction and its psychological adverse effects. One study was done on students of King Saud University, and found a prevalence of smartphone addiction of 48%, with a significant gender differences in the degree of addiction (13). Another study was done in the same university and assessed the adverse physical effects of smartphone addiction on academic performance (14).

Only 2 studies have investigated the relationship between smartphone addiction and depression; 1 on medical students (10), and the other on female high school students (15).

Previous researchers have found gender differences in smartphone addiction (6,16). No Saudi study has assessed gender difference, which is vital in planning targeted prevention and intervention strategies to deal with this problem. The aim of the present study was to assess the gender differences in pattern of smartphone use and addiction in relation to depression and trait anxiety among Saudi university students.

## Methods

### Study design

This was a cross-sectional study of students of Taif University, Taif, Saudi Arabia from November 2017 to March 2018.

### Sampling methodology

Multistage sampling was carried out, and the university community of Taif University was the sampling frame. From the 4 health colleges of Taif University, 1 was chosen by simple random sampling, and the same was done to choose 1 college out of the 7 theoretical colleges, where the male and female sections of each college were included. There were 2138 students registered in both female and male sections of the 2 colleges in the academic year 2017–2018. The response rate was 74.5% and the total number of participants was 1594 students.

### Ethical considerations

The study was reviewed and approved by the Research Ethics Committee of Taif University and from the deanships of the chosen colleges. Verbal consent was obtained from the participating students.

### Study instrument

A predesigned questionnaire was used with the first few questions on the demographic characteristics, college type and educational grade.

In the first section, those who replied yes to ownership of a smartphone were qualified to answer the subsequent sections. Of the 1594 participants, 1570 (98.49%) had a smartphone. Of the 1570 questionnaires, 57 incomplete questionnaires were excluded, leaving 871 valid questionnaires from students of the health college and 642 from the theoretical college.

The second section included questions on patterns of smartphone use.

The third section was the Arabic validated version of the Problematic Use of Mobile Phones (PUMP) scale that was used to assess smartphone addiction. The Arabic version of this scale was validated in a previous Saudi study (17), and had excellent internal consistency and convergent validity (18,19). The scale includes 20 questions based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for substance use disorder (17,18), and every question was answered on a Likert scale of 1–5. The total score ranged from 20 to 100, with higher scores indicating more usage and more problematic use.

The fourth section assessed trait anxiety levels using the Arabic validated version of the Taylor Manifest Anxiety Scale that consists of 50 questions. Students' trait anxiety level was assessed as follows: normal (score of 0–16), mild (17–20), moderate (21–26), severe (27–29), and very severe (30–50) (19).

In the fifth section, depression level was assessed using the Arabic version of the Beck Depression Inventory

that includes 21 items. Every item was scored from 0 to 3 according to its severity, and the total score ranged from 0 to 63. The students were assessed as normal if they had a score < 26. Depression level was assessed as follows: mild (26–38), moderate (39–55) and severe (56–63) (20).

### Statistical analysis

Data were coded, tabulated and analysed using SPSS version 20 (IBM, Armonk, NY, USA). Qualitative data were expressed as numbers and percentages, and the  $\chi^2$  test was applied to test the relationship between variables. Quantitative data were expressed as mean (standard deviation), and for nonparametric variables, as median (interquartile range). Mann–Whitney and Kruskal–Wallis tests were applied for comparison between nonparametric variables. Correlation analysis using the Spearman's test was done, and  $P < 0.05$  was considered statistically significant. As there was no documented cutoff point for PUMP score, we considered the median of our studied group score as a cutoff point. So, the studied group was divided into positive smartphone addiction group (score  $\geq 59$ ) and negative smartphone addiction group (score < 59). Binary logistic regression analysis was performed, which analyses independent predictors with odds ratios for a binary outcome (here, smartphone addiction).

## Results

The mean age of the participants was 20.58 (1.71) years. Of them, 825 (54.5%) were female and 688 (45.5%) were male, 57.6% were from health colleges, and 10.1% were married (Table 1). Depression and trait anxiety were found in 32.7% and 58.7% of students, respectively (Table 2).

There were gender differences (in favour of females) for: students' grades, college type, marital status, average duration of daily mobile use, duration of each daily call and number of daily calls (Table 1).

Compared to male students, female students had a significantly higher prevalence of depression (34.9% vs 29.9%) and trait anxiety (69.2% vs 46.1%) respectively (Table 2). The same gender difference was found in relation to depression and trait anxiety scores [median IQR: (18–24 vs 14–22) and (20–9 vs 13–14), respectively]. Female students showed a significantly higher median PUMP value compared to male students (median IQR: 60–27 vs 55–31, respectively).

There were significant positive correlations between PUMP score and depression score ( $r = 0.534$ ,  $P < 0.001$ ), trait anxiety score ( $r = 0.225$ ,  $P < 0.001$ ), duration of owning a smartphone ( $r = 0.077$ ,  $P = 0.003$ ), and average duration of each daily call ( $r = 0.189$ ,  $P < 0.001$ ) respectively.

Median IQR of PUMP score was significantly higher among 6th year students (63–30) compared to other grades ( $P < 0.001$ ), and among students from theoretical colleges compared to health colleges (63–33 vs 53–26) ( $P < 0.001$ ) (Table 3). Single students showed a significantly higher PUMP score compared to married students (60–30 vs 52–24) ( $P = 0.008$ ). The PUMP scores were significantly higher among students who reported average daily

**Table 1 Gender difference in characteristics and patterns of smartphone phone use**

Parameter	Male No. (%)	Female No. (%)	Test	P
Grade				
1st	155 (22.5)	115 (13.9)	$\chi^2$ 49.94	< 0.001
2nd	142 (20.6)	139 (16.8)		
3rd	119 (17.3)	119 (14.4)		
4th	110 (16)	138 (16.7)		
5th	95 (13.8)	151 (18.3)		
6th	67 (9.7)	163 (19.8)		
College type				
Health	378 (54.9)	493 (59.8)	$\chi^2$ 3.56	0.059
Theoretical	310 (45.1)	332 (40.2)		
Marital status				
Married	55 (8)	98 (11.9)	$\chi^2$ 6.22	0.013
Unmarried	633 (92)	727 (88.1)		
Family monthly income (SAR)				
< 10 000	217 (31.5)	240 (29.1)	$\chi^2$ 1.1	0.577
10 000–20 000	318 (46.2)	398 (48.2)		
> 20 000	153 (22.2)	187 (22.7)		
Average duration of daily mobile use				
< 2 h	343 (49.9)	348 (42.2)	$\chi^2$ 10.37	0.006
2–4 h	158 (32)	198 (24)		
> 4 h	187 (27.2)	279 (33.8)		
Average duration of each daily call				
> 15 min	428 (62.2)	400 (48.5)	$\chi^2$ 29.8	< 0.001*
16–30 min	154 (22.4)	239 (29)		
31–60 min	73 (10.6)	129 (15.6)		
> 1 h	33 (4.8)	57 (6.9)		
Age, yr, median IQR				
	20–3	21–3	U 2.219	0.027
Duration of owning smartphone, median IQR				
	8–3	9–2	U 0.985	0.325
No. of daily calls, median IQR				
	2–1	2–2	U 3.12	0.002

\*Highly significant difference.

IQR = interquartile range; SAR = Saudi riyal; U = Mann–Whitney U test.

smartphone use of > 4 hours (median IQR 65–31.25), compared to those who used the smartphone for shorter durations ( $P < 0.001$ ). Students suffering from depression had significantly higher PUMP scores compared to those without depression (median IQR 74–20 vs 48–22) ( $P < 0.001$ ). The same was observed for students who suffered from trait anxiety (median IQR 63–30) compared to those without trait anxiety (51–27) ( $P < 0.001$ ).

Binary logistic regression analysis showed that being female or single, older age, or having depression or trait anxiety were independent predictors for smartphone addiction (Table 4).

**Table 2 Gender difference regarding depression, trait anxiety and smartphone addiction**

Parameter	Male No. (%)	Female No. (%)	Test	P
Depression				
Present	206 (29.9)	288 (34.9)	$\chi^2$ 4.1	0.04
Absent	482 (70.1)	537 (65.1)		
Type of depression (n = 494)				
Mild	108 (52.4)	112 (38.9)	$\chi^2$ 9.59	0.008
Moderate	91 (44.2)	158 (54.9)		
Severe	7 (3.4)	18 (6.3)		
Depression scores, median IQR				
	14–22	18–24	U 3.33	0.001
Trait anxiety				
Present	317 (46.1)	571 (69.2)	$\chi^2$ 82.83	<0.001*
Absent	371 (53.9)	254 (30.8)		
Type of trait anxiety (n = 888)				
Mild	159 (50.5)	242 (42.4)	$\chi^2$ 10.31	0.016
Moderate	93 (29.3)	157 (27.5)		
Severe	43 (13.6)	107 (18.7)		
Very severe	22 (6.9)	65 (11.4)		
Trait anxiety scores, median IQR				
	13–14	20–9	U 12.1	<0.001*
PUMP scores, median IQR				
	55–31	60–27	U test 2.74	0.006

\*Highly significant difference.

IQR = interquartile range; SAR = Saudi riyal; U = Mann–Whitney U test.

## Discussion

We found a female predominance for average duration of daily mobile use, average duration of each daily call, and number of daily calls, which agreed with other national and international studies (6, 14). Women have been found to be more addictive to social media (14), more interested in social networking (21), and always report a higher number and length of mobile calls (6). This is because women use mobile phones more in social interaction than men do (17).

The prevalence of depression (32.7%) and trait anxiety (58.7%) reported in the present study was in line with that reported recently in Taif University (22,23). This high prevalence was attributed to academic pressure, stressful college environment, social and cultural factors, and adverse social relationships (24).

In the present study, the mean PUMP score of the whole sample [59.51 (16.93)] agreed with the mean value observed in another Saudi study [60.8 (14.9)] (14). In that study, the mean was an indicator of higher prevalence of smartphone addiction. This is consistent with another Saudi study that revealed a high level of smartphone addiction among high school students (15). The observed mean PUMP score in the present study was comparable to that observed in a study in Pakistan on university

**Table 3 Relationship between PUMP scores and characteristics, pattern of smartphone use, trait anxiety and depression**

Variable	Mobile addiction scores, median IQR	Test	P
Grade			
1st	53.5–26.25	H 27.08	0.001*
2nd	60–30		
3rd	53–29.25		
4th	63–33		
5th	52.5–24		
6th	63–30		
Marital status			
Married	52–24	U 2.65	0.008
Single	60–30		
Family monthly income, SAR			
< 10 000	59–24	H 3.77	0.151
10 000–20 000	59–29.75		
> 20 000	57–31		
College type			
Health	53–26	U 6.01	< 0.001*
Theoretical	63–33		
Average duration of daily mobile use			
< 2 h	52–25	H 74.78	< 0.001*
2–4 h	55.5–27		
> 4 h	65–31.25		
Depression			
Present	74–20	U 24.58	< 0.001*
Absent	48–22		
Type of depression			
Mild	68–15	H 52.72	< 0.001*
Moderate	77–19		
Severe	90–19		
Trait anxiety			
Present	63–30	U 32.57	< 0.001*
Absent	51–27		
Type of trait anxiety			
Mild	59–27	H 68.91	< 0.001*
Moderate	60–28.5		
Severe	63–28		
Very severe	79–28		

\*Highly significant difference

H = Kruskal–Wallis test; IQR = interquartile range; SAR = Saudi riyal; U = Mann–Whitney test.

students [56.33 (15.92)] (25), and another study of Indian adolescents [59 (1.3)] (26).

The present study showed a significant gender difference according to the PUMP scores in favour of female students, as reported in other studies (6). The gender difference could have resulted from the higher trait anxiety scores among female students, which was positively correlated with PUMP scores. In addition, female students showed more moderate to severe forms of

**Table 4 Binary logistic regression analysis of risk factors for smartphone addiction**

Variable	Smartphone addiction			P
	$\beta$	Wald	Odds ratio	
Sex	0.73	24.23	2.08 (1.55–2.79)	< 0.001*
Age	0.01	0.11	1.01 (0.92–1.12)	0.735
Marital status	0.64	7.18	1.90 (1.19–3.06)	0.007
Presence of depression	2.87	59.39	17.76 (8.54–36.92)	< 0.001*
Presence of trait anxiety	0.22	9.43	1.25 (1.08–1.45)	0.002

\*Highly significant.

depression (61% vs. 48%) and more severe and very severe trait anxiety (30% vs. 20%) than male students did, and severity of depression and anxiety were correlated with smartphone addiction. Generally, the cause of that gender difference is still not well understood. It could be explained by the significantly higher prevalence of depression among female participants and the known vicious circle between smartphone addiction and depression (27). Some studies have attributed this difference to the extensive female use of smartphones for social purposes compared to men (21,27,28). For more understanding of that gender difference, further research is needed to assess gender-related predictors of smartphone addiction.

In the present study there were significant positive correlations between smartphone addiction and both depression and trait anxiety scores, which has been found in international studies (5,6,9,10) and Saudi studies (15), including 1 in Taif university (5). According to the conclusions from previous studies, smartphone addiction forms a vicious cycle with psychopathology (29). The overuse of mobile phones may increase stress by the continuous checking and response to text messages and notifications (29). This excessive reassurance-seeking behaviour is associated with depression and anxiety (29). Smartphone overuse forces the user to be awake late at night, leading to sleep problems and worsening depression and stress (4). Electromagnetic waves from mobile phones also delay melatonin production and lead to sleep disorders and depression (30). Other studies found that depression is a predictor for mobile phone addiction, as depressed individuals overuse smartphones as a coping mechanism to rid themselves of stress and depressive emotions (31).

In the present study, the 6th year students had significantly higher PUMP scores than students from other years, which is in agreement with another Saudi study (14). However, this is in contrast with other studies that have shown the inverse relationship between age and addictive use of technologies (21). This disagreement could be explained by the older age of our sample of university students who use smartphones for both educational and entertainment purposes, which



make them vulnerable to addiction (7–10).

The present study showed that single, compared to married, students had significantly higher PUMP scores. This is in line with other studies in which being single was associated with addictive social networking (13, 21). There was a nonsignificant difference between PUMP scores and family monthly income in the present study. This differed from a Malaysian study in which students with higher income had significantly more mobile phone use (32). This variation could be attributed to the different sociocultural factors and socioeconomic standard of Saudi Arabia, which has an oil-based economy (33). This could explain the high and growing rate of smartphone use in Saudi Arabia, which was estimated to be 63.17% in 2016 (34).

Students from the theoretical college showed significantly higher levels of PUMP scores compared to health college students. This could be attributed to the large number of time-consuming tasks of health colleges students who have condensed academic courses, continuous assessments and examinations (22), giving them insufficient time to use smartphones, compared to the theoretical college students. In addition, Saudi medical students are engaged in practical training courses in hospitals as well as studying for the Saudi Medical Licensure Examination (35).

We found significantly higher PUMP scores among students who had an average duration of daily mobile use of > 4 hours, which is consistent with previous studies (7,8,13–15). The significant positive correlation found between PUMP scores and the average duration of each daily call has also been reported in previous studies (7,8).

The younger age of owning a smartphone was significantly associated with smartphone addiction (9). Similarly, we found a significant positive correlation

between PUMP scores and duration of owning a smartphone.

In the present study, the risk factors for smartphone addiction were being female or single, older age, or having depression or trait anxiety. This agrees with the results of a wide range of studies done to address this issue (5,6,9, 10, 13,14,21,27,28). This reinforces the reported gender difference regarding smartphone addiction.

One of the limitations of this study was using a self-reported questionnaire that had the possibility of reporting bias. Another limitation was being a cross-sectional study that showed the relation between variables but impeded the detection of the cause–effect relationship. The present study was a single centre study that precludes generalization of the results.

## Conclusion

The present study showed that smartphone addiction is a major problem among Saudi university students, and is associated with psychological disorders such as depression and trait anxiety. The study calls for future research on larger numbers of students from other universities to allow the generalization of results. Gender-related predictors of smartphone addiction should be investigated in those studies to explore motivations and contents of smartphone use that lead to that behavioural problem. We recommend raising the awareness of university students about the negative effects of smartphones through health education campaigns, in addition to carrying out counselling campaigns with the help of expert psychotherapists to help smartphone addicts to overcome this problem. These interventions should take in consideration the observed gender difference of the problem.

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## Schéma d'utilisation du téléphone portable et dépendance rapportés à la dépression et l'anxiété

### Résumé

**Contexte :** Les étudiants universitaires qui utilisent leur smartphone de manière intensive s'exposent à une dépendance vis-à-vis du téléphone portable potentiellement liée à la dépression et à l'anxiété réactionnelle.

**Objectifs :** Évaluer les différences entre les sexes en termes de modes d'utilisation du smartphone et de dépendance rapportés à la dépression et l'anxiété réactionnelle parmi les étudiants universitaires en Arabie saoudite.

**Méthodes :** Une étude transversale a été menée auprès de 1 513 étudiants de l'Université de Taif (Arabie saoudite). Un questionnaire auto-administré a été utilisé pour recueillir des données démographiques ainsi que des données sur les schémas d'utilisation du smartphone. L'échelle PUMP (*Problematic Use of Mobile Phones*, ou usage problématique du téléphone portable) a été utilisée pour établir la dépendance vis-à-vis du smartphone. La version arabe validée de l'échelle



d'anxiété manifeste de Taylor et de l'inventaire de dépression de Beck a été utilisée pour évaluer respectivement l'anxiété réactionnelle et la dépression.

**Résultats :** Une prédominance féminine a été relevée concernant la prévalence de la dépression et de l'anxiété réactionnelle, les scores PUMP, la durée d'utilisation quotidienne du téléphone portable et le nombre quotidien d'appels. Une corrélation positive importante a été établie entre le score PUMP et les scores d'évaluation de la dépression et de l'anxiété réactionnelle, l'ancienneté de possession du smartphone et la durée moyenne de chaque appel quotidien. Les scores PUMP étaient comparativement beaucoup plus élevés chez les étudiants de sixième année, ceux suivant des études théoriques, les étudiants célibataires et les étudiants qui utilisent un smartphone plus de quatre heures par jour.

**Conclusions :** La dépendance vis-à-vis du smartphone est un problème majeur chez les étudiants universitaires en Arabie saoudite. Elle est associée à la dépression et à l'anxiété réactionnelle. Les études futures devraient viser à établir les meilleures interventions pour protéger les étudiants universitaires des effets négatifs des smartphones.

## نمط وإدمان استخدام الهاتف النقال وعلاقة ذلك بالاكئاب والقلق

داليا السيد دسوقي، هاني أبو زيد

### الخلاصة

الخلفية: يتعرض طلاب الجامعة ممن يستخدمون الهواتف الذكية بنهم شديد لخطر الإدمان الذي قد يرتبط بالاكئاب والقلق الشخصي.

الأهداف: هدفت الدراسة إلى تقييم الاختلافات الجنسية في أنماط استخدام الهواتف الذكية وإدمانها وعلاقتها بالاكئاب والقلق الشخصي في صفوف طلاب الجامعات السعودية.

طرق البحث: دراسة مقطعية أجريت على 1513 طالباً بجامعة الطائف، في المملكة العربية السعودية. واستُخدم استبيان ذاتي التبليغ لجمع البيانات السكانية وبيانات بشأن استخدام الهاتف الذكي. كما استُخدم مقياس «الاستخدام المفرط للهواتف النقالة» لتحديد درجة إدمان الهواتف الذكية. واستُخدمت الإصدار العربية المجازة لمقياس تايلور لتقييم القلق النفسي وجرى معطيات الاكئاب بحسب «بيك» لتقييم القلق الشخصي والاكئاب، على التوالي.

النتائج: تغلبت الإناث على الذكور فيما يلي: معدل انتشار الاكئاب والقلق الشخصي، والدرجات على مقياس الاستخدام المفرط للهواتف النقالة، ومدة استخدام الهاتف النقال يوميا، وعدد المكالمات اليومية. كما وُجدَ ترابط إيجابي وثيق بين الدرجات على مقياس الاستخدام المفرط للهواتف النقالة وبين درجات الاكئاب والقلق الشخصي، ومدة اقتناء الهاتف الذكي، ومتوسط مدة كل مكالمات يومية على حدة. وكانت الدرجات على مقياس الاستخدام المفرط للهواتف النقالة أعلى بكثير في صفوف طلبة السنة السادسة، وطلبة الكليات النظرية، والطلبة غير المتزوجين، والطلبة الذين يستخدمون الهاتف الذكي لأكثر من أربع ساعات في اليوم.

الاستنتاجات: يمثل إدمان الهاتف الذكي مشكلة جسيمة في صفوف طلاب الجامعات السعودية، ويقرن ذلك بالإصابة بالاكئاب والقلق الشخصي. وينبغي أن تستهدف الدراسات المستقبلية وضع أفضل التدخلات من أجل حماية الطلاب الجامعيين من الآثار السلبية المترتبة على استخدام الهواتف الذكية.

## References

- Chen B, Liu F, Ding S, Ying X, Wang L, Wen Y. Gender differences in factors associated with smartphone addiction: a cross-sectional study among medical college students. BMC Psychiatry 2017 Oct 10;17(1):341–50. <http://dx.doi.org/10.1186/s12888-017-1503-z> PMID:29017482
- Clayton RB, Leshner G, Almond A. The extended iSelf: the impact of iPhone separation on cognition, emotion, and physiology. J Computer-Mediated Commun. 2015;20(2):119–35. <https://doi.org/10.1111/jcc4.12109>
- Choi S, Mok J, Kim D, Choi J, Lee J, Ahn H, Choi E, Song W. Latent class analysis on internet and smartphone addiction in college students. Neuropsychiatry Dis Treat. 2014 May 20;10:817–28. <http://dx.doi.org/10.2147/NDT.S59293> PMID:24899806
- Zarghami M, Khalilian A, Setareh J, Salehpour G. The impact of using cell phones after light-out on sleep quality, headache, tiredness, and distractibility among students of a university in North of Iran. Iran J Psychiatry Behav Sci. 2015 Dec;9(4):e2010. <http://dx.doi.org/10.17795/ijpbs-2010> PMID:26834802
- Elhai JD, Dvorak RD, Levine JC, Hall BJ. Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. 2017 Jan 1;207:251–9. <http://dx.doi.org/10.1016/j.jad.2016.08.030> PMID:27736736
- Hong FY, Chiu SI, Huang DH. A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese university female students. Comput Hum Behav. 2012 Nov;28(6):2152–9. <https://doi.org/10.1016/j.chb.2012.06.020>
- Kimb SM, Huh HJ, Cho H, Kwon M, Choi JH, Ahn HJ, PhD, Sun Woo Lee SW, Kim YJ, Kim DJ. The effect of depression, impulsivity, and resilience on Smartphone Addiction in University Students. J Korean Neuropsychiatr Assoc. 2014 Jul;53(4):214–20. <http://>

[dx.doi.org/10.4306/jknpa.2014.53.4.214](https://doi.org/10.4306/jknpa.2014.53.4.214)

8. Lee H, Ahn H, Choi S, Choi W. The SAMS: Smartphone Addiction Management System and verification. *J Med Syst.* 2014 Jan;38(1):1–10. [http://dx.doi.org/10.1007/s10916-013-0001-1](https://doi.org/10.1007/s10916-013-0001-1) PMID:24395031
9. Boumosleh MJ, Jaalouk D. Depression, anxiety, and smartphone addiction in university students – a cross sectional study. *PLoS One.* 2017 Aug 4;12(8):e0182239. [http://dx.doi.org/10.1371/journal.pone.0182239](https://doi.org/10.1371/journal.pone.0182239) PMID:28777828
10. Hegazy AA, Alkhail BA, Awadalla NJ, Qadi M, Al-Ahmadi J. Mobile phone use and risk of adverse health impacts among medical students in Jeddah, Saudi Arabia. *Br J Med Med Res.* 2016;15(1):1–11. [http://dx.doi.org/10.9734/BJMMR/2016/24339](https://doi.org/10.9734/BJMMR/2016/24339)
11. Kim D, Lee Y, Lee J, Nam JK, Chung Y. Development of Korean Smartphone Addiction Proneness Scale for Youth. *PLoS One.* 2014 May 21;9(5):e97920. [http://dx.doi.org/10.1371/journal.pone.0097920](https://doi.org/10.1371/journal.pone.0097920)
12. KSA leads the world in mobile usage. <https://www.itp.net/588729-ksa-leads-the-world-in-mobile-usage>, accessed 27 January 2020.
13. Aljomaa SS, Al-Qudah MF, Albursan IS, Bakhiet SF, Abduljabbar AS. Smartphone addiction among university students in the light of some variables. *Comput Human Behav.* 2016 Aug;61:155–64. <https://doi.org/10.1016/j.chb.2016.03.041>
14. Alosaimi FD, Alyahya H, Alshahwan H, Al Mahyijari N, Shaik SA. Smartphone addiction among university students in Riyadh. Saudi Arabia. *Saudi Med J.* 2016 Jun;37(6):675–83. [http://dx.doi.org/10.15537/Smj.2016.6.14430](https://doi.org/10.15537/Smj.2016.6.14430) PMID:27279515
15. Al-Dossary NA, Al-Thebait AA, Al-Awwad AA, Al-Anzi RZ, Asseri TM. The association between smartphone use pattern, smartphone addiction, and depression among female secondary school students in Khobar, Saudi Arabia. *Int J Sci Res.* 2017;6(8):310–4. [http://dx.doi.org/10.36106/ijrsr](https://doi.org/10.36106/ijrsr)
16. Pawłowska B, Potembska E. Gender and severity of symptoms of mobile phone addiction in Polish gymnasium, secondary school and university students. *Curr Probl Psychiatry.* 2012;12(4):433–8.
17. Merlo LJ, Stone AM, Bibbey A. Measuring problematic mobile phone use: development and preliminary psychometric properties of the PUMP scale. *J Addict.* 2013;912807. <https://doi.org/10.1155/2013/912807>
18. Bianchi A, Phillips JG. Psychological predictors of problem mobile phone use. *CyberPsychol Behav.* 2005 Feb 28;8(1):39–51. [http://doi.org/10.1089/cpb.2005.8.39](https://doi.org/10.1089/cpb.2005.8.39)
19. Fahmi M, Ghali M, Meleka K. Arabic version of the personality scale of manifest anxiety. *Egyptian Psychiatry.* 1977;11:119–26.
20. Beck AT, Steer RA, Carbin MG. Psychometric properties of the Beck Depression Inventory: twenty-five years of evaluation *Clin Psychol Rev.* 1988;8:77–100.
21. Andreassen CS, Billieux J, Griffiths MD, Kuss DJ, Demetrovics Z, Mazzoni E, Pallesen S. The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: a large-scale cross-sectional study. *Psychol Addict Behav.* 2016 Mar;30(2):252–62. [http://dx.doi.org/10.1037/adb0000160](https://doi.org/10.1037/adb0000160) PMID:26999354
22. Alzahrani AH. Depression and suicide among medical students: a comparison study between medical and medical sciences students in Taif University, Taif-KSA. *Int J Med Sci Public Health* 2017;6(5):964–8. [http://dx.doi.org/10.5455/ijm-sph.2017.0954227012017](https://doi.org/10.5455/ijm-sph.2017.0954227012017)
23. Alshehri A, Alzahrani H, Alotaibi M. Internet Addiction among Taif university students and its association with psychiatric co-morbidities. *Merit Res J Med Med Sci.* 2015 Dec;3(12):536–44. <http://www.meritresearchjournals.org/mms/index.htm>
24. Zaini R, Anjum F, Dahlawi H. Assessment of depression among applied medical science college students at Taif University: a questionnaire survey. *J Psychiatry.* 2017;21:1–3. [http://dx.doi.org/10.4172/2378-5756.1000431](https://doi.org/10.4172/2378-5756.1000431)
25. Iqbal W, Khan AM, Khan SA. Problematic mobile phone among medical students using PUMP Scale. *JMHS.* 2017 Jul–Sep;11(3):1127–9. [http://www.pjmhsonline.com/2017/july\\_sep/pdf/1127.pdf](http://www.pjmhsonline.com/2017/july_sep/pdf/1127.pdf)
26. Dhanasekaran RS, Arumugam B, Vaanan E. Problematic usage of mobile phones among adolescents in Chennai – a cross sectional study. *Natl J Res Community Med.* 2017;6(Suppl. 2):170–73. <https://journals.indexcopernicus.com/api/file/viewBy-FileId/285960.pdf>
27. van Deursen AJAM, Bolle CL, Hegner SM, Kommers PAM. Modeling habitual and addictive smartphone behavior: The role of smartphone usage types, emotional intelligence, social stress, self-regulation, age, and gender. *Comput Human Behav.* 2015 Apr;45:411–20. <https://doi.org/10.1016/j.chb.2014.12.039>
28. Kim Y, Jeong JE, Cho H, Jung DJ, Kwak M, Rho MJ, Yu H, Kim DJ, Choi IY. Personality Factors Predicting Smartphone Addiction Predisposition: Behavioral Inhibition and Activation Systems, Impulsivity, and Self-Control. *PLoS One.* 2016 Aug 17;11(8):e0159788. [http://dx.doi.org/10.1371/journal.pone.0159788](https://doi.org/10.1371/journal.pone.0159788) PMID:27533112
29. Billieux J, Maurage P, Lopez-Fernandez O, Kuss DJ, Griffiths MD. Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Curr Addict Rep.* 2015;2(2):156–162. [http://dx.doi.org/10.1007/s40429-015-0054-y](https://doi.org/10.1007/s40429-015-0054-y)
30. Wood AW, Loughran SP, Stough C. Does evening exposure to mobile phone radiation affect subsequent melatonin production? *Int J Radiat Biol.* 2006 Feb;2(2):69–76. [http://dx.doi.org/10.1080/09553000600599775](https://doi.org/10.1080/09553000600599775) PMID:16546905
31. Kim R, Lee KJ, Choi YJ. Mobile phone overuse among elementary school students in Korea: factors associated with mobile phone use as a behavior addiction. *J Addict Nurs.* 2015 Apr–Jun;26(2):81–5. [http://dx.doi.org/10.1097/JAN.000000000000074](https://doi.org/10.1097/JAN.000000000000074) PMID:26053080

32. Zulkefely S, Baharudin R. Mobile phone use amongst students in a university in Malaysia: its correlates and relationship to psychological health. *Eur J Sci Res.* 2009;37(2):206e218. [http://psasir.upm.edu.my/id/eprint/7060/1/mobile\\_phone.pdf](http://psasir.upm.edu.my/id/eprint/7060/1/mobile_phone.pdf)
33. A. Alkhathlan K. Contribution of oil in economic growth of Saudi Arabia. *Appl Econ Lett.* 2013;20(4):343–8. <https://doi.org/10.1080/13504851.2012.703310>
34. The Statistics Portal: Technology & Telecommunications. Smartphone penetration rate as share of the population in Saudi Arabia from 2015 to 2022. <https://www.statista.com/statistics/625436/smartphone-user-penetration-in-saudi-arabia/>
35. Galinović I, Vuković V, Troselj M, Antić S, Demarin V. Migraine and tension type headache in medical students: a questionnaire study. *Collegium Antropologicum* 2009;33(1):169–73.

# The primary healthcare network in Lebanon: a national facility assessment

Randa Hemadeh,<sup>1</sup> Ola Kdouh,<sup>1</sup> Rawan Hammoud,<sup>1</sup> Tarek Jaber<sup>1</sup> and Lama A. Khalek<sup>1</sup>

<sup>1</sup>Department of Primary Healthcare, Ministry of Public Health, Beirut, Lebanon (Correspondence to: O. Kdouh: olakdouh@gmail.com).

## Abstract

**Background:** The assessment of material and human resources, as well as services at healthcare facilities can further our understanding of their capacity to adapt to a people-centred framework.

**Aims:** To assess health infrastructure, drugs, equipment and human resources in primary healthcare centres (PHCCs) within the Lebanese National Primacy Healthcare Network.

**Methods:** The study surveyed all 212 primary healthcare centres in the network to assess services, as well as material and human resource availability. The survey was developed by the Ministry of Public Health and administered at each PHCC through face-to-face interviews with the facilities' directors. Data collection took place between December 2017 and January 2018. Descriptive statistics and  $\chi^2$  tests were used to analyse the collected data.

**Results:** The majority of PHCCs in the network delivered all services required by the national standards (78%), and had all basic equipment necessary for the delivery of care (89%), in addition to viable means of communication (85%). However, there was a significant shortage of family medicine physicians and nurses. Bivariate analysis highlighted regional disparities between urban and rural areas.

**Conclusions:** This study can further our understanding of the capacity and ability of healthcare facilities to adapt to a people-centred framework. It provides baseline data that will inform Lebanon in its efforts to strengthen primary health care, and assist donors and local and international nongovernmental organizations in planning interventions and programmes, and better allocation of financial support.

Keywords: facility assessment, health human resources, health services, Lebanon, primary healthcare

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## Introduction

People-centred healthcare systems can reduce healthcare costs, and potentially lead to improved population health outcomes, access to care, and patient satisfaction (1). These systems aim to empower patients, families and communities, providing them with healthcare services while respecting their needs, preferences and expectations (1). Reorienting the model of care towards preventive ambulatory services is essential to move towards a people-centred healthcare system (1). Therefore, countries striving to develop a people-centred system need to strengthen primary healthcare (PHC) and ensure effective service delivery. Crucial to the delivery of services are health infrastructure, drugs and equipment, and trained health human resources (2); assessment of which can further our understanding of the capacity, and ability of healthcare facilities to adapt to a people-centred framework. This would also provide policy-makers with data and empirical evidence that can guide programme design, implementation and monitoring (3).

In Lebanon, public spending on health constitutes only 5.8% of the total government spending (4); allocations to the Ministry of Public Health (MoPH) from the government budget decreased from 5.9% in 2005 to 3.4% in 2012 (4); and given the Lebanese healthcare

system's orientation towards curative care, only 5% of the MoPH budget is allocated to preventive PHC services (5). These challenges are exacerbated by the ongoing political turmoil in the region, culminating in the Syrian refugee crisis, and have had a massive impact on the Lebanese healthcare system in general and PHC sector in particular, as Syrian refugees constitute 47% of all those who access care through the National PHC Network (6, 7). As strengthening PHC has always been a key pillar of the national health strategy, Lebanon was still able to move towards people-centred care in recent decades (6).

The MoPH established its National PHC Network in 1996, through which it aimed to regulate and maintain quality of care and effective service delivery at PHC centres (PHCCs) (8). This network currently comprises 226 PHCCs; most of which are affiliated with nongovernmental organizations (NGOs) and municipalities. It serves > 1 million people annually. Through its delivery of a comprehensive range of PHC services at reduced rates, it aims to improve access to effective, quality health care, particularly among the most vulnerable. Complementing the establishment of the network, the MoPH targets community needs through the integration of noncommunicable disease management in PHC and launching of the national mental health

programme (9,10). In 2009, the MoPH initiated a national primary healthcare accreditation programme, leading to the accreditation of 52 PHCCs as of June 2018. Furthermore, in 2016, the MoPH took a major step towards universal health coverage as it collaborated with the World Bank to subsidize a benefits package delivered through 75 PHCCs, for 150 000 vulnerable Lebanese citizens; particularly those affected by the Syrian refugee crisis (11).

However, reliable and comprehensive data on the functional capacities and the state of material and human resources in PHCCs are still unavailable. As the MoPH looks to advance people-centred care and expand its universal health coverage programme, a better understanding of the sector's infrastructure and resources is integral to guiding short- and long-term reforms and investment efforts.

Here, we surveyed PHCCs in Lebanon to assess services, as well as material and human resource availability, and explored facility characteristics associated with the fulfilment of national PHC standards. This study is believed to be the first to document comprehensive data on the state of material and health human resources within the National PHC Network, and assess the availability and readiness of services provided by the PHCCs.

## Methods

### Objectives

This study aimed to provide a detailed account of the current state of the National Primary Healthcare Network in Lebanon. Specifically, it assessed availability of health infrastructure, health human resources, and availability of primary healthcare services, and service readiness, at the PHCCs within the National Primary Healthcare Network. Additionally, it explored facility characteristics associated with the fulfilment of staffing and infrastructure national standards.

### Data collection

Data collection took place in Lebanon between December 2017 and January 2018. A survey was administered at each PHCC through interviews with the PHCC directors. Responses were validated through direct observation at the facilities by trained public health officers employed at the MoPH. All 212 centres that were part of the National Primary Healthcare Network at the time were targeted and included in the study.

### Facility assessment tool

Development of the facility assessment tool was guided by the World Health Organization Service Availability and Readiness Assessment (SARA) (12) and other internal assessment tools at the MoPH. An initial draft was developed, translated into Arabic, and then back translated into English at the MoPH. It was reviewed and validated by the technical team at the Primary Healthcare Department. The tool was piloted in 2 stages. First, it was administered in 2 PHCCs that offered all services included within the tool. The main pilot findings were related

to the flow of the questionnaire and the data collection process. The tool was then modified in accordance with the pilot observations. Afterwards, the modified version was piloted again and the tool was validated and adopted. The survey tool assesses the availability of health human resources, infrastructure, and services, in addition to the readiness of services at the PHCCs. Readiness refers to the capacity of a PHCC to deliver the service and is measured through tracer items that include trained staff, infrastructure, and the availability of written guidelines, equipment and commodities (12).

### Availability of health human resources

The availability of health human resources refers to the physical presence of the following staffing categories: (1) part-time and full-time physicians: general practitioners (GPs), family physicians, gynaecologists, dentists, cardiologists, paediatricians, nephrologists, urologists, endocrinologists, orthopaedists, pulmonologists, ophthalmologists, gastroenterologists, psychiatrists, dermatologists, ear, nose and throat specialists, rheumatologists, and neurologists; (2) part-time and full-time supporting staff: registered nurses, assistant nurses, midwives, social workers/mental health social workers, psychologists, radiologists, laboratory technicians, dieticians, pharmacist assistants, and pharmacists; and (3) part-time and full-time administrative staff: administrative directors, data entry staff, information technology staff, and secretaries.

According to the Lebanese national PHC standards, all PHCCs should recruit the following clinical staff: GP/family physician, paediatrician, gynaecologist, cardiologist/endocrinologist, dentist, and registered nurse. The availability of health human resources was assessed through: (1) percentage of PHCCs employing all aforementioned clinical staff; and (2) percentage of PHCCs employing all medical staff as required by the national standards with the exception of a registered nurse.

### Availability of health infrastructure

The availability of infrastructure refers to the physical presence of the following: (1) basic amenities: backup electrical supply, fire extinguisher, complaint box, access to sanitation facilities, and accessibility equipment; (2) basic equipment: thermometer, stethoscope, adult scale, child scale, blood pressure apparatus, and lighting source; (3) means of communication: landline/cellular telephone, computer, information system, and access to intranet and internet; and (4) infection control: written guidelines on infection control, disinfectants, soap and running water or alcohol-based rubs, space for sterilization, latex gloves, waste receptacle, and sink in each clinic. The availability of health infrastructure was assessed through the percentage of PHCCs reporting the presence of all the infrastructure requirements.

### Availability and readiness of services

The availability of services refers to the delivery of the following services at a facility: (1) family medicine (FM)/general consultation services; (2) dental services; (3) pae-



diatric services; (4) reproductive, maternal, and newborn health services; (5) noncommunicable disease management; (6) mental health services; (7) diagnostic imaging services; (8) basic laboratory services; and (9) pharmaceutical services. The availability of PHC services was assessed through the percentage of PHCCs administering the above-mentioned services.

Service readiness was evaluated for the 5 basic services required by the national PHC standards: (1) FM/general consultation services; (2) dental services; (3) paediatric services; (4) reproductive, maternal and newborn health services; and (5) noncommunicable disease management. A score comprising availability of trained staff, infrastructure, written guidelines, service-specific equipment and commodities was calculated for each PHCC. This score was based on the national PHC standards, and developed following consultations with programme coordinators at the Primary Healthcare Department. Centres were then classified as either ready or in progress in each of the aforementioned services.

### Facility characteristics

The fulfilment of staffing and health infrastructure national standards was compared across the following facility characteristics: governorate, settlement type, accreditation status, and international NGO support. Lebanon comprises 8 different governorates. Settlement type refers to the location of the PHCCs in an urban or rural setting. Accreditation status refers to whether the PHCCs were accredited at the time of the study. Finally, international NGO support indicates whether the PHCCs received support from international NGOs, which can include capacity building, equipment, and financial aid.

### Data analysis

Descriptive statistics, mainly frequencies and percentages, for our categorical facility characteristics were reported. The availability of services at the PHCCs was reported using bar plots.  $\chi^2$  tests were conducted to assess correlation between the fulfilment of staffing and health infrastructure requirements and facility characteristics. Statistical significance was set at  $P < 0.05$ . Statistical analyses were conducted on RStudio version 1.1.453.

### Ethical considerations

The facility survey was administered as part of the MoPH's monitoring and evaluation activities. Required administrative authorization to use the data for research was obtained from the concerned parties at the Lebanese MoPH. Heads of PHCCs were informed about the MoPH's initiative and informed consent to use the data for research was obtained from all participating heads of PHCCs before administering the survey.

## Results

### Primary Healthcare Network

There were 212 PHCCs within the MoPH Primary Healthcare Network distributed across all Lebanese gover-

norates (Table 1). Mount Lebanon included the largest number of PHCCs ( $n = 55$ , 25.9%) while the lowest was recorded in Beirut ( $n = 14$ , 6.6%). Additionally, more than half of the PHCCs were located in rural areas ( $n = 125$ , 59.0%). Seventeen (8.0%) of the PHCCs were accredited through the national PHC accreditation programme.

### Availability of health infrastructure

On average there were 6 clinics in every PHCC, with the minimum and maximum number of clinics across the facilities being 2 and 18, respectively. The average hours of operation in the weekdays and weekends for all facilities were 7.49 (standard deviation = 3.15) and 4.75 (4.19), respectively. One hundred and eighty-eight (88.7%) PHCCs reported availability of all 6 types of basic equipment; 181 (85.4%) fulfilled all means of communication requirements; 103 (48.5%) fulfilled basic amenities requirements; 84 (39.6%) fulfilled infection control requirements; and 57 (26.9%) fulfilled all infrastructure requirements.

### Availability of health human resources

Among health human resources, there were 484 nurses within the National Primary Healthcare Network, 88.0% of whom were employed on a full-time basis. Overall, 122 PHCCs (57.6%) employed all medical staff as per the PHC national standards, and 147 PHCCs (69.3%) employed all medical staff with the exception of a registered nurse. The most widely employed specialists at PHCCs were cardiologists/endocrinologists (employed by 91.5% of PHCCs), followed by paediatricians (91.0%) and gynaecologists (88.7%); taking into account that most were part-timers

**Table 1 PHCC characteristics**

Characteristics	n	Valid percentage (%)
<b>Governorate</b>		
Beirut	14	6.6
Mount Lebanon	55	25.9
North	30	14.2
Akkar	22	10.4
Baalbek-Hermel	18	8.5
Bekaa	19	9.0
South	27	12.7
Nabatieh	27	12.7
<b>Accreditation</b>		
Yes	17	8.0
<b>Settlement type</b>		
Urban	87	41.0
Rural	125	59.0
<b>Facility type</b>		
PHCC	199	93.9
PHCC within hospital OPD	13	6.1
<b>International NGO support</b>		
Yes	95	44.8
<b>Total</b>	<b>212</b>	<b>100.00</b>

NGO = nongovernmental organization; OPD = outpatient department; PHCC = primary healthcare centre.

**Table 2 Number of PHCCs employing specific health human resources**

Health human resources category	n	Valid percentage (%)
Generalist	169	79.7
Family physician	29	13.7
Paediatrician	193	91.0
Gynaecologist	188	88.7
Dentist	180	84.9
Cardiologist/endocrinologist	194	91.5
Registered nurse	165	77.8
Assistant nurse	131	61.8
Midwife	66	31.1
Social worker/mental health social worker	79	37.3
Pharmacist assistant	93	43.9
Pharmacist	135	63.7
Administrative director	187	88.2
Data entry staff	128	60.4
IT	68	32.1
Secretary	91	42.9
<b>Total number of PHCCs</b>	<b>212</b>	<b>100</b>

IT = information technology; PHCC = primary healthcare centre.

who worked in more than one PHCC at a time (Table 2). The least commonly employed staff were FM physicians (13.7%), midwives (31.1%) and IT staff (32.1%).

### Availability and readiness of services

Overall, there were 165 PHCCs (77.8%) that offered the 5 main services required by the national standards (Figure 1). Two hundred and eight (98.1%) PHCCs offered paediatric services; 206 (97.2%) offered pharmaceutical services; and 200 (94.3%) each offered general medical services and noncommunicable disease management. Only 78 (36.8%) and 67 (31.6%) PHCCs offered mental health and diagnostic services. In total, 22 PHCCs (10.4%) offered all 9 services including diagnostic imaging, laboratory, pharmaceutical and mental health services.

Service readiness was highest for noncommunicable disease management ( $n = 129$ , 64.5%), followed by general medical ( $n = 108$ , 54.0%), paediatric ( $n = 91$ , 43.8%), dental ( $n = 68$ , 35.8%) and reproductive and maternal services ( $n = 55$ , 27.6%).

### Facility characteristics associated with staffing and health infrastructure requirements

The PHCC governorate was significantly associated with fulfilling staffing requirements ( $P = 0.006$ ) (Table 3). In fact, the greatest proportion of centres that fulfilled these requirements was observed in Mount Lebanon (76.4%) and Beirut (71.4%). In Akkar, this proportion reached 36.4%, the lowest among Lebanese governorates. Consistently, a greater proportion of PHCCs in urban areas (73.6%) fulfilled the staffing requirements as compared to rural areas (46.4%). Additionally, the majority of accredit-

ed centres (88.2%) fulfilled the staffing requirements as opposed to 54.9% among nonaccredited PHCCs. This difference in proportion was significant ( $P = 0.008$ ). International NGO support and accreditation status were both significantly associated with fulfilling health infrastructure requirements ( $P = 0.044$  and  $0.001$ , respectively).

## Discussion

Overall, 77.8% of PHCCs within the network offered all 5 main PHC services. However, their readiness for the delivery of these services was low. This was mainly attributed to the unavailability of advanced medical equipment, and the absence of written clinical guidelines that informed future quality improvement, capacity building, and resource provision efforts. Juxtaposed to the above, the majority of PHCCs in the network had all the basic equipment necessary for the delivery of care (88.7%), and viable means of communication (85.4%), including internet access and a backup electrical supply. These results are consistent with the MoPH's efforts in strengthening PHCCs through the provision of medical supplies and equipment, and the implementation of its electronic health information system across its PHC network.

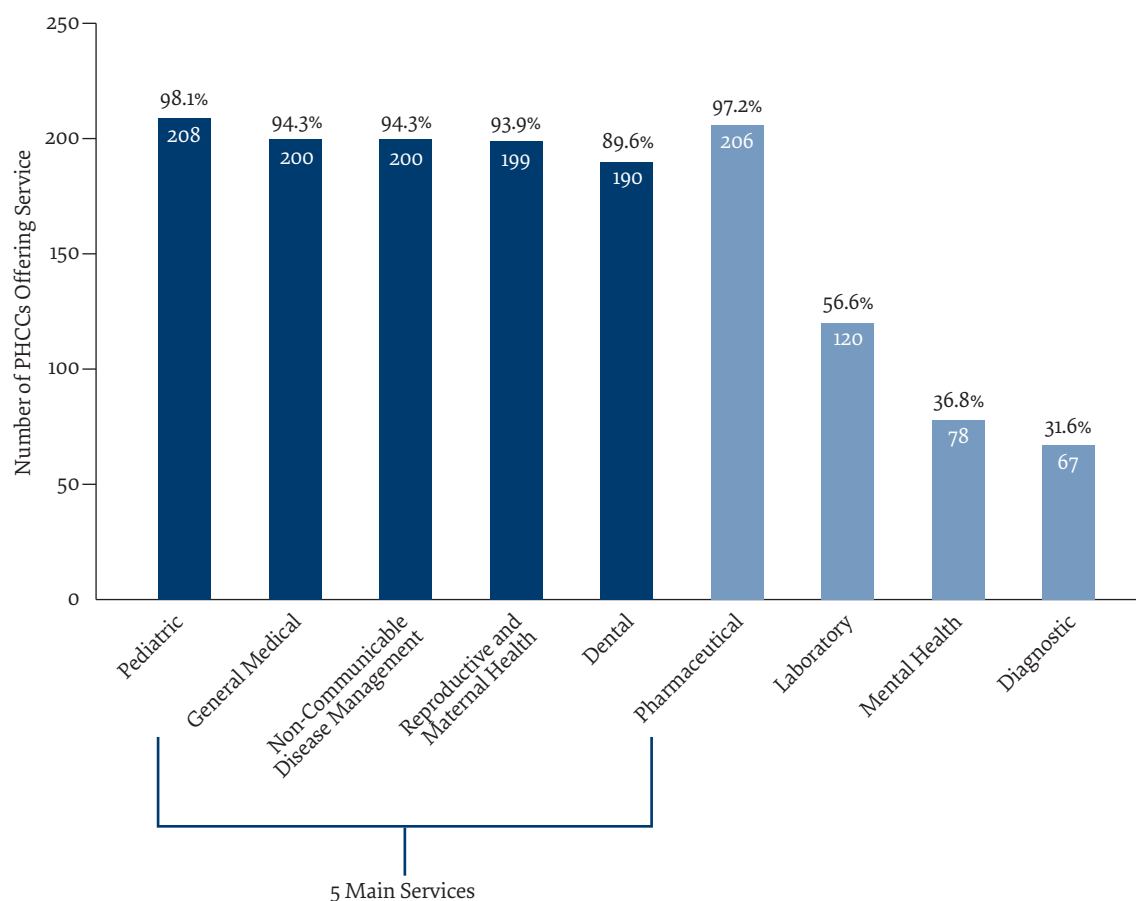
Concerning health human resources, there was a significant shortage of FM physicians at the PHCCs. In Lebanon, this shortage can be attributed to several barriers inherent to the educational system, including the scarcity of FM programmes (13), and the low prestige associated with the profession in low- and middle-income countries (14). This is consistent with studies on FM in the Middle East, which have expanded on the low number of FM training programmes (15), and reported a low FM physician to population ratio across Arab countries (16). Additionally, a recent study conducted in Saudi Arabia revealed a significant shortage of FM physicians, employed in only 7% of all PHCs in the country (17). In efforts to reinforce an FM model of care, the MoPH in Lebanon developed and subsidized a bridging programme for GPs working in PHCCs to transition to FM specialists. GPs enrolled in the programme were also committed to working in the PHC sector following receipt of their degrees. In line with this initiative, further interministerial programmes to reskill specialists in FM are needed to advance the FM model of care. However, in light of limited financial resources in the PHC sector in general and the MoPH in particular, the ability to initiate and sustain such programmes remains unclear.

Similarly, our study uncovered a shortage of nurses in PHCCs. More than 20% of surveyed PHCCs did not employ a registered nurse as required by the national standards. These results are consistent with previous studies on the nursing workforce in Lebanon, which reported a nurse to population ratio of 2.72 per 1000 as compared with 4.05, 4.55 and 4.87 in Jordan, Kuwait and Saudi Arabia, respectively (18,19). There are several barriers that might account for this, including low enrolment in nursing programmes, and migration of the nursing workforce primarily to Gulf countries (20,21).

**Table 3 Facility characteristics and fulfilment of staffing and health infrastructure requirements**

Variable	Staffing requirements fulfilled, n (%)	Staffing requirements not fulfilled, n (%)	P	Infrastructure requirements fulfilled, n (%)	Infrastructure requirements not fulfilled, n (%)	P
Governorate						
Beirut	10 (71.4)	4 (28.6)	0.006	2 (14.3)	12 (85.7)	0.309
Mount Lebanon	42 (76.4)	13 (23.6)		14 (25.4)	41 (74.6)	
North	19 (63.3)	11 (36.7)		9 (30.0)	21 (70.0)	
Akkar	8 (36.4)	14 (63.6)		4 (13.6)	18 (86.4)	
Baalbek-Hermel	11 (61.1)	7 (38.9)		3 (16.7)	15 (83.3)	
Bekaa	8 (42.1)	11 (57.9)		4 (21.1)	15 (78.9)	
South	13 (48.2)	14 (51.8)		12 (40.7)	15 (59.3)	
Nabatieh	11 (40.7)	16 (56.3)		9 (33.3)	18 (66.7)	
Settlement type						
Rural	58 (46.4)	67 (53.6)	0.001	33 (24.8)	92 (75.2)	0.848
Urban	64 (73.6)	23 (26.4)		24 (27.6)	63 (72.4)	
Accreditation status						
No	107 (54.9)	88 (45.1)	0.008	46 (23.1)	149 (76.9)	0.001
Yes	15 (88.2)	2 (11.7)		11 (58.8)	6 (41.2)	
NGO support						
No	64 (54.7)	53 (45.3)	0.352	25 (21.4)	92 (78.6)	0.044
Yes	58 (61.1)	37 (38.9)		32 (31.6)	63 (68.4)	

NGO = nongovernmental organization; OPD = outpatient department; PHCC = primary healthcare centre.

**Figure 1 Availability of services at primary healthcare centres in Lebanon.**

Additionally, the PHC sector's competition with hospitals and larger medical centres, which employed > 85% of the nursing workforce in Lebanon in 2014 (18), aggravates the issue. In response, the MoPH regularly coordinates with the Order of Nurses and educational institutions to offer nursing students internship opportunities and engage them in the PHCC sector. However, further reform initiatives are warranted to attract nurses to PHCCs through offering them improved working conditions, better career prospects, and greater financial incentives.

The study analysis further explored facility characteristics associated with improved staffing and health infrastructure. It revealed urban–rural disparities in health human resource availability. The proportion of facilities fulfilling staffing requirements was lower in rural than urban areas, indicating an alarming gap, as more than half of the PHCCs in the network are located in a rural setting. These findings are consistent with international and local literature on the barriers to the recruitment and retention of health human resources in rural and underserved areas (22,23). The disparities between urban and rural areas were similarly reported in the United Arab Emirates (24), Jordan (25) and in Morocco (26) where the number of inhabitants per physician varied from 380 in the capital to 6362 in rural areas. This relative shortage in health human resources in rural areas can potentially be addressed through financial incentive systems, such as bonuses and pay increases, in addition to programmes and initiatives securing continuous education, training and professional development for staff (23).

We also found that the fulfilment of infrastructure and equipment standards at the facilities was correlated with international NGO support. In fact, following the Syrian refugee crisis, the MoPH formed a National Health Steering Committee through which United Nations agencies, international NGOs, and other stakeholders coordinated activities, programmes and support (27). The aforementioned result indicates that the MoPH successfully played its role as the leader of the health response by ensuring that the received funds and

support were in line with the national PHC standards.

Our study had some limitations. The facility assessment tool did not include sections on service affordability and quality in addition to provider full-time equivalency and details on outreach activities and referral arrangements, therefore limiting the scope of the analysis. Furthermore, the number of health human resources could not be accurately calculated through the survey, as it did not capture the duplication of part-time staff across healthcare facilities.

## Conclusion

This study provided a comprehensive assessment of materials, human resources and health services at PHCCs in the Lebanese National PHC Network. Study findings can inform local efforts to optimize PHC service provision and move towards a people-centred healthcare system. The study highlighted the need to address urban–rural disparities in human resource availability, strengthen FM as an essential pillar of people-centred care, and empower and expand the nursing workforce in the sector. However, crucial to the implementation of any effort are financial reforms that address the scarcity of funding in the sector through increasing the government's budget allocation to the MoPH, and reprioritizing PHC within the MoPH's budget allocation. This is also relevant for donors and local and international NGOs, as the identification of gaps within the PHC sector could assist in planning interventions and programmes, and better allocation of equipment, aid and financial support.

Future research should explore discrepancies in resource availability and service provision between urban and rural PHCCs. While our study gave ample description of the PHCCs' internal characteristics, more information on their external interactions is needed. As such, an assessment geared towards the interaction of the facilities with their environment, including the wider healthcare system and the community at large, is warranted.

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## Réseau de soins de santé primaires au Liban : évaluation nationale des établissements

### Résumé

**Contexte :** L'évaluation des ressources matérielles et humaines, ainsi que des services dans les établissements de soins de santé peut aider à mieux comprendre leur capacité à s'adapter à un cadre centré sur la personne.

**Objectifs :** La présente étude visait à évaluer les infrastructures de santé, les médicaments, le matériel et les ressources humaines dans les centres de soins de santé primaires du réseau national de soins de santé primaires du Liban.

**Méthodes :** L'étude s'est intéressée aux 212 centres de soins de santé primaires que compte le réseau, afin d'en évaluer les services ainsi que la disponibilité des ressources matérielles et humaines. L'enquête a été mise au point par le ministère de la Santé publique et menée dans chaque centre de soins de santé primaires lors d'entretiens en présentiel avec les directeurs des établissements. La collecte des données a eu lieu entre décembre 2017 et janvier 2018. Des statistiques descriptives et des tests du  $\chi^2$  ont été utilisés pour analyser les données collectées.

**Résultats :** La majorité des centres du réseau assuraient tous les services requis conformément aux exigences nationales (78 %) et possédaient tout le matériel de base nécessaire pour dispenser les soins (89 %), en plus de moyens de communication viables (85 %). Néanmoins, une pénurie importante de médecins et de personnels infirmiers en médecine familiale a été relevée. Une analyse bivariée a mis en évidence des disparités régionales entre les zones urbaines et rurales.

**Conclusions :** La présente étude permet d'approfondir notre compréhension de la capacité et de l'aptitude des établissements de soins de santé à s'adapter à un cadre centré sur la personne. Elle fournit des données de référence qui guideront le Liban dans ses efforts de renforcement du système de soins de santé primaires et qui aideront les donateurs et les organisations non gouvernementales locales et internationales à planifier leurs interventions et leurs programmes, ainsi qu'à mieux affecter leur soutien financier.

## شبكة الرعاية الصحية الأولية في لبنان: تقييم المرافق الوطنية

رندة حمادة، علا قدوح، روان حمود، طارق جابر، لمى عبد الخالق

### الخلاصة

**الخلفية:** يمكن أن يُسهم تقييم الموارد المادية والبشرية، إلى جانب الخدمات المقدمة عبر مرافق الرعاية الصحية، في تعزيز فهمنا لقدرة تلك المرافق على التكيف مع الإطار الصحي الذي يركز على الناس.

**الأهداف:** هدفت هذه الدراسة إلى تقييم البنية التحتية الصحية، والأدوية، والمعدات، والموارد البشرية في مراكز الرعاية الصحية الأولية التابعة لشبكة الرعاية الصحية الأولية الوطنية اللبنانية.

**طرق البحث:** أجري في الدراسة مسح لجميع مراكز الرعاية الصحية الأولية البالغ عددها 212 مركزاً تابعاً للشبكة بغرض تقييم الخدمات، إلى جانب توافر الموارد المادية والبشرية. وأعدت وزارة الصحة العامة المسح ونفذته في كل مركز من مراكز الصحة العامة الأولية من خلال إجراء مقابلات مباشرة مع مديري المرافق. وُجمعت البيانات في الفترة ما بين ديسمبر/ كانون الأول 2017 ويناير/ كانون الثاني 2018. واستُخدمت الإحصاءات الوصفية واختبار  $\chi^2$  بقصد تحليل البيانات التي جُمعت.

**النتائج:** قدمت غالبية مراكز الرعاية الصحية الأولية التابعة للشبكة جميع الخدمات اللازمة بموجب المعايير الوطنية (78٪)، وتوفرت لها جميع المعدات الأساسية اللازمة لتقديم الرعاية (89٪)، بالإضافة إلى توافر وسائل الاتصال الفعالة (85٪). ولكن كان هناك نقص في عدد الأطباء وطواقم التمريض في مجال طب الأسرة. وأبرز التحليل ذو المتغيرين تباينات إقليمية بين المناطق الحضرية والريفية.

**الاستنتاجات:** يمكن أن تسهم هذه الدراسة في تعزيز فهمنا لقدرة وكفاءة مرافق الرعاية الصحية على التكيف مع الإطار الذي يركز على الناس. وتوفر الدراسة بيانات أساسية يمكن الاسترشاد بها في الجهود التي يبذلها لبنان من أجل تعزيز الرعاية الصحية الأولية، كما ستساعد الجهات المانحة والمنظمات غير الحكومية المحلية والدولية في التخطيط للتدخلات والبرامج، وتحسين تخصيص المساعدات المالية.

## References

1. Framework on integrated, people-centred health services: report by the Secretariat. Geneva: World Health Organization; 2016 (<https://apps.who.int/iris/handle/10665/252698>, accessed 8 January 2020).
2. Oyekale AS. Assessment of primary health care facilities' service readiness in Nigeria. BMC Health Serv Res. 2017 Mar 1;17(1):172. <http://dx.doi.org/10.1186/s12913-017-2112-8> PMID:28249578
3. O'Neill K, Takane M, Sheffel A, Abou-Zahr C, Boerma T. Monitoring service delivery for universal health coverage: the Service Availability and Readiness Assessment. Bull World Health Organ. 2013 Dec 1;91(12):923–31. <http://dx.doi.org/10.2471/BLT.12.116798> PMID:24347731
4. World Bank. Lebanon economic monitor. The great capture. 2015. Washington DC: World Bank; 2015 (<http://documents.al-bankaldawli.org/curated/ar/397721468185952923/pdf/101022-WP-PUBLIC-disclosed-11-18-4am-DC-time-11am-Beirut-Box393257B-The-World-Bank-LEM-Fall-2015.pdf>, accessed 8 January 2020).
5. Public health: overview of the health sector. Council for Development and Reconstruction; 2013 ([http://www.cdr.gov.lb/eng/progress\\_reports/pr102013/Epub.pdf](http://www.cdr.gov.lb/eng/progress_reports/pr102013/Epub.pdf), accessed 8 January 2020).
6. Ammar W, Kdough O, Hammoud R, Hamadeh R, Harb H, Ammar Z, et al. Health system resilience: Lebanon and the Syrian refugee



- crisis. *J Global Health*. 2016 Dec;6(2):020704. <http://dx.doi.org/10.7189/jogh.06.020704> PMID:28154758
7. EPHRP DASHBOARD Semi-Annual, 2018. Beirut: Ministry of Public Health; 2018 ([https://www.moph.gov.lb/userfiles/files/Programs%26Projects/Emergency%20Primary%20Health%20Care/EPHRP\\_Dashboard\\_June2018.pdf](https://www.moph.gov.lb/userfiles/files/Programs%26Projects/Emergency%20Primary%20Health%20Care/EPHRP_Dashboard_June2018.pdf), accessed 8 January 2020).
  8. Ammar W. Health beyond politics. World Health Organization, Eastern Mediterranean Regional Office; Ministry of Public Health, Lebanon; 2009 ([https://www.moph.gov.lb/DynamicPages/download\\_file/2007](https://www.moph.gov.lb/DynamicPages/download_file/2007), accessed 8 January 2020).
  9. Mental health and substance use – prevention, promotion, and treatment – situation analysis and strategy for Lebanon 2015–2020. Beirut: Ministry of Public Health; 2015 (<https://www.moph.gov.lb/en/Pages/6/553/nmhp>, accessed 8 January 2020).
  10. Integration of non-communicable disease services within primary health care [website]. Beirut: Ministry of Public Health (<https://www.moph.gov.lb/en/Pages/6/776/non-communicable-disease-program-primary-health-care>, accessed 8 January 2020).
  11. Emergency primary health care restoration project towards universal health coverage in collaboration with World Bank [website]. Beirut: Ministry of Public Health (<https://www.moph.gov.lb/en/Pages/6/779/universal-health-coverage-project-lebanon>, accessed 8 January 2020).
  12. Service Availability and Readiness Assessment (SARA): an annual monitoring system for service delivery: Reference manual. Geneva: World Health Organization; 2013 ([https://www.who.int/healthinfo/systems/SARA\\_Reference\\_Manual\\_Full.pdf](https://www.who.int/healthinfo/systems/SARA_Reference_Manual_Full.pdf), accessed 8 January 2020).
  13. Agreus L, Saab B. International primary care snapshots: Sweden and Lebanon. *Br J Gen Pract*. 2015 Jan;65(630):28–9. <http://dx.doi.org/10.3399/bjgp15X683185> PMID:25548300
  14. Puertas EB, Arósquipa C, Gutiérrez D. Factors that influence a career choice in primary care among medical students from high-, middle-, and low-income countries: a systematic review. *Rev Panam Salud Publica*. 2013 Nov;34(5):351–8. PMID:2455376
  15. Abyad A, Al-Baho AK, Unluoglu I, Tarawneh M, Al Hilfy, Thamer Kadum Yousif. Development of family medicine in the Middle East. *Fam Med*. 2007 Nov–Dec;39(10):736. PMID: 1798741
  16. Osman H, Romani M, Hlais S. Family medicine in Arab countries. *Fam Med*. 2011 Jan;43(1):37. PMID:21213135
  17. Al-Khalidi YM, Al-Ghamdi EA, Al-Mogbil TI, Al-Khashan HI. Family medicine practice in Saudi Arabia: The current situation and Proposed Strategic Directions Plan 2020. *J Family Community Med*. 2017 Sep–Dec;24(3):156–63. [http://dx.doi.org/10.4103/jfcm.JFCM\\_41\\_17](http://dx.doi.org/10.4103/jfcm.JFCM_41_17). PMID:28932160
  18. Alameddine M, Chamoun N, Btaiche R, El Arnaout N, Richa N, Samaha-Nuwayhid H. The workforce trends of nurses in Lebanon (2009–2014): A registration database analysis. *PLoS One*. 2017 Aug 11;12(8):e0182312. <http://dx.doi.org/10.1371/journal.pone.0182312>. PMID: 2880061
  19. World health statistics 2015. Geneva: World Health Organization; 2015 ([https://www.who.int/gho/publications/world\\_health\\_statistics/2015/en/](https://www.who.int/gho/publications/world_health_statistics/2015/en/), accessed 8 January 2020).
  20. El-Jardali F, Alameddine M, Dumit N, Dimassi H, Jamal D, Maalouf S. Nurses' work environment and intent to leave in Lebanese hospitals: Implications for policy and practice. *Int J Nurs Stud*. 2011 Feb;48(2):204–14. <http://dx.doi.org/10.1016/j.ijnurstu.2010.07.009> PMID:20932524
  21. El-Jardali F, Dumit N, Jamal D, Mouro G. Migration of Lebanese nurses: a questionnaire survey and secondary data analysis. *Int J Nurs Stud*. 2008 Oct;45(10):1490–500. <http://dx.doi.org/10.1016/j.ijnurstu.2007.10.012> PMID:18242613
  22. Working together for health: the World Health Report 2006. Geneva: World Health Organization; 2006 (<https://www.who.int/whr/2006/en/>, accessed 8 January 2020).
  23. El-Jardali F, Alameddine M, Jamal D, et al. A national study on nurses' retention in healthcare facilities in underserved areas in Lebanon. *Hum Resour Health*. 2013 Sep 30;11:49. <http://dx.doi.org/10.1186/1478-4491-11-49> PMID:24079458
  24. Hannawi S, Al Salmi I. Health workforce in the United Arab Emirates: analytic point of view. *Int J Health Plann Manage*. 2014 Oct–Dec;29(4):332–41. <http://dx.doi.org/10.1002/hpm.2198> PMID:24114989
  25. Health system profile – Jordan. Cairo: World Health Organization Regional Office for the Eastern Mediterranean Region; 2016 (<http://apps.who.int/medicinedocs/documents/s17296e/s17296e.pdf>, accessed 8 January 2020).
  26. Boutayeb A, Helmert U. Social inequalities, regional disparities and health inequity in North African countries. *Int J Equity Health*. 2011 May 31;10:23. <http://dx.doi.org/10.1186/1475-2875-10-23> PMID:21627818
  27. Health Response Strategy Maintaining Health Security, Preserving Population Health & Saving Children and Women Lives: a new approach 2016 & beyond. Beirut: Ministry of Public Health; 2016 (<https://www.moph.gov.lb/en/Pages/9/1269/strategic-plans#/en/view/3447/health-response-strategy>, accessed 8 January 2020).

# Transforming the pharmaceutical workforce in the Eastern Mediterranean Region: a call for action

Banan Abdulrzaq Mukhalalati,<sup>1</sup> Lina Bader,<sup>2</sup> Asmaa Alhaqan<sup>3</sup> and Ian Bates<sup>4</sup>

<sup>1</sup>Clinical Pharmacy and Practice Department, College of Pharmacy, Health Cluster, Qatar University, Doha, Qatar. <sup>2</sup>International Pharmaceutical Federation, Netherlands. <sup>3</sup>Department of Pharmacy Practice, School of Pharmacy, Kuwait University, Kuwait. <sup>4</sup>School of Pharmacy, University College London, United Kingdom. (Correspondence to: Banan Mukhalalati: banan.m@qu.edu.qa).

## Abstract

Planning and development of the pharmaceutical workforce is fundamental to achieving universal health coverage and the United Nations Sustainable Development Goals by 2030. The International Pharmaceutical Federation (FIP) has recognized the importance of constructing mechanisms for transforming the global workforce. FIP has launched a developmental road map in order to support and facilitate global, regional and national transformations of pharmaceutical education and the workforce. Literature on the pharmaceutical workforce in the WHO Eastern Mediterranean Region is limited but what there is reports persistent workforce challenges. This necessitates stronger engagement across all countries of the Region to develop workable and sustainable strategic plans for workforce and educational development by adopting and adapting approaches to national transformation needs and the FIP roadmap. Countries have an opportunity to engage with FIP in collaborative programmes to implement the FIP roadmap locally, and provide proof of concept and a leadership model for other WHO regions.

Keywords: pharmaceutical workforce, pharmacy education, World Health Organization, Eastern Mediterranean Region

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## Global roadmap for the pharmaceutical workforce

In September 2015, the United Nations (UN) General Assembly launched 17 Sustainable Development Goals (SDGs) that included targets relating to health and health care delivery. One of the SDGs describes achieving universal health coverage (UHC) by 2030, which is dependent on access to good quality health services including the safe and effective medicines and vaccines (1). In line with this, three of the six building blocks in the World Health Organization's (WHO) policies for health systems relate to the health workforce, health service delivery and access to essential medicines (2). Recognizing the importance of the health workforce in strengthening systems, the WHO launched the Global strategy on human resources for health: workforce 2030 in 2016. The strategy calls for quicker progress towards meeting both the SDGs and UHC by ensuring equitable access to a competent and capable health workforce (3). Considering the UN targets, WHO policy building blocks and the above-mentioned global strategy, it can be argued that the planning and development of the pharmaceutical workforce – collectively the health care experts in medicines – is fundamental in strengthening health systems, and for achieving the SDGs and UHC by 2030 (4).

The International Pharmaceutical Federation (FIP) is the global leadership body with an outreach to over four million pharmacists and pharmaceutical scientists around the world (5). FIP, through its formal relations

with WHO and official partners, has recognized and communicated the importance of programmes to transform the pharmaceutical workforce, with a focus on global mechanisms for workforce development and education (5). FIP, through its relations with WHO, advocates for pharmacists' and pharmaceutical scientists' roles in the global health agenda.

FIP has continuously worked to expand the evidence on the education and workforce development through a series of global reports (6–8). These reports collectively represent a call for action with regard to transformation of the global pharmacy workforce (6). They include recommendations on integrating pharmacy workforce planning into broader national health workforce planning (7), emphasizing the importance of a needs-based approach in the development of a locally (nationally) relevant workforce (8). Regular reports on trends provide comprehensive up-to-date analyses of the global pharmacy workforce (9).

In 2016, FIP led the cocreation of a developmental roadmap to facilitate the global transformation of pharmaceutical education and the pharmaceutical workforce. The roadmap was developed in collaboration with national leadership bodies and was approved by consensus at the Global Conference on Pharmacy and Pharmaceutical Sciences Education held in Nanjing, China in 2016. The roadmap is composed of three main elements: a global vision for education and the workforce; a set of pharmaceutical workforce development goals;

and a set of statements on pharmacy and pharmaceutical sciences education (the Nanjing Statements) (10).

The global vision for education and the workforce describes the future professional directions for workforce transformation and how education supports the evolution of practice and science. The thirteen pharmaceutical workforce development goals provide a systematic framework for clear measures and indicators to facilitate national workforce planning, implementation, and monitoring towards the achievement of the global vision. The goals are purposefully aligned with the SDGs and WHO strategies for human resources for health and health workforce transformation. The pharmaceutical workforce development goals are grouped into three clusters: “academy”, with a focus on education providers primarily for initial education and training; “professional development” with a focus on pharmaceutical workforce development; and finally “systems”, with a focus on systematic policy development, and governmental and leadership strategy (11).

The Nanjing Statements are primarily intended for providers of initial education and training as well as providers of continuing professional development and education. The document comprises 67 statements on education and training, grouped into eight clusters: shared global vision; professional skills mix; recruitment of students; foundation (early years) training and professional leadership; experiential education; resources and academic faculty; quality assurance; and continuing professional development (12).

## Evidence and implementation in the Eastern Mediterranean Region

Published literature on the pharmaceutical workforce in the Eastern Mediterranean Region of WHO is limited compared with other health care professions (13,14) and with other WHO regions that have substantially developed their health workforce intelligence strategies and processes (15,16). The lack of critical literature on human resources and the health workforce is evident across the WHO Eastern Mediterranean Region in general (17), a situation that negatively affects workforce intelligence and monitoring in the health sector (18). However, it is worth noting that from the literature available one main challenge is the clear imbalance in the distribution and capacity of the pharmaceutical workforce. This suggests that better coordination and monitoring of the workforce both regionally and globally is urgently needed (19) while learning from experiences of other countries. For example, in New Zealand, Health Workforce has moved from predictive analytics using quantitative methods that estimate future numbers of health workers to the use of strategic foresight philosophy, which is focused on aggregated service models. These models consider the realities of the future of health care, advocate for contextual operational flexibility, and collect qualitative and behavioural information of workforce professionals and their professional registration data in order to improve health

workforce distribution and provision (15).

The reports on workforce trends released regularly by FIP provide detailed analysis of capacity, production and gender trends across various WHO regions (9,20). Both the 2015 and 2018 FIP reports on workforce intelligence indicated that the Eastern Mediterranean Region is showing a relative and absolute increase in capacity, as well as the largest proportional increase in pharmacist workforce and production compared with other WHO regions. Furthermore, the reports indicate that based on available data, Egypt and Jordan currently have some of the largest graduate production capacities in the world per capita (9). However, these observations, as pointed out in the 2018 report, are based on a limited number of countries of the Eastern Mediterranean Region providing data (six of the 21 Member States). This data gap necessitates a broader and stronger engagement across all countries of the Region, coordinated by FIP, in order to obtain the required data for future analysis of workforce intelligence and evidence-based recommendations. Furthermore, collective action by the pharmacy leaders in the Region is needed to strengthen workforce planning and development across all countries. Other research conducted in the Eastern Mediterranean Region highlighted an increasing number of pharmacy schools being established in some countries of the Region. This increase potentially has an impact on pharmacy practice and the supply of pharmacists to other countries through mobility and migration trends. Taken together, this may be indicative of a continued disconnect between the education, regulation and practice sectors that could be associated with lack of involvement of professional leadership bodies in workforce-related issues (9,21–24), including the significant, but largely unmeasured, impact of transnational professional migration.

The increased production of graduates and pharmacists in the Region, linked with inadequate data intelligence and workforce planning and career pathways, raises the issue of effective regulation and policy formation by policy-makers and professional leadership bodies. This is a critical issue and further raises concerns for the policy-makers in the Region (9). This situation requires urgent and concerted action across the Region, using a needs-based approach to develop a regional workforce development vision. We argue that based on evidence, implementation strategies and measures to monitor the workforce should ideally be mapped to the FIP global call for country case studies released in 2017 (9). This call aims to promote and align national workforce development projects with the systematic pharmaceutical workforce development goals in order to provide both a concerted and collaborative incentive for workforce transformation. By using the framework of the pharmaceutical workforce development goals and Nanjing Statements to identify national gaps and needs, countries of the Eastern Mediterranean Region will be able to identify gaps in policies and processes, and develop workable strategic plans for workforce development and educational policies based on adopting

and adapting approaches to the national transformation needs. Furthermore, working collectively, stakeholders in the Region could carry out a pilot regional case study in leadership, which could enable other WHO regions to establish similar proposals for the development of workforce planning and strategies based on identified need – a global cascade of concerted action and activities.

## Call for action: from country-level commitment to regional transformation

The 2018 FIP report on workforce trends concluded that further focused work is needed at regional levels to initiate specific discussions around needs-based approaches and interregional commonalities for health workforce transformation. Therefore, stronger engagement and commitment to workforce development is needed by all countries of the Region to foster change at a regional level.

The Region can benefit from examining the experiences of other countries in strengthening the capacity and capability of the health workforce through local action based on local intelligence. These experiences include achieving a critical mass in the public health workforce by evaluating entry-level education and training, conducting structured work-based education and training models through traineeship schemes (such as foundation training), restructuring continuous professional development activities and facilitating specialization opportunities (often through further postgraduate training in management and leadership, for example) (16).

Collectively, individual national-level commitments would result in regional transformation in the Eastern Mediterranean Region. Such a regional-level transformation would offer a regional case study for other WHO regions. Coordinating a concerted regional effort requires better collaboration and participation of academic, practice, professional and governmental sectors across the Region in order to collectively engage with transformational mechanisms – the pharmaceutical workforce development goals and Nanjing Statements – in order to identify, address and monitor workforce trends, needs and progression. FIP has developed mechanisms to use and implement the Nanjing outcomes; for example, development of self-assessment tools from the Nanjing Statements and piloting a workforce transformation

programme that facilitates national-level partnerships to transform the global workforce one country at a time.

Concerted regional action across the Region provides an opportunity for collaboration for the mutual benefit of the countries. Such a regional commitment would build on the four strategic objectives of the Framework for action for health workforce development in the Eastern Mediterranean Region that was developed by the WHO Regional Office for the Eastern Mediterranean in 2018 to implement the global strategy on human resources for health (25). This would also advance and support the operationalization of the recently released Amman Commitment to action on primary health care reform for the Eastern Mediterranean Region (26). Furthermore, establishing a region-wide pharmaceutical workforce pilot case study provides a better pragmatic basis for workforce intelligence planning, educational reform, policy development and leadership advocacy by engaging all countries across the Region to contribute and share data for a systematic needs analysis. Transformative change at the regional level relies on the full commitment and engagement of each of the 22 countries of the Region. Only then can we make progress on the WHO global strategy in line with the regional framework for action for health workforce development.

The evidence obtained from a needs-based analysis of the pharmaceutical workforce and education policy can be used in the development of a focused and credible region-wide vision for workforce planning, and the creation of education and transformative policies for professional careers. These evidence-led policies would tackle the regional challenges, such as: long-term conditions requiring complex medicines, the medicines-related complexity of comorbidity, transformation to pharmacy-led patient-focused services, improvement of pharmacy input into public health policy, and the development of regional leadership in professional practice for both young and experienced pharmaceutical professionals. There is no health care without a workforce and the time has come to pay more attention to this critical factor in the improvement of health for the countries of the Eastern Mediterranean Region.

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**Competing interests:** None declared.

## Transformer le personnel pharmaceutique dans la Région de la Méditerranée orientale : un appel à l'action

Banan Abdulrazaq Mukhalalati,<sup>1</sup> Lina Bader,<sup>2</sup> Asmaa Alhaqan<sup>3</sup> et Ian Bates<sup>4</sup>

### Résumé

La planification et le développement du personnel pharmaceutique sont essentiels à la réalisation de la couverture sanitaire universelle et des Objectifs de développement durable (ODD) des Nations Unies à l'horizon 2030. La Fédération internationale pharmaceutique (FIP) a reconnu l'importance de mettre en place des mécanismes de transformation du personnel à l'échelle mondiale. Elle a élaboré une feuille de route de développement afin d'appuyer et de faciliter les transformations de la formation et du personnel dans le secteur pharmaceutique aux niveaux mondial, régional et national. Dans la Région OMS de la Méditerranée orientale, la littérature sur le personnel pharmaceutique est limitée,



mais les éléments dont on dispose font état de difficultés persistantes en ce qui concerne cette catégorie du personnel. Cela nécessite un engagement plus fort de tous les pays de la Région afin d'élaborer des plans stratégiques, réalisables et pérennes en matière de développement du personnel et de formation en adoptant et en adaptant des approches qui permettent de répondre aux besoins de transformation au niveau national et de mettre en œuvre la feuille de route de la FIP. Les pays ont l'occasion de s'engager avec la FIP dans le cadre de programmes collaboratifs afin de mettre en œuvre la feuille de route proposée par celle-ci au niveau local. C'est aussi la possibilité de proposer aux autres Régions OMS une validation de principe et un modèle d'encadrement.

## تحوّل القوى العاملة الصيدلانية في إقليم شرق المتوسط: دعوة إلى العمل

بنان المخللاتي، لينة بدر، أسماء الحقان، إيان بيتس

### الخلاصة

يُعدُّ تخطيط القوى العاملة الصيدلانية وتنميتها أمراً جوهرياً لتحقيق التغطية الصحية الشاملة وأهداف التنمية المستدامة التي أطلقتها الأمم المتحدة بحلول عام 2030. وقد أقرّ الاتحاد الدولي للصيدلة بالأهمية التي يكتسبها وضع آليات لتحويل القوى العاملة في العالم كله. وأطلق الاتحاد الدولي للصيدلة خارطة طريق تنمية من أجل دعم وتيسير التحولات في مجال التثقيف الصيدلاني والقوى العاملة الصيدلانية على المستويات العالمية، والإقليمية، والوطنية. وتتسم الأدبيات بشأن القوى العاملة الصيدلانية في إقليم شرق المتوسط التابع لمنظمة الصحة العالمية بكونها محدودة، ويوضح المتوافر منها وجود تحديات مستعصية تواجه القوى العاملة. ويستلزم ذلك مشاركة أقوى عبر جميع بلدان الإقليم لوضع خطط استراتيجية قابلة للتنفيذ ومستدامة للقوى العاملة وتنميتها تعليمياً، وذلك من خلال اعتماد نهج وتكييفها وفقاً لاحتياجات التحول الوطنية وخارطة طريق الاتحاد الدولي للصيدلة. ولدى البلدان فرصة سانحة للمشاركة مع الاتحاد الدولي للصيدلة في برامج تعاونية تهدف إلى تنفيذ خارطة طريق الاتحاد محلياً، وتقديم دليل على وجود المفهوم والقيام بدور قيادي لباقي أقاليم منظمة الصحة العالمية.

## References

- Tracking universal health coverage: 2017 global monitoring report. Geneva: World Health Organization; 2017.
- Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies: Geneva: World Health Organization; 2010.
- Global strategy on human resources for health: workforce 2030. Geneva: World Health Organization; 2016.
- Bader L, Bates I, John C. From workforce intelligence to workforce development: advancing the Eastern Mediterranean pharmaceutical workforce for better health outcomes. *East Mediterr Health J*. 2018;24(9):899–904. <https://doi.org/10.26719/2018.24.9.899>
- International Pharmaceutical Federation (FIP) (website) (<https://www.fip.org/>, accessed 31 August 2019).
- Global pharmacy workforce and migration report: a call for action. The Hague: International Pharmaceutical Federation; 2006.
- 2009 FIP global pharmacy workforce report. The Hague: International Pharmaceutical Federation; 2009.
- 2012 FIP global pharmacy workforce report. The Hague: International Pharmaceutical Federation; 2012.
- Global pharmacy workforce intelligence: trends report 2015. The Hague: International Pharmaceutical Federation; 2015.
- Transforming pharmacy and pharmaceutical sciences education in the context of workforce development. The Hague: International Pharmaceutical Federation; 2017 ([https://www.fip.org/www/streamfile.php?filename=fip/publications/FIPed\\_Nanjing\\_Report\\_2017\\_11.10.17.pdf](https://www.fip.org/www/streamfile.php?filename=fip/publications/FIPed_Nanjing_Report_2017_11.10.17.pdf), accessed 4 November 2019).
- Pharmaceutical workforce development goals. The Hague: International Pharmaceutical Federation; 2016.
- Research, development and evaluation strategies for pharmaceutical education and the workforce: a global report. The Hague: International Pharmaceutical Federation; 2017.
- Desselle SP. Much needed attention devoted to pharmacy workforce issues. *Res Social Adm Pharm*. 2006;2(3):294–8. <https://doi.org/10.1016/j.sapharm.2006.08.003>
- Hasan S, Sulieman H, Chapman C, Stewart K, Kong DCM. Community pharmacy in the United Arab Emirates: characteristics and workforce issues. *Int J Pharm Pract*. 2011;19(6):392–9. <https://doi.org/10.1111/j.2042-7174.2011.00134.x>
- Rees GH. Addressing inadequate health workforce intelligence. *Int Med J*. 2015;45(9):887–9. <https://doi.org/10.1111/imj.12847>
- Jenner D, Hill A, Greenacre J, Enock K. Developing the public health intelligence workforce in the UK. *Public Health*. 2010;124(5):248–52. doi: 10.1016/j.puhe.2010.03.007
- El-Jardali F, Jamal D, Abdallah A, Kassak K. Human resources for health planning and management in the Eastern Mediterranean region: facts, gaps and forward thinking for research and policy. *Hum Res Health*. 2007;5(1):9. <https://doi.org/10.1186/1478-4491-5-9>
- El-Jardali F, Makhoul J, Jamal D, Ranson MK, Kronfol NM, Tchaghchagian V. Eliciting policymakers' and stakeholders' opinions



- to help shape health system research priorities in the Middle East and North Africa region. *Health Policy Plan.* 2009;25(1):15–27. <https://doi.org/10.1093/heapol/czp05>
19. Hawthorne N, Anderson C. The global pharmacy workforce: a systematic review of the literature. *Human Res Health.* 2009;7(1):48. <https://doi.org/10.1186/1478-4491-7-48>
  20. Pharmacy workforce intelligence: global trends report 2018. The Hague: International Pharmaceutical Federation; 2018.
  21. Bajis D, Moles R, Chaar B. Stakeholders' perspectives on quality assurance in the Eastern Mediterranean Region. *Am J Pharm Educ.* 2018;82(10):6482. <https://doi.org/10.5688/ajpe6482>
  22. Bader LR, McGrath S, Rouse MJ, Anderson C. A conceptual framework toward identifying and analyzing challenges to the advancement of pharmacy. *Res Social Adm Pharm.* 2017;13(2):321–31. <https://doi.org/10.1016/j.sapharm.2016.03.001>
  23. Kheir N, Zaidan M, Younes H, El Hajj M, Wilbur K, Jewesson PJ. Pharmacy education and practice in 13 Middle Eastern countries. *Am J Pharm Educ.* 2008;72(6):133. <https://doi.org/10.5688/aj7206133>
  24. Kheir N, Fahey M. Pharmacy practice in Qatar: challenges and opportunities. *South Med Rev.* 2011;4(2):45–9. <https://doi.org/10.5655/smr.v4i2.1007>
  25. Framework for action for health workforce development in the Eastern Mediterranean Region 2017–2030. Cairo: World Health Organization Regional Office for the Eastern Mediterranean; 2018.
  26. The Amman Commitment to Action on Primary Health Care. International Pharmaceutical Federation; 2019 (<https://amman2019.congress.pharmacy/amman-jordan/>, accessed 31 August 2019).

# Elimination of trachoma from Morocco: a historical review

Jaouad Hammou,<sup>1,2</sup> Majdouline Obtel,<sup>2,3</sup> Rachid Razine,<sup>2,3</sup> Amina Berraho<sup>4</sup> and Mohamed Belmekki<sup>5</sup>

<sup>1</sup>Faculty of Medicine and Pharmacy of Rabat, Mohammed V University, Rabat, Morocco. <sup>2</sup>Social Medicine Laboratory (Public Health, Hygiene and Preventive Medicine), Faculty of Medicine and Pharmacy of Rabat, Mohammed V University, Rabat, Morocco. <sup>3</sup>Laboratory of Biostatistics, Clinical Research and Epidemiology (LBRCE), Department of Public Health, Faculty of Medicine and Pharmacy of Rabat, Mohammed V University, Rabat, Morocco. <sup>4</sup>Hassan II Foundation of Ophthalmology, Rabat, Morocco. <sup>5</sup>Abulcasis International University of Health Sciences (UIASS), Rabat, Morocco. (Correspondence to: Jaouad Hammou: [hjaouad2020@yahoo.fr](mailto:hjaouad2020@yahoo.fr)).

## Abstract

Since the 1950s, the Kingdom of Morocco has been and remains one of the pioneers in the fight against trachoma, a disease that has completely disappeared in the majority of its national territory, but some endemic pockets have persisted and pose a health risk, particularly for children and women. Morocco finds itself today, thanks to years of joint efforts, at the forefront of the world stage of the fight against trachoma. The country has demonstrated through its experience the effectiveness and relevance of the “SAFE” strategy – an extensive programme designed to tackle trachoma and its complications. The strategy is complex in its implementation and requires the synergy of a set of actors dedicated to specific activities, whether medico-surgical management activities aimed at setting up a physical project for local development, or information and awareness-raising activities. The key to the long-term success of eliminating blinding trachoma was not only to link distribution of drugs to the entire project area for several years to reduce substantially the reservoir of human-to-human transmission, but also to ensure permanence. In addition, services that provide quality palpebral surgery and especially repeat treatment campaigns with antibiotics, as well as health education campaigns and the promotion of personal and collective hygiene have generated sustainable changes in the living environment of receiving populations.

**Keywords:** Trachoma, Chlamydiae trachomatis, blindness, SAFE strategy, neglected tropical diseases

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## Introduction

Trachoma, caused by particular serovars of *Chlamydia trachomatis*, is the leading infectious cause of blindness (1). Infection is associated with an inflammatory conjunctivitis known as “active trachoma”. Repeated episodes (2) of active trachoma can result in eyelid scarring, which in some individuals leads to trachomatous trichiasis (TT), in which one or more eyelashes are diverted to touch the eye. TT is extremely painful (3). It can be corrected surgically. If it is left untreated, it can lead to corneal opacification, low vision and blindness.

Endemic blinding trachoma is found in populations with poor personal and community hygiene. Factors associated with elevated individual risk of trachoma include lack of adequate water supply, absence of basic sanitation facilities, living with a trachoma case, crowding and poverty in general. The common element seems to be the presence of children with dirty faces in the proximal environment: the presence of infectious ocular and nasal discharges facilitates transmission.

Trachoma can be eliminated as a public health problem using a package of interventions known as the “SAFE strategy”, comprising surgery for TT, antibiotics to clear ocular *C. trachomatis* infection and facial cleanliness and environmental improvement (particularly improved access to water and sanitation) to reduce *C. trachomatis* transmission (4).

Worldwide, an estimated 1.9 million people are

visually impaired as a result of trachoma, of whom 450 000 are blind (5). As of 2018, there were 157.7 million people living in districts in which the trachomatous inflammation–follicular (TF: the presence of five or more follicles, each at least 0.5mm in diameter, in the central part of the upper tarsal conjunctiva) prevalence was  $\geq 5\%$  in 1–9-year-olds (6). In 2016, the global burden of TT was estimated to be 2.8 million cases in all endemic countries combined (7).

Morocco does not contribute people to either of these prevalence estimates, having recently been acknowledged to have eliminated the disease as a public health problem, after decades of work against the disease. Here, we set out to document the history of trachoma control in Morocco to 1) keep in memory this disease which may present a future risk of re-emergence; 2) demonstrate the relevance of the SAFE strategy as a control tool; and 3) share our experience with all endemic countries, in case the lessons we learned are also useful for them.

## Methods

### *History of the fight against trachoma in Morocco*

The first Moroccan statistics on trachoma date from 1927 to 1952, when it became clear that trachoma was prevalent throughout the country, with a greater frequency in its southern part (8,9). The information for the years prior to 1952, although interesting, is some-

what difficult to interpret epidemiologically, because often no clear distinction was made between inflammatory and cicatricial trachoma (10). In this bibliographic context, the first critical reference work remains the surveys carried out by Kupka et al. between 1962 and 1965 (11,12) in the regions of Errachidia, Ouarzazate, Tata and Goulmima, where the active trachoma prevalence was between 85% and 99%, varying between zones. The proportion of active trachoma cases to all cases ranged from 41% to 63%. TT affected 2–7% of the population, and the severity of trachoma was more marked in females.

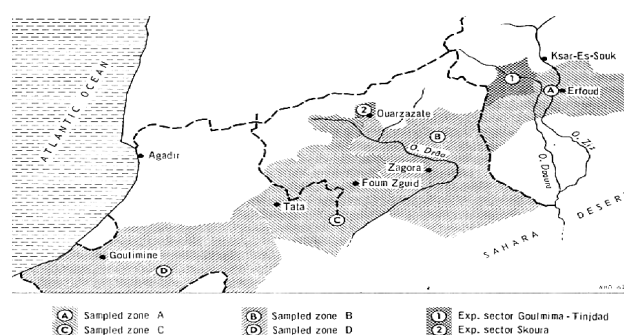
In 1952, a mass trachoma treatment programme was launched in Morocco. The campaign involved topical application of 1% chlortetracycline ointment, twice daily, for 3–5 consecutive days per month for 6 months (13). Between 1953 and 1971, Morocco, in collaboration with the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) trained doctors and nurses about trachoma at the National Center of Ophthalmology of Salé (a city near Rabat). Subsequently, teams were deployed throughout the national territory, particularly in the regions of the Draa Valley and Dades, to treat populations with trachoma (13,14).

In 1954 an experiment was conducted in 24 southern Moroccan villages to provide data for an evaluation of the three fundamental measures for the control of epidemic eye infections: first, mass treatment and prevention with an antibiotic during the epidemic conjunctivitis season; secondly, mass sulfonamide treatment before the epidemic season, to reduce the frequency of human sources of contagion; and third, fly control. The main objective of the latter study was to reduce the number of fly populations in the villages and to study: 1) natural seasonal variations between different fly species; 2) the role of these species in seasonal conjunctivitis epidemics; and 3) the effect of fly control on such epidemics. This part of the story shows how much Morocco was engaged in the fight against trachoma through diversified actions, particularly the environmental component. Through this study, a correlation was established between the number of flies and the frequency of conjunctivitis. The investigators recommended establishing a sanitation programme over the long term (15).

Kupka et al. studies during 1962–1965 investigated environmental factors, particularly water resources and their use, as well as the relationship between the prevalence and severity of trachoma in women and the increased risk of exposure to infection. There was a clear correlation between the prevalence of trachoma and the distance from housing to water supplies, the risk being higher when the distance grew. There were more cases of active (inflammatory) trachoma when use of water for hygiene was low (12) (Figure 1).

In 1975, the Morocco trachoma control strategy was revised following analysis of the epidemiological situation based on provincial reports and targeted surveys. The revision proposed a two-component

**Figure 1 Location of sampled zone and experimental sectors in south Morocco (12)**



approach: 1) a school-specific strategy based on the organization of national days to fight communicable ophthalmia, which concerned all community (traditional) and primary schools. This strategy was based on the treatment of all detected cases with topical chlortetracycline 1%, twice daily, for 5 days in the case of conjunctivitis, and 6 weeks in the case of active trachoma, health education also being offered (16); and 2) a strategy for the entire population in 14 provinces in the south-east of the country. These campaigns for the prevention of communicable ophthalmia were organized each year in October and November. Treatment was based on the application of chlortetracycline 1%, twice daily for 3 days. If a case of active trachoma was found, the treatment involved application of chlortetracycline 1%, 2 times a day for 6 weeks and treatment to all members of the family (17).

During the 1990s, epidemiological investigations confirmed the ongoing reality of trachoma in Morocco. Despite many years of specific control, the disease was still a major cause of preventable blindness. Certainly, the improvement in standards of living of the majority of the population closely correlated to the economic development experienced by the country, and had significantly reduced the geographical extent of trachoma to a point at which it had disappeared completely from Moroccan cities and most of the national territory. However, some residual provinces in the south-east of the country remained affected. This situation was confirmed in 1992 by a national survey on the prevalence and causes of blindness.

The 1992 survey estimated the overall national prevalence of trachoma to be 5.4%. Virtually all cases were found in rural communities of Errachidia, Figuig, Ouarzazate, Tata and Zagora. Women and children were the most affected. Approximately 360 000 people had TF or TI (trachomatous inflammation–intense: pronounced inflammatory thickening of the upper tarsal conjunctiva that obscures more than half of the normal deep tarsal vessels), while TT affected between 35 000 and 40 000 people (18). The national survey thus made it possible to establish a national report card on trachoma, with identification of the remaining endemic areas.

To know more about the epidemiological situation, the Ministry of Health organized further studies. In 1992, a survey was conducted in the province of Ouarzazate to: 1) assess the magnitude and severity of disease; and 2) train health workers on the epidemiological evaluation of trachoma, including the use of the simplified trachoma grading system recommended by WHO (19).

The study was conducted in conformity with the guidelines proposed by WHO, with a random sample of 30 clusters selected from the general population of the province, using a probability proportional to size method. Thus, the sample comprised 1200 individuals, of whom 1185 were examined. The overall prevalence of active trachoma (TF and/or TI) was 18% (95% CI = 12.8–23.2%). The prevalence of TI in children aged under 10 years was 12.8% (95% CI = 6.8–18.8%). The severity of disease was confirmed by a prevalence of TT of 2.2% (95% CI = 1.4–3.0%) and of corneal blindness, which was estimated at 1.6%. After this study, the investigators concluded that trachoma deserved public health attention, particularly in the valley of Oued Draa, where all the indicators suggested more severe disease than that found elsewhere in the province (20).

In 1993, the Ministry of Health conducted a new survey on the prevalence and severity of trachoma in the target provinces. The blinding character of trachoma was again demonstrated: TT affected 1% and 2.2% of >15-year-olds in Figuig and Ouarzazate, respectively, while corneal opacities were estimated to affect 1.2% and 3.3% of >15-year-olds in those two provinces (21).

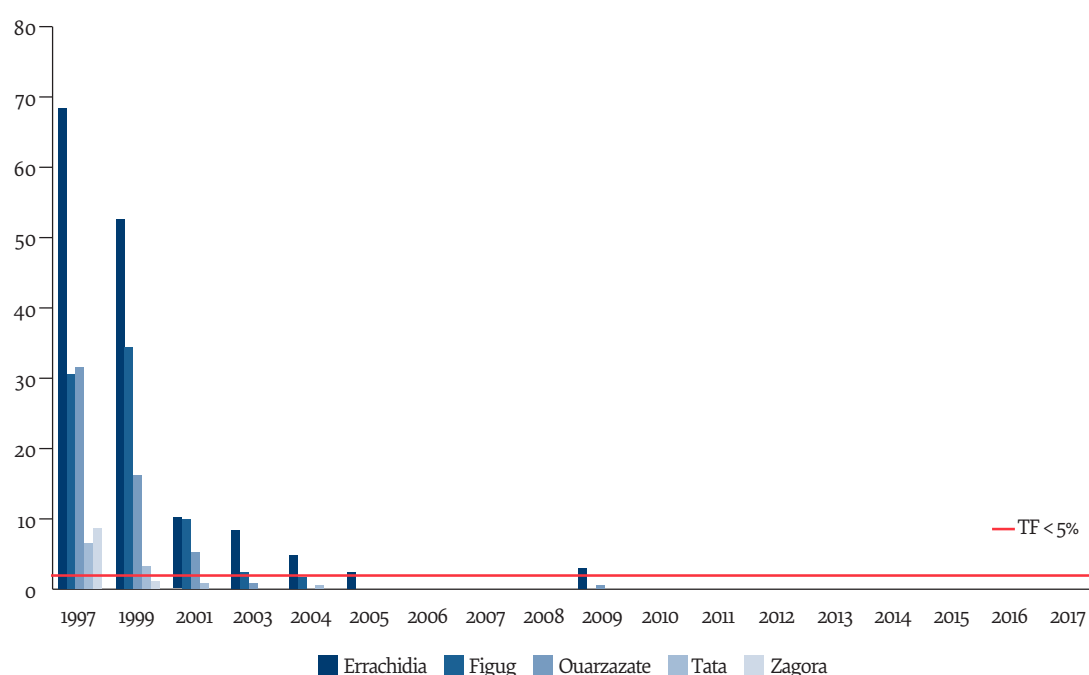
In 1998, the World Health Assembly adopted resolution WHA51.11 on the global elimination of blinding

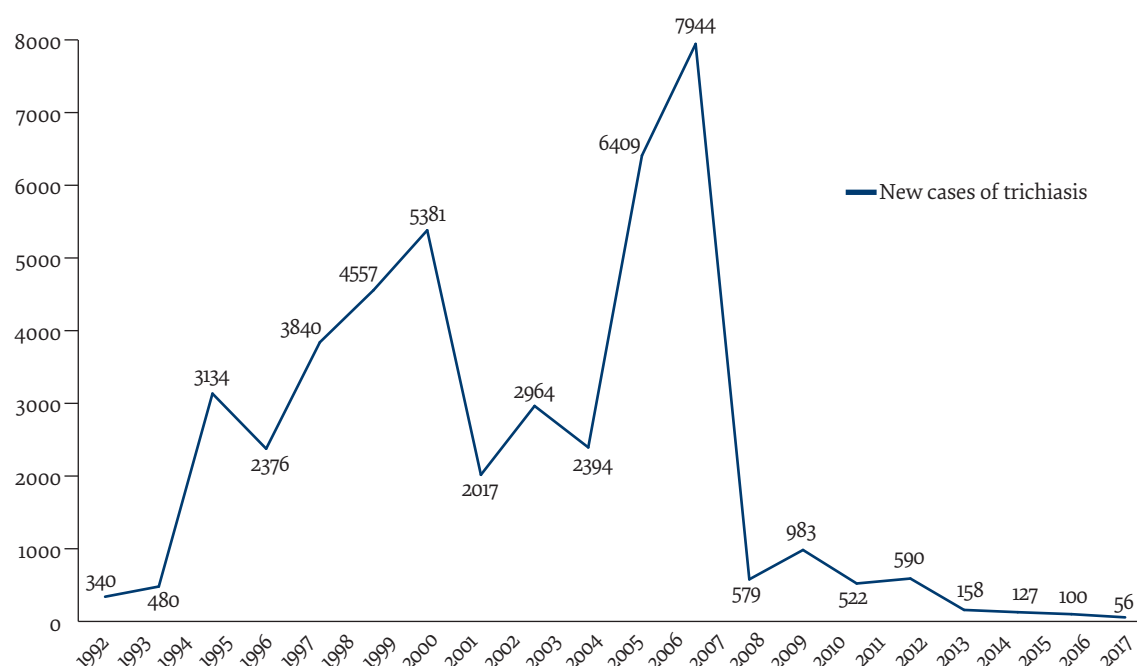
trachoma. It recommended increased implementation of the SAFE strategy (22). In 1999, Morocco and four other trachoma-endemic countries (Ghana, Mali, the United Republic of Tanzania and Viet Nam) were offered the support of the International Trachoma Initiative (ITI) to fight the disease even more effectively, with launch of a range of intersectoral activities. The five countries incorporated an azithromycin mass-drug administration programme into their therapeutic strategy.

Thereafter, the SAFE strategy was introduced in the target provinces of Morocco (Errachidia, Figuig, Ouarzazate, Tata and Zagora). Many actions were undertaken. Several thousand cases of TT were operated annually by trained health workers. Active trachoma was addressed through mass treatment with azithromycin plus implementation of the F and E components of SAFE in collaboration with national partners, including the Ministry of National Education, the Ministry of Employment, Social Development and Solidarity, the Ministry of Equipment, the National Office of Drinking Water, Helen Keller International Morocco, Hassan II Ophthalmology Foundation and local development associations.

The use of azithromycin was first tested in the province of Tata before being generalized in 1999 to the other four provinces. Approximately 700 000 doses of this drug were distributed annually between 1999 and 2005 (23). This achieved antibiotic coverage of  $\geq 80\%$  of the eligible population in the targeted provinces and (in concert with the F and E activities) a reduction in prevalence of active trachoma among children aged 1–9 years to  $\leq 5\%$  (Figure 2).

**Figure 2** Prevalence of trachomatous inflammation–follicular (TF) in children aged 1–9 years, by province, Morocco 1997, 1999, 2001, 2003, 2004 and 2005

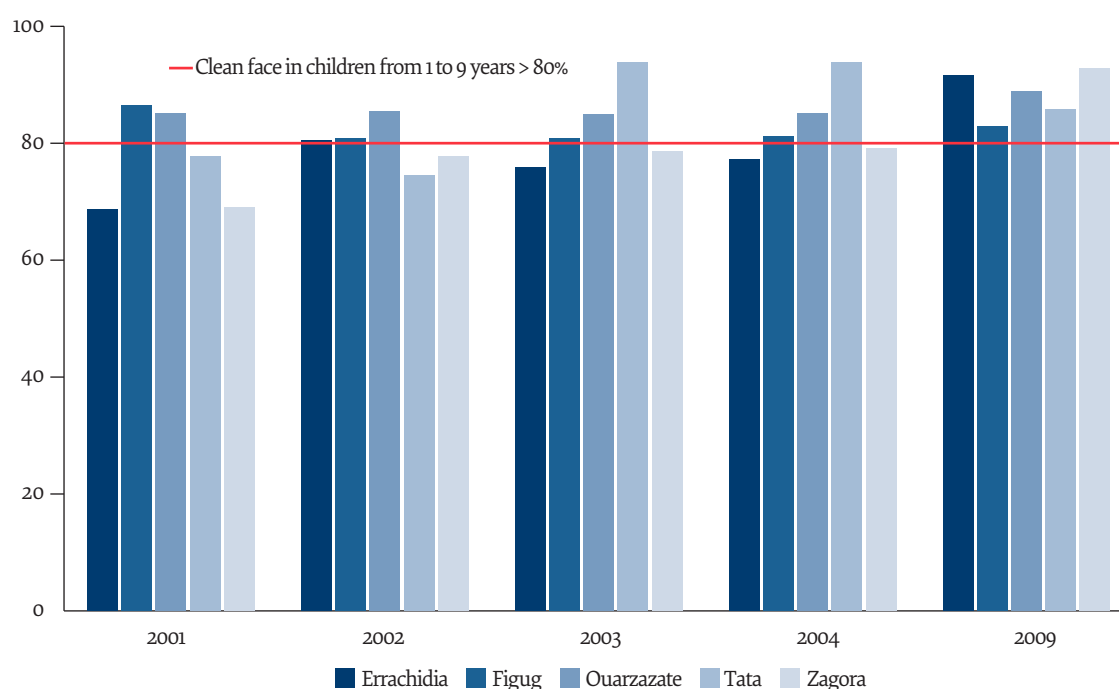


**Figure 3** Surgical treatment of trachomatous trichiasis (TT) in the target provinces 1992–2015

From 1997 to the end of 2005, 35 000 people with TT were treated surgically. This reduced the prevalence of TT to less than 0.1 per 1000 in the all-ages population of the targeted provinces. In accordance with WHO recommendations, the programme continued to operate on incident cases of TT (Figure 3).

The distribution of antibiotics was accompanied by education and awareness-raising actions using

various methods of communication, including radio, television, print media and movies about the disease, its risk factors and its consequences. Schools, health facilities, educational and social centers and mosques were also used to organize communication activities. Approximately 1.3 million people benefited from these activities each year. Physical actions to improve personal and collective hygiene were also undertaken, including: 1) organizing cleanliness campaigns, such as measures

**Figure 4** Evolution of the rate of clean face (%) in children aged 1–9 years



to fight flies, and demonstrations of hygienic disposal of human waste; 2) constructing latrines in schools and mosques; and 3) drilling wells and constructing water towers to provide water to mosques, schools and communities. The prevalence surveys conducted by the programme provided an opportunity to assess the cleanliness of the face and the conditions of collective hygiene. WHO's definition of "clean face" was used in the various prevalence and hygiene assessment surveys (Figure 4).

By the end of 2005, Morocco had reached the elimination prevalence targets and initiated the establishment of epidemiological surveillance work.

The epidemiological surveillance system was developed by the Moroccan programme with support from WHO, ITI and the International Agency for the Prevention of Blindness, Italy. It allowed control of the determinants of trachomatous disease and rested on existing structures in the national healthcare system (Provincial Epidemiology Cells, Regional Epidemiology Observatories and the Epidemiological Surveillance Service). The trachoma epidemiological surveillance system was established at the level of the target provinces to help track trends in trachoma, to generate decisions and facilitate action at the local level. It incorporated three methods, as follows: 1) sentinel surveillance of TF. Each year, children aged 1–9 years attending schools or primary healthcare centres were routinely screened. In each TF case, a contact investigation was commenced in the family and in the village. 2) The epidemiological surveillance of TT. This is based on a strategy called "exhaustive screening of TT" for the whole population (door to door). 3) Special investigations and epidemiological studies (24).

In 2009, the Ministry of Health carried out representative surveys in order to assess the epidemiological situation of trachoma at the level of the most disadvantaged communities in the target provinces, to measure some indicators related to behaviour change and environmental improvement and to evaluate the epidemiological surveillance system for trachoma.

In 2010, the results of these surveys were validated by a committee of national and international experts in Rabat. They reached two important conclusions: 1) no cases of TI were observed in children aged 1–9 years in all provinces; and 2) comparative analysis of cross-sectional data with those of the epidemiological surveillance system for trachoma showed that the latter was supplying critical information to monitor trachoma (25).

In 2015, WHO's Strategic and Technical Advisory Group on Neglected Tropical Diseases endorsed standardized processes for confirming and acknowledging success for all neglected tropical diseases targeted for eradication, elimination of transmission, or elimination as a public health problem. The process for diseases targeted for elimination as a public health problem was defined as "validation" (26).

Elimination of trachoma as a public health problem

is defined as: 1) a prevalence of TT "unknown to the health system" of < 1 case per 1000 all-ages population (or < 0.2% in ≥15-year-olds); and 2) a prevalence of TF in children aged 1–9 years of < 5%, in each formerly endemic district, and a system to identify and manage incident cases of TT (27).

Establishing that the TT and TF prevalence thresholds have been met in a district is a two-step process. First, following a period of implementation of interventions against trachoma, and at least 6 months after the final planned round of antibiotic mass drug administration has been completed, an impact survey is undertaken. If the TF prevalence threshold has been met, the district enters a 2-year period of pre-validation surveillance, during which time antibiotic mass drug administration should not be implemented. Second, at the conclusion of that 2-year period, a pre-validation surveillance survey should be undertaken (28,29).

In perfect agreement with WHO criteria for validation of trachoma's elimination as a public health problem, Morocco presented a dossier documenting the achievement of elimination targets. The epidemiological situation at the end of 2016 was characterized by:

- Prevalence of TT ≤ 1 / 1000 in the all-ages population.
- Prevalence of TF 0.92% in children aged 1–9 years.

The dossier presented information to support the current epidemiological situation of trachoma in the country and described the systems for identifying and managing patients with TT. Based on the evidence provided in the dossier and the recommendation of an ad-hoc dossier review group, WHO concluded that Morocco had eliminated trachoma as a public health problem. This great achievement was officially announced by WHO in November 2016 (30,31).

## Results and conclusions

The lessons to be learned from the Moroccan programme to fight trachoma include the following elements that were felt locally to be critical to success (32):

- Political engagement
- Integration of trachoma control in primary health care
- Implementation of all components of the SAFE strategy
- Adoption of evaluation as a fundamental component of monitoring and planning
- Decentralization of planning, monitoring and evaluation
- Communication to the general public on the progress of the fight against trachoma (including, for example, field visits by media professionals).

Morocco would be happy to advise other countries engaged in the fight against trachoma.

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**Competing interests:** None declared.

## Élimination du trachome au Maroc : une revue historique

### Résumé

Depuis les années 1950, le Royaume du Maroc est l'un des pionniers de la lutte contre le trachome. Cette maladie a complètement disparu de la majeure partie de son territoire national, mais elle demeurait endémique dans certaines poches, représentant un risque pour la santé, en particulier pour les enfants et les femmes.

Aujourd'hui, grâce à des années d'efforts conjoints, le Maroc se trouve à l'avant-scène de la lutte mondiale contre le trachome. À travers son expérience, le pays a démontré l'efficacité et la pertinence de la stratégie « CHANCE », programme à grande échelle conçu pour s'attaquer au trachome et à ses complications. La mise en œuvre de cette stratégie est complexe. Elle nécessite la participation conjointe d'un ensemble d'acteurs se consacrant à des activités spécifiques, qu'il s'agisse d'activités de prise en charge médico-chirurgicale visant à mettre en place un projet physique de développement local ou d'activités d'information et de sensibilisation.

Pour réussir à éliminer durablement le trachome cécitant, la solution a consisté non seulement à étendre la distribution de médicaments à toute la zone du projet pendant plusieurs années afin de réduire considérablement le réservoir de transmission interhumaine, mais également à assurer la permanence de cette distribution. De plus, les services qui assurent une chirurgie palpébrale de qualité et surtout des campagnes régulières de traitement par antibiotiques, ainsi que des campagnes d'éducation sanitaire et la promotion de l'hygiène personnelle et collective, ont généré des changements durables dans l'environnement de vie des populations qui en bénéficient.

### القضاء على التراكوما في المغرب: استعراض تاريخي

جواد حمو، مجدولين أوبطيل، رشيد رزين، أمينة برحو، محمد بلمكي

### الخلاصة

منذ خمسينات القرن الماضي، واصلت المملكة المغربية دورها كرائدة لجهود مكافحة التراكوما، وهو المرض الذي اختفى كلية من معظم ترابها الوطني، غير أن بعض الجيوب المستوطنة بالمرض ما زالت موجودة وتمثل خطراً صحياً، لا سيما بالنسبة للنساء والأطفال.

ويتبوأ المغرب اليوم، بفضل سنوات من الجهود المشتركة، مكان الصدارة على ساحة الجهود العالمية المبذولة للقضاء على التراكوما. وأوضح البلد من خلال ما يمتلكه من خبرة فعالية استراتيجية جراحة الأهداب والمضادات الحيوية ونظافة الوجه وتحسين البيئة ومدى ملاءمتها - وهي عبارة عن برنامج ممتد صُمم للتصدي للتراكوما ومضاعفاتها. وتتسم الاستراتيجية بالتعقيد في تنفيذها وتتطلب تحقيق تأزر بين مجموعة من الجهات الفاعلة المُكرّسة لأنشطة محددة، سواء كانت أنشطة تدبير علاجي طبي وجراحي تهدف إلى إنشاء مشروع فعلي للتنمية المحلية، أو أنشطة إعلامية ومُذكية للوعي.

ولم يكن السر وراء النجاح الممتد لجهود القضاء على التراكوما المسببة للعمى متمثلاً وحسب في ربط توزيع الأدوية بكامل منطقة المشروع للحد بصورة جوهرية من مستودع انتقال العدوى بين البشر، بل وتمثل أيضاً في العمل على ضمان استدامة المشروع. وعلاوة على ذلك، فقد أدت الخدمات التي تُقدّم من خلالها جراحة أهداب جيدة، وتكرّر حملات العلاج بالمضادات الحيوية على وجه خاص، إلى جانب حملات التثقيف الصحي وتعزيز النظافة الشخصية والجماعية، إلى إحداث تغييرات مستدامة في البيئة المعيشية للفئات السكانية المتلقية لتلك الخدمات.

### References

1. Hadfield J, Harris SR, Seth-Smith HMB, Parmar S, Andersson P, Giffard PM, et al. Comprehensive global genome dynamics of *Chlamydia trachomatis* show ancient diversification followed by contemporary mixing and recent lineage expansion. *Genome Res.* 2017 Jul;27(7):1220-1229. <https://doi.org/10.1101/gr.212647.116>
2. Gambhir M, Basáñez MG, Burton MJ, Solomon AW, Bailey RL, Holland MJ, et al. The development of an age-structured model for trachoma transmission dynamics, pathogenesis and control. *PLoS Negl Trop Dis.* 2009 Jun 16;3(6):e462. <https://doi.org/10.1371/journal.pntd.0000462>.
3. Palmer SL, Winskell K, Patterson AE, Boubacar K, Ibrahim F, Namata I, et al. "A living death": a qualitative assessment of quality of life among women with trichiasis in rural Niger. *Int Health.* 2014 Dec;6(4):291-7. <https://doi.org/10.1093/inthealth/ihu054>
4. Résolution WHA51.11. Élimination mondiale du trachome cécitant. In : Cinquante et Unième Assemblée mondiale la Santé, Genève, 11-16 mai 1998. Résolutions et décisions, annexes (WHA51/1998/REC/1). Genève : Organisation mondiale de la Santé ; 1998.
5. Bourne RR, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, et al. Causes of vision loss worldwide, 1990-2010: a systematic analysis. *Lancet Glob Health.* 2013;1(6): e339-49. [https://doi.org/10.1016/S2214-109X\(13\)70113-X](https://doi.org/10.1016/S2214-109X(13)70113-X). PubMed PMID: 25104599.
6. Weekly epidemiological record Relevé épidémiologique hebdomadaire 29 JUNE 2018, 93th YEAR / 29 JUIN 2018, 93e année - No 26, 2018, 93, 369-380 (<http://www.who.int/wer>).

7. Flueckiger RM, Courtright P, Abdala M, Abdou A, Abdulnafa Z, Al-Khatib T, et al. The global burden of trichiasis in 2016. *bioRxiv*. 2018;348995.
8. Delanoë E. (Mazagan), Historique de la lutte antitrachomateuse au Maroc de 1913 à nos jours, *Maroc Médical* n°329, 1952.
9. Pages R. (Rabat), Conjonctivites folliculaires et trachome, *Maroc Médical* n°348, 1954.
10. Nizetic B. Sur les aspects « Santé Publique » des problèmes de la vision et des maladies oculaires au Maroc, (essai d'une approche globale devant servir comme base à l'établissement d'un plan d'ensemble dans le domaine de l'ophtalmologie), mars 1970
11. Reinhardt J. Rapport sur une visite au Maroc 4-26 février 1968, *Fonctionnaire médical pour les maladies oculaires transmissibles*, Maroc 0509 PNUD (AT) 250-53.
12. Kupka K, Nizetic B, Reinhardt J. Sampling studies on the epidemiology and control of trachoma in southern Morocco. *Bull World Health Organ*. 1968;39(4):547-566
13. Reinhardt J, Weber A, Nizetic B, Kupka K, Maxwell-Lyons F. Studies in the epidemiology and control of seasonal conjunctivitis and trachoma in southern Morocco. *Bull World Health Organ*. 1968;39(4):497-545
14. Thylefors BI. Contrôle mondial du trachome : passé présent et futur. *Rev.int.trach et de pathologie oculaire tropicale et sub-tropicale et de santé publique*.1995 :10-20
15. Ponghis G. Quelques observations sur le rôle de la mouche dans la transmission des conjonctivites saisonnières dans le sud-marocain. *Bull. Org. Mond. Santé* 1957
16. Circulaire du Ministère de la Santé-Royaume du Maroc, N° : 1613/DE/32 du 27 juillet 1994 Lutte contre les ophtalmies transmissibles en milieu non scolaire.
17. Circulaire du Ministère de la Santé-Royaume du Maroc, N°333/DP/11/DE/32 du 19 janvier 1995 Lutte contre les ophtalmies transmissibles en milieu scolaire.
18. Negrel AD, Khazraj YC, Akalay O. Le trachome dans la province de Ouarzazate, Maroc. *Bull World Health Organ*. 1992;70(4):451-456
19. Chami Khazraji Y, Akalay O, Négrel AD. Prévalence et causes de la cécité et de la baisse de vision au Royaume du Maroc, Résultats de l'enquête nationale sur les causes de la prévalence des déficiences visuelles, Rapport final, 1992, *Bulletin épidémiologique* n°5 du premier trimestre 1992.
20. Thylefors B, Dawson CR, Jones BR, West SK, Taylor HR. A simple system for the assessment of trachoma and its complications. *Bull World Health Organ*. 1987;65(4):477-483.
21. Chami Khazraji Y, Négrel AD, Ottmani S. Prévalence et gravité du trachome dans les provinces de Ouarzazate (Zagora), Tata, Figuig et Errachidia, Résultats des enquêtes provinciales sur la prévalence du trachome, Rapport final, 1993, Rapport du Programme National de Lutte contre la Cécité, non publié.
22. Résolution WHA51.11. Élimination mondiale du trachome cécitant. In : Cinquante et Unième Assemblée mondiale de la Santé, Genève, 11-16 mai 1998. Résolutions et décisions, annexes (WHA51/1998/REC/1). Genève : Organisation mondiale de la Santé ; 1998.
23. ITI supported trachoma elimination in Morocco from 1995 to 2005. (<http://www.trachoma.org/where-we-work/morocco>).
24. Hammou J, Mariotti S, Jabr I, Chaouki N. Système de Surveillance Epidémiologique du trachoma (<http://associationdesmedecins.ma/wp-content/uploads/2013/12/Guide-de-Surveillance-Epidemiologique-du-Trachome-Cecitant.pdf>).
25. Hammou J. Etude communautaire sur le trachome cécitant chez les communautés les plus désavantagées au Maroc. *Journal de la Société Marocaine d'Ophtalmologie*, n°22-septembre 2013.
26. Generic framework for control, elimination and eradication of neglected tropical diseases. Genève: Organisation mondiale de la Santé; 2016.
27. Report of the 2nd global scientific meeting on trachoma, Geneva, 25-27 August, 2003. Genève: Organisation mondiale de la Santé; 2003.
28. WHO Strategic and Technical Advisory Group on Neglected Tropical Diseases. Technical consultation on trachoma surveillance 11-12 September 2014, Task Force for Global Health, Decatur, USA. Genève : Organisation mondiale de la Santé ; 2015.
29. Validation de l'élimination du trachome en tant que problème de santé publique (WHO/HTM/NTD/2016.8). Genève: Organisation de la Santé ; 2016.
30. Le Maroc élimine le trachome, la principale cause infectieuse de cécité. Cairo: WHO Regional Office for the Eastern Mediterranean; 2016 (<http://www.emro.who.int/fr/media/actualites/morocco-eliminates-trachoma-the-leading-infectious-cause-of-blindness.html>)
31. Hammou J, El Ajaroumi H, Hasbi H, Nakhlaoui A, Hmadna A, El Maaroufi A. In Morocco, the elimination of trachoma as a public health problem becomes a reality (Published Online January 11, 2017). *Lancet Global Health* 2017;5(3):Pe250-e251 [https://doi.org/10.1016/S2214-109X\(17\)30023-2](https://doi.org/10.1016/S2214-109X(17)30023-2)
32. Chami Y, Hammou J, Mahjour J. Leçons à tirer du programme marocain de lutte contre le trachome. *Revue de Santé Oculaire Communautaire* 2005;2(1):21

# One Health operational framework for action for the Eastern Mediterranean Region, focusing on zoonotic diseases

Heba Mahrous,<sup>1</sup> Nesre Redi,<sup>1</sup> Tran Minh Nhu Nguyen,<sup>2</sup> Salah Al Awaidey,<sup>3</sup> Ehsan Mostafavi,<sup>4</sup> Dalia Samhouri<sup>1</sup>

<sup>1</sup>World Health Organization Regional Office for the Eastern Mediterranean, Cairo, Egypt (Correspondence: H. Mahrous: hmahrous@who.int; hebarisha@gmail.com). <sup>2</sup>World Health Organization Country Office for India, Delhi, India. <sup>3</sup>Ministry of Health, Muscat, Oman. <sup>4</sup>Research Centre for Emerging and Re-emerging Infectious Diseases, Pasteur Institute of Iran, Tehran, Islamic Republic of Iran.

## Abstract

Human health is intrinsically linked to the health of animals and to the environment, and efforts by just one sector alone cannot prevent or adequately address the complex problems at the human–animal–environment interface. Countries of the World Health Organization Eastern Mediterranean Region, as any other region, face the threat of emerging and re-emerging zoonoses. However, the challenges in this Region are high given the lack of resources, poor health systems, and political factors. Hence, adopting the One Health approach becomes urgent to assist those countries. Subsequently, based on analysis of One Health capacities in the Region and in close consultation with representatives and subject matter experts from countries in the Region, a framework for action towards effectively implementing the One Health approach was developed. The framework capitalizes on current opportunities in the region and provide countries with a list of practical key activities towards optimal use of their resources and strengthening their capabilities to tackle concurrent and future health challenges at the interface. Strong governance structures and building on existing mechanisms are crucial for achieving effective disease surveillance and response. Additionally, using intersectoral approaches for risk assessment and risk mitigation for health issues at the human–animal–environment interface can improve efficiency and result in more successful outcomes.

Keywords: One Health, human–animal interface, framework for action, zoonoses, Eastern Mediterranean Region

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## Introduction

Emerging and endemic zoonotic diseases pose a threat to animal and human health and to global health security (1). It is estimated that zoonoses are responsible for 2.5 billion cases of human illness and 2.7 million deaths worldwide each year (2). The global economic burden due to zoonotic diseases is tremendous. According to the World Bank estimate, the economic losses from 6 major outbreaks of fatal zoonoses [Nipah virus (Malaysia), West Nile fever (United States of America; USA), severe acute respiratory syndrome (Asia, Canada and others), highly pathogenic avian influenza (Asia and Europe), bovine spongiform encephalitis (USA and United Kingdom of Great Britain and Northern Ireland), Rift Valley fever (United Republic of Tanzania, Kenya, and Somalia) between 1997 and 2009 amounted to at least US\$80 billion (3). The recent Ebola virus epidemic in West Africa is a stark reminder of the role animal reservoirs play in public health and reinforces the urgent need for a global One Health approach, as efforts by one sector alone cannot prevent or adequately address these complex problems at the human–animal–environment interface (2).

The One Health approach, according to the Tripartite Zoonoses Guide, means that all relevant sectors and disciplines across the human–animal–environment interface are involved in addressing health in a coordinated

way that is more effective, efficient or sustainable than might be achieved if not all relevant sectors were engaged (4). This coordination/collaboration is required to detect, assess and respond to both high-impact zoonotic disease events and endemic zoonoses caused by infectious organisms that know no boundaries, and whose impact on individuals and communities goes beyond the direct health outcomes to affect economies and societies as a whole (5). Over the years, the scope of One Health has extended to include food security, food safety, antimicrobial resistance and strengthening health systems (6–8).

The lack of surveillance data on emerging zoonoses in many developing countries, the fact that surveillance is mostly event based, and incomplete inventory of pathogens that exists in mammalian and other reservoirs have led to underestimation of their burden on humans, livestock and wildlife, and have limited the possibility of their control (9).

The World Health Organization (WHO) Eastern Mediterranean Region suffers from acute and chronic problems such as economic restrictions, conflict, civil war, social unrest, political instability, human migration and transboundary animal movement, which have had implications for emergence, control and management of zoonotic diseases such as avian influenza, brucellosis, rabies, Crimean–Congo haemorrhagic fever, Middle Eastern respiratory syndrome and transboundary animal



diseases (10–13). Furthermore, lack of reliable data at national/regional levels due to absence of continuous systematic surveillance of zoonotic diseases, as well as lack of or weak intersectoral collaborations, policies, strategies and programmes, coupled with insufficient trainings for professionals in crucial technical areas have contributed to failure of control and management activities (14–16).

The purpose of this paper is to provide a brief explanation of the One Health operational framework, including its establishment, main components, road map activities, and key recommendations on how it could be implemented and adapted to each country's context. Furthermore, we identify systems, mechanisms and practices to address and respond better to, endemic, emerging and re-emerging zoonotic diseases in a multisectoral manner.

## Methodology

The One Health operational framework is built upon the findings of the International Health Regulation's Joint External Evaluation (IHR-JEE) reports, National Action Plan for Health Security (NAPHS) and the IHR-PVS National Bridging Workshops (NBW). The JEE, NAPHS and NBW were conducted in 18, 12 and 3 countries, respectively, out of the 22 countries of the WHO Eastern Mediterranean Region. The performance of regional countries in zoonoses and other One Health-related technical areas were evaluated, gaps identified, and priority actions to address these gaps recommended (17–19). For instance, a skilled sufficient workforce in the animal health sector is not always available in most of the evaluated countries. This has an adverse effect on detection and response activities, and consequently, on the spread of diseases. There is a persistent need for dedicating new staff and providing them with professional in-service training to create a culture of learning and constructive attitudes, and to build their potential to deal with any challenges at the human–animal–environment interface.

In view of the differences between the countries evaluated in terms of One Health operational capacity, high-priority activities based on gaps identified in the JEE reports, NAPHS and NBWs are proposed in this framework. Furthermore, an expert consultation meeting on One-Health Framework for Action was organized in December 2018 in Amman, Jordan. This included participation from representatives of the Ministries of Health and Ministries of Agriculture of 7 regional countries, WHO Regional Office for the Eastern Mediterranean, Food and Agriculture Organization of the United Nations (FAO), World Organisation for Animal Health (OIE), national agencies, and academic and other partner institutions. Recommendations and inputs from the consultation meeting were incorporated into the document. In general, the framework basically capitalizes on current opportunities and gives direction for strategic investment in preparedness, detection and response to zoonotic diseases across relevant sectors at all levels.

## Framework components and roadmap activities

In most evaluated countries there are capacities on the ground that pave the way and create an enabling environment for enhancing implementation of the One Health approach at the human–animal–environment interface. National committees for zoonoses, food safety and a joint response to zoonotic disease outbreaks are some examples of such capacities. However, there is still a lack of clear terms of reference for the assigned staff; sound coordination mechanisms; effective and timely information sharing among key stakeholders; and a real-time surveillance system for zoonotic diseases. These needs are addressed under this framework through several proposed priority activities grouped into 7 components that are essential for successful implementation of the One Health approach. These components include governance and management; networks and partnerships; One Health workforce development; surveillance preparedness and response; communication and advocacy; applied research; and monitoring and evaluation. They provide a systematic technical basis for countries in the development and implementation of the One Health approach for mitigating health issues of national concern.

WHO Member States are at different stages of implementing the One Health approach. Some countries already have a One Health committee or hub to undertake the responsibility of implementation but need guidance on how this forum can be optimally functional. Other countries still lag behind and do not have clear ideas on how they can start towards having a robust One Health implementation on the ground. Therefore, there is flexibility in activity planning and target setting to meet national requirements. This framework includes a list of roadmap activities under each of the 7 components (Appendix 1). However, countries are encouraged to modify and adapt it in accordance with their needs to develop realistic, achievable and effective plans.

## The way forward

The expert meeting in Amman discussed how to roll out the One Health framework for implementation in the WHO Eastern Mediterranean Region. Despite previous and current international, regional and national efforts to implement a One Health approach, challenges are still holding back progress, such as: the need to work across many different disciplines; administrative barriers; lack of trained and skilled personnel, timely provision of resources, and accredited diagnostic laboratories; understanding the structure and management of existing systems; development of adequate science-based risk-mitigation strategies; lack of agreement on leadership issues; and task distribution among partners (2, 20). Accordingly, the framework components have been tailored carefully to assist countries to overcome such challenges. For countries where there are no plans addressing One Health activities, country representatives agreed that there is a need to develop a national operational plan based on this framework



in close consultation with national stakeholders and using available One Health bodies/initiatives. Then, it has to be advocated and endorsed by ministries of health, ministries of agriculture (veterinary authorities) and other relevant ministries/sectors to support implementation of identified multisectoral activities. For countries that have plans in place, they can use this framework to enhance their existing operational plans with key activities, such as risk assessment, prioritization of zoonotic diseases, preparedness and response activities, assessment of existing capacities, identifying research priorities, and coordination with partners. Participants in the expert meeting acknowledged the added value of the framework as a guiding document for applying the One Health approach in a systematic way, and as a justification for contacting senior officials/

ministers to allocate resources for activities. FAO and OIE requested the framework to be shared with their regional offices so that they can disseminate it to countries through their channels.

The Region is committed to continue providing technical support for regional countries to set up a multisectoral collaboration and coordination mechanism among their professionals in the human health, animal health and environmental sectors, and help countries to develop national plans in order to meet their obligations under the International Health Regulations (2005). Moreover, the Region will organize and facilitate technical expert meetings among countries to share lessons learned, and to facilitate sharing of inter-regional experience.

## Acknowledgements

The World Health Emergencies Programme in the WHO Eastern Mediterranean Region gratefully acknowledges Member States representatives, international organizations (FAO and OIE), partners and subject matter experts for their extensive input to enhance the One Health Operational Framework, and in particular, during the expert consultation workshop organized in Amman/Jordan, December 2018.

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**Competing Interests:** None declared

## Cadre d'action opérationnel « Une seule santé » pour la Région de la Méditerranée orientale, accent mis sur les zoonoses

### Résumé

La santé humaine est intrinsèquement liée à la santé des animaux et à l'environnement, et les efforts d'un seul secteur ne peuvent prévenir ou résoudre de manière adéquate les problèmes complexes à l'interface homme-animal-environnement. Les pays de la Région OMS de la Méditerranée orientale, comme toute autre région, sont confrontés à la menace des zoonoses émergentes et réémergentes. Toutefois, les défis dans cette Région sont importants étant donné la pénurie de ressources, la faiblesse des systèmes de santé et les facteurs politiques. Il devient donc urgent d'adopter l'approche « Une seule santé » pour aider ces pays. Par la suite, sur la base de l'analyse des capacités de l'approche « Une seule santé » dans la Région et en étroite consultation avec les représentants et les experts en la matière des pays, un cadre d'action pour la mise en œuvre efficace de cette approche a été élaboré. Le cadre capitalise sur les opportunités actuelles dans la Région et fournit aux pays une liste d'activités clés pratiques en vue d'une utilisation optimale de leurs ressources et du renforcement de leurs capacités pour relever les défis sanitaires existants et futurs à l'interface. Des structures de gouvernance solides et le renforcement des mécanismes existants sont essentiels pour assurer une surveillance et une riposte efficaces face aux maladies. En outre, l'utilisation d'approches intersectorielles pour l'évaluation et l'atténuation des risques pour les questions liées à la santé à l'interface homme-animal-environnement permet d'améliorer l'efficacité et de mener à des résultats plus probants.

### الإطار التشغيلي للصحة الواحدة في إقليم شرق المتوسط، والتركيز على الأمراض الحيوانية المنشأ

هبة محروس، نسري ريدي، نهو نجوين، صلاح العويدي، إحسان مصطفىاوي، داليا سمهوري

### الخلاصة

ترتبط صحة الإنسان ارتباطاً جوهرياً بصحة الحيوانات والبيئة، ولا يمكن للجهود التي يبذلها قطاع واحد وحده أن تمنع المشكلات المعقدة عند نقاط التفاعل بين الإنسان والحيوان والبيئة أو أن تعالج هذه المشكلات معالجة كافية. وتواجه بلدان إقليم منظمة الصحة العالمية لشرق المتوسط، شأنها في ذلك شأن سائر الأقاليم، تهديداً بنشأة أمراض مستجدة أو معاودة ظهور أمراض حيوانية المنشأ. ولكن التحديات في هذا الإقليم جسيمة بالنظر إلى قلة الموارد وسوء النظم الصحية والعوامل السياسية. ومن ثم، فإن اعتماد نهج «الصحة الواحدة» أمر ملح لمساعدة تلك البلدان. وبالتالي واستناداً إلى تحليل القدرات في مجال «الصحة الواحدة» في الإقليم وبالتشاور الوثيق مع ممثلي البلدان والخبراء المتخصصين في هذا المجال، وُضع إطار عمل لتنفيذ

نهج «الصحة الواحدة» تنفيذاً فعالاً. ويستغل الإطار الفرص المتاحة حالياً في الإقليم ويزود البلدان بقائمة من الأنشطة الرئيسية العملية للاستفادة المثلى من مواردها وتعزيز قدراتها على التصدي للتحديات الصحية الراهنة والمستقبلية عند نقاط التفاعل. ويُعد وجود هياكل قوية للحكومة، والبناء على الآليات القائمة، أمراً بالغ الأهمية لتحقيق الترسّد الفعال للأمراض ومواجهتها. بالإضافة إلى ذلك، فإن استخدام نهج مشتركة بين القطاعات لتقييم المخاطر والتخفيف من آثارها على القضايا الصحية في التفاعل بين الإنسان والحيوان والبيئة يمكن أن يحسّن الكفاءة ويحرز نتائج أنجح.

## References

1. Salzer SJ, Silver R, Simone K, Behraves CB. Prioritizing zoonoses for global health capacity building – themes from one health zoonotic disease workshops in 7 countries, 2014–2016. *Emerg Infect Dis.* 2017;23(Suppl). [https://wwwnc.cdc.gov/eid/article/23/13/17-0418\\_article](https://wwwnc.cdc.gov/eid/article/23/13/17-0418_article)
2. Gebreyes WA, Dupouy-Camet J, Newport MJ, Oliveira CJ, Schlesinger LS, Saif YM, et al. The global One Health paradigm: challenges and opportunities for tackling infectious diseases at the human, animal, and environment interface in low-resource settings. *PLoS Negl Trop Dis.* 2014 Nov 13;8(11):e3257. <http://dx.doi.org/10.1371/journal.pntd.0003257> PMID:25393303
3. People, pathogens and our planet: the economics of one health. Washington, DC: World Bank; 2012 (<http://documents.worldbank.org/curated/en/612341468147856529/People-pathogens-and-our-planet-the-economics-of-one-health>, accessed 4 April 2020).
4. Taking a multisectoral, One Health approach: a tripartite guide to addressing zoonotic diseases in countries. Food and Agriculture Organization of the United Nations; World Organisation for Animal Health; World Health Organization; 2018 (<http://www.sacids.org/wp-content/uploads/2019/03/A-Tripartite-Guide-to-Addressing-Zoonotic-Diseases-in-Countries.pdf>, accessed 4 April 2020).
5. Detels R, Gulliford M, Karim QA, Tan CC. Oxford textbook of global public health, 6th edition. Oxford University Press; 2015.
6. J. Zinsstag ES, K. Wyss, M.B. Mahamat. Potential of cooperation between human and animal health to strengthen health systems. *Lancet.* 2005 Dec 17;366(9503):2142–5. PMID:16360795
7. One Health: Food and Agriculture of the United Nations Strategic Action Plan. FAO; 2011 (<http://www.fao.org/3/al868e/al868e00.pdf>, accessed 4 April 2020).
8. Schelling E, Wyss K, Bechir M, Moto DD, Zinsstag J. Synergy between public health and veterinary services to deliver human and animal health interventions in rural low income settings. *BMJ.* 2005 Nov 26;331(7527):1264–7. <http://dx.doi.org/10.1136/bmj.331.7527.1264> PMID:16308393
9. Merianos A. Surveillance and response to disease emergence. *Curr Top Microbiol Immunol.* 2007;315:477–509. [http://dx.doi.org/10.1007/978-3-540-70962-6\\_19](http://dx.doi.org/10.1007/978-3-540-70962-6_19) PMID:17848076
10. Di Nardo A, Knowles NJ, Paton DJ. Combining livestock trade patterns with phylogenetics to help understand the spread of foot and mouth disease in sub-Saharan Africa, the Middle East and Southeast Asia. *Rev Sci Tech.* 2011 Apr;30(1):63–85. <http://dx.doi.org/10.20506/rst.30.1.2022> PMID:21809754
11. Gwida M, Neubauer H, Ilhan Z, Schmooch G, Melzer F, Nockler K, et al. Cross-border molecular tracing of brucellosis in Europe. *Comp Immunol Microbiol Infect Dis.* 2012 Mar;35(2):181–5. <http://dx.doi.org/10.1016/j.cimid.2011.12.012> PMID:22277829
12. Memish ZA, Al-Rabeeah AA. Public health management of mass gatherings: the Saudi Arabian experience with MERS-CoV. *Bull World Health Organ.* 2013 Dec 1;91(12):899–899A. <http://dx.doi.org/10.2471/BLT.13.132266> PMID:24347725
13. Nowotny N, Kolodziejek J. Middle East respiratory syndrome coronavirus (MERS-CoV) in dromedary camels, Oman, 2013. *Euro Surveill.* 2014 Apr 24;19(16):20781. <http://dx.doi.org/10.2807/1560-7917.es2014.19.16.20781> PMID:24786259
14. Dyer O. Infectious diseases increase in Iraq as public health service deteriorates. *BMJ.* 2004 Oct 23;329(7472):940. <http://dx.doi.org/10.1136/bmj.329.7472.940-a> PMID:15499110
15. Horton DL, Ismail MZ, Siryan ES, Wali AR, Ab-dulla HE, Wise E, et al. Rabies in Iraq: trends in human cases 2001–2010 and characterisation of animal rabies strains from Baghdad. *PLoS Negl Trop Dis.* 2013;7(2):e2075. <http://dx.doi.org/10.1371/journal.pntd.0002075> PMID:23469303
16. Seimenis A. Capacity building for zoonotic and foodborne diseases in the Mediterranean and Middle East regions (an intersectoral WHO/MZCP proposed strategy). *Int J Antimicrob Agents.* 2010 Nov;36 Suppl 1:S75–9. <http://dx.doi.org/10.1016/j.ijantimicag.2010.06.027> PMID:20708385
17. Strengthening health security by implementing the International Health Regulations (2005). WHO Eastern Mediterranean Region: JEE mission reports (<https://www.who.int/ihr/procedures/mission-reports-eastern-mediterranean/en/>, accessed 4 April 2020).
18. NAPHS for all a 3 step Strategic Framework for National Action Plan for Health Security. Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/bitstream/handle/10665/278961/WHO-WHE-CPI-2018.52-eng.pdf?sequence=1>, accessed 4 April 2020).
19. Strategic Partnership for International Health Regulations (2005). IHR-PVS National Bridging Workshop [website] (<https://extranet.who.int/sph/ihr-pvs-bridging-workshop>, accessed 4 April 2020).
20. Rushton J, Häsler B, De Haan N, Rushton R. Economic benefits or drivers of a 'One Health' approach: why should anyone invest? *Onderstepoort J Vet Res.* 2012 Jun 20;79(2):461. <http://dx.doi.org/10.4102/ojvr.v79i2.461> PMID:23327381

## Appendix 1. Roadmap activities

Components of the framework		
Governance & Management	Network & Partnership	One Health Capacity Development
<p><b>Objective:</b></p> <p>To ensure that a system is in place to govern, manage, coordinate and oversee all One Health activities.</p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>• Identify a national multisectoral One Health committee from the governmental authorities with clear terms of references</li> <li>• Develop policies, strategies, operational plans, SOPs necessary for implementing One Health activities.</li> <li>• Identify/establish a coordination mechanism to maintain ongoing dialogue with stakeholders.</li> </ul>	<p><b>Objective:</b></p> <p>To foster collaboration and partnerships.</p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>• Identify key stakeholders and collaborators, indicate their likely contributions to implementation of One Health activities.</li> <li>• Develop new/adjust existing mechanisms to regulate and facilitate collaboration and coordination between relevant sectors.</li> <li>• Establish a unified electronic system to facilitate networking and partnership across sectors.</li> <li>• Hold regular meeting to ensure smooth implementation of planned activities.</li> </ul>	<p><b>Objective:</b></p> <p>To assess and strengthen the multi-disciplinary One Health core capacities required to prevent, detect, and respond to, zoonotic diseases and mitigate their impact.</p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>• Conduct gap analysis to assess existing human resources (identifying level of experience, skill, trainings and tasks of assigned staff) in all concerned sectors.</li> <li>• Establish a national workforce development strategy for capacity building of staff in all sectors.</li> <li>• Develop relevant training programmes as identified in the gap analysis report (field epidemiology, case management, laboratory services, infection prevention and control etc.).</li> <li>• Conduct an assessment of government and nongovernment laboratory capacities (human and animal), protocol, supplies, equipment and accreditation.</li> <li>• Strengthen laboratory diagnostic capacity and capability for detection of zoonotic diseases as identified in the assessment report.</li> <li>• Develop/provide materials for infection prevention and control and biosecurity (e.g., guidelines, SOPs, personal protective equipment).</li> <li>• Develop/provide material for case management (e.g., guidelines and SOPs).</li> </ul>

## Appendix 1. Roadmap activities

Components of the framework			
Surveillance, Preparedness & Response	Communication & Advocacy	Applied research	Monitoring & Evaluation
<p><b>Objective:</b></p> <p>To enhance national coordinated surveillance, preparedness and response for prevention, detection and control of zoonotic diseases.</p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>• Draw up a list of priority zoonotic diseases.</li> <li>• Develop or update and ratify a zoonotic disease strategy.</li> <li>• Assess/evaluate existing zoonotic disease surveillance systems.</li> <li>• Establish a joint integrated disease surveillance system with operational plans, guidelines, SOPs and needed facilities.</li> <li>• Train staff on the integrated disease surveillance system.</li> <li>• Develop a database/platform and data collection forms to compile and enter surveillance data.</li> <li>• Conduct joint risk assessment at the human–animal–environment interface for emerging zoonotic diseases.</li> <li>• Develop a national multi-sectoral integrated emergency preparedness and response plan for zoonotic events with SOPs.</li> <li>• Establish multidisciplinary rapid response teams at different administrative levels.</li> <li>• Train joint rapid response teams from animal and human health sectors.</li> <li>• Conduct simulation exercises and after action reviews on coordinated response to zoonotic diseases</li> </ul>	<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• To develop multilevel, multisectoral capacity for communication and advocacy, and to gain commitment and support from all sectors</li> </ul> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>• Identify target audience, responsible sectors (messengers) and communication channels.</li> <li>• Develop an action plan for risk communication including SOPs.</li> <li>• Develop functional communication and coordination mechanisms among stakeholders.</li> <li>• Raise public awareness to encourage disease notification, prevention and containment.</li> <li>• Provide risk communication training for relevant staff and community members.</li> <li>• Identify relevant national and international partners, actors and key players according to threats identified and their likely contribution.</li> <li>• Organize meetings with identified key players to gain their commitment and ensure their effective engagement</li> </ul>	<p><b>Objective:</b></p> <p>To strengthen knowledge about zoonotic pathogens and their mechanism of sustenance and transmission through joint research.</p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>• Identify priority research areas at the human–animal interface.</li> <li>• Promote applied research collaboration.</li> <li>• Assess national capacity to conduct the necessary research.</li> <li>• Prepare joint research proposals on zoonotic pathogens.</li> <li>• Prepare agreements with national and international partners for collaboration on main research questions.</li> <li>• Publish or report findings of research activities zoonoses.</li> </ul>	<p><b>Objective:</b></p> <p>To generate evidence on whether planned activities are achieving their objectives and to support decisions on what to do if they are not.</p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>• Develop a monitoring and evaluation plan on all activities proposed in the 6 components.</li> <li>• Organize orientation days to circulate the plan to relevant parties and secure their endorsement of it.</li> <li>• Conduct monitoring and evaluation.</li> </ul>

# Prevalence of dental caries among children aged 5–15 years from 9 countries in the Eastern Mediterranean Region: a meta-analysis

Sonal Kale<sup>1</sup>, Pradnya Kakodkar<sup>1</sup>, Sahana Shetiya<sup>1</sup> and Rizwan Abdulkader<sup>2</sup>

<sup>1</sup>Dr DY Patil Vidyapeeth University, Maharashtra, India (Correspondence to: P. Kakodkar: pradnya.kakodkar@gmail.com). <sup>2</sup>SBCM Joint Programme-Riyadh, Ministry of Health, Riyadh, Saudi Arabia.

## Abstract

**Background:** Dental caries affects all age groups, although children are affected to a greater extent. Several studies have assessed the prevalence of dental caries in the World Health Organization (WHO) Eastern Mediterranean Region. However, prevalence data for dental caries have not been pooled for all countries in the Region.

**Aims:** To estimate by meta-analysis the pooled prevalence of dental caries among children aged 5–15 years in the Region.

**Methods:** The study protocol was registered in PROSPERO with registration number CRD42016037157. Twenty-one studies (37 estimates) were identified through systematic search for articles published between 1 January 2005 and 5 July 2018. The required data from each article were extracted into the datasheet. A random-effects meta-analysis was performed for the overall age group and for age 5, 12 and 15 years individually.

**Results:** Data were available for only 9 of the 21 countries in the Region. Heterogeneity between studies was high ( $I^2 > 98\%$ ). There was considerable variation among the countries for the prevalence of dental caries at different ages. The pooled prevalence for deciduous dentition in children aged 5 years was 65% (45–85%); 61% (50–72%) for permanent dentition in children aged 12 years; 70% (64–75%) for children aged 15 years; and 66% (59–73%) for children aged 6–15 years. The most common index used for oral examination to calculate caries experience was WHO Basic Oral Health Survey Criteria, 1997.

**Conclusions:** Dental caries continues to be an oral health concern among children in 9 countries in the Region.

Keywords: dental caries, prevalence, children, Eastern Mediterranean Region, meta-analysis

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## Introduction

Dental caries has long been a global oral health burden (1). It not only affects oral health but also has a deleterious effect on overall health and quality of life (2), especially in underprivileged countries (3). The World Health Organization (WHO) reports that 60–90% of children are affected by dental caries (4). Dental caries affects all age groups, although children are affected to a greater extent than adults. Part of the solution to overcome this problem is to estimate the current burden accurately and plan for a comprehensive dental programme. The WHO Country Area Profile Program database maintains data on caries prevalence data. However, there are a few limitations: data are not available for all age groups and all the WHO countries; and if data are available, they are not updated on a regular basis. In the WHO Eastern Mediterranean Region, data are available but they are not updated on a regular basis (5). In 2018, Al Ayyan et al. conducted a meta-analysis of the Gulf countries in the Region, and found that prevalence of caries in deciduous teeth was 80.9% (6).

To obtain a complete picture of the dental caries situation among children in all the countries in the Region, a meta-analysis has been planned, which will provide evidence-based information, based upon which, appropriate health care policies can be developed. Along

with prevalence, it is also essential to evaluate the various indices used in the published literature for assessing caries, as different indices give varying results within the same populations (7). For example, the International Caries Detection and Assessment System (ICDAS) considers even white spots as caries, while the traditional Decayed Missing and Filled (DMF) index ignores noncavitated enamel lesions, leading to underestimation of caries (8).

The aim of this review was to assess prevalence of caries among children aged 5–15 years by conducting a meta-analysis, and to identify the most common indices used for estimating caries prevalence in the Region.

## Methods

This study was part of a bigger review that was conducted to estimate prevalence of caries across all WHO regions. The review protocol is registered in PROSPERO (registration number CRD42016037157). Here, we discuss only the meta-analysis pertaining to the Eastern Mediterranean Region.

## Literature search

A literature search was conducted in PubMed and Google Scholar for the relevant articles using a preset search strategy. The keywords used were “Dental caries AND



Prevalence AND Children AND (name of country)". Only articles published between 1 January 2005 and 5 July 2018 were considered. The search was carried out independently by 1 author (SK) and was verified by 2 others (PK and SHS). The inclusion criteria were: studies that were community based, cross-sectional, English language, and conducted among children aged 5–15 years. Only those studies providing data about children native to the countries of the Region were retrieved. Exclusion criteria were: studies that were conducted with a secondary objective to identify prevalence; studies on caries association and correlation with risk factors; studies on immigrants and special groups; studies including one gender only; and short communications and letters to the editor.

### Data extraction

Study characteristics such as authors' names, year of publication, age/age group included, sample size, index used, prevalence of dental caries, type of dentition and risk factors for dental caries are summarized in Appendix 1 (9–29). The caries prevalence of permanent dentition (D) for the age group 6–15 years and caries prevalence of deciduous dentition (d) for the age group 5–15 years were calculated separately. The caries prevalence represented the D component and d component of the Decayed, Missing and Filled Teeth (DMFT) and dmft indices (DMFT is for permanent teeth and dmft for deciduous teeth). The D and d component of DMFS (Decayed, Missing and Filled Surface) and dmfs (deciduous teeth) were not considered.

Caries prevalence data were extracted for individual ages. If individual age prevalence was not mentioned, the combined prevalence of age groups (e.g., 6–15 and 8–10 years) was considered. If prevalence was not mentioned but data about the D and d components, along with the total sample size, were available, the prevalence rate was calculated.

### Quality Assessment

The quality assessment of the included studies was performed based on the criteria reported by Kale et al. (30).

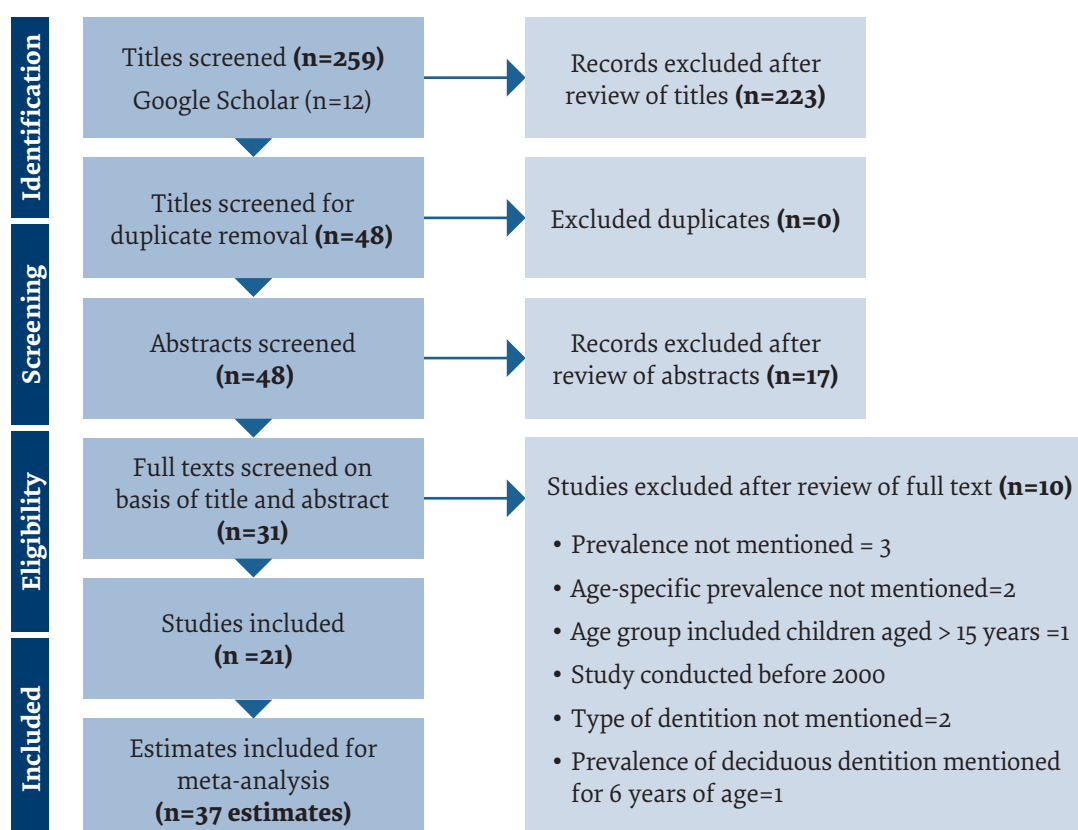
### Statistical analysis

A random-effects meta-analysis was performed to estimate the pooled prevalence and 95% confidence intervals (CIs) and were depicted by means of forest plots. Heterogeneity was quantified using I<sup>2</sup> statistics. Separate meta-analyses were performed for ages 5, 12 and 15 years and overall for 6–15 years. All analyses were performed using STATA version 12.

### Results

A total of 259 articles from PubMed and 12 from Google Scholar were retrieved initially (Figure 1). After reviewing the titles of the articles, 133 were excluded, as they did not fit the selection criteria. After reading through the abstracts of the remaining articles, 17 more were excluded. An in-depth reading of the remaining articles led to the exclusion of 7 more, for reasons such as not mentioning the prevalence, inclusion of children aged > 15 years, and

Figure 1 PRISMA flow chart showing the article selection process



providing prevalence of deciduous and permanent dentition together. Ultimately, 21 articles with 37 estimates were considered for meta-analysis. Relevant literature was only found for 9 of the 21 countries currently in the Eastern Mediterranean Region [Islamic Republic of Iran, Iraq, Yemen, Jordan, Libya, United Arab Emirates (UAE), Bahrain, Lebanon and Egypt]. For children aged 5 years there were 4 estimates; for children aged 12 years there were 11 estimates; for children aged 15 years there were 7 estimates; and for children aged 6–15 years there were 33 estimates available. Only 2 studies that were reported by Ahmadzadeh et al. (15) and Hamza (17) were found to have moderate quality as per quality assessment criteria (30). All other studies were of high quality and none was of low quality.

The heterogeneity between the studies was high ( $I^2 > 98\%$ ) and therefore an aggregate data random-effect model was adopted for the meta-analysis. The pooled prevalence for deciduous dentition for children aged 5 years was 65% (95% CI: 45–85%) (Figure 2); 61% (95% CI: 50–72%) for permanent dentition in children aged 12 years (Figure 3); 70% (95% CI: 64–75%) for children aged 15 years (Figure 4); and 66% (95% CI: 59–73%) for children aged 6–15 years (Figure 5). Based on the data extracted from each included study, the index information was obtained (Appendix 1). The number of times the index was used was totalled to meet the second objective. The most common index used for evaluating dental caries experience was the WHO Basic Oral Health Criteria, 1997 (used in 13 studies), followed by the DMFT index, 1937 (3 studies), WHO Basic Oral Health Criteria, 1987 (3 studies) and WHO Basic Oral Health Criteria, 2013 (2 studies).

## Discussion

Several studies have been conducted in the Eastern Mediterranean Region to assess the prevalence of dental caries. However, there has been no effort to pool the prevalence data for all the countries in the Region. Hence, this meta-analysis was conducted to obtain prevalence data for dental caries in children aged 5–15 years in the Region, and to establish the most frequently used index for assessing

caries in these studies. The pooled prevalence obtained for children aged 5 years was 65%. This is lower than the prevalence of 80.95% in Gulf countries reported by Al Ayyan et al. (6). Despite the fact that it is lower than the previously reported prevalence, it still does not meet the target set of 50% caries free by WHO in 2000 (31). Our review had data from only 4 studies of deciduous teeth, while the review by Al Ayyan et al. (6) included 34 studies from 1992–2016. This might explain the variation in prevalence. Three of the 4 estimates in the present study were from the UAE and the other was from Yemen. The reason reported for dental caries in these studies was the negative attitude of parents towards their children's dental health.

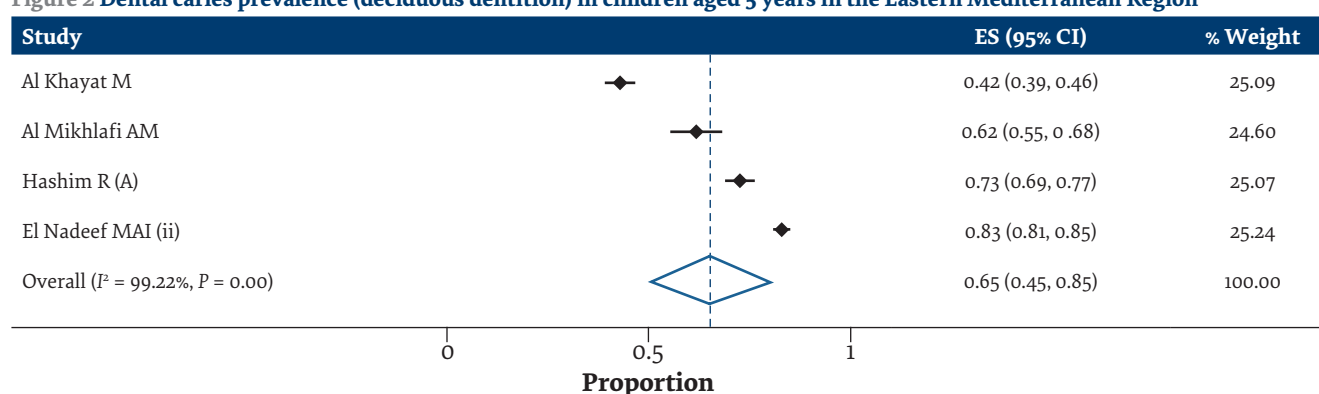
For the children aged 12 years, the pooled prevalence was 61%. This result was obtained by pooling the prevalence from the Islamic Republic of Iran, Jordan, Yemen, Libya, United Arab Emirates, Iraq, Bahrain and Lebanon. Dental caries in this age group was attributed to low socioeconomic status, low parental education, consumption of refined food and poor access to dental services. Two studies (13,19) reported low socioeconomic status to be the reason for high prevalence of caries, whereas another (28) reported it as a reason for low prevalence of caries.

Among children aged 15 years, the prevalence of dental caries was 70%. This was contributed by studies from the Islamic Republic of Iran, UAE, Bahrain and Lebanon. Poor oral hygiene practices among children, consumption of cariogenic diet and low socioeconomic status were the reported factors for the presence of dental caries.

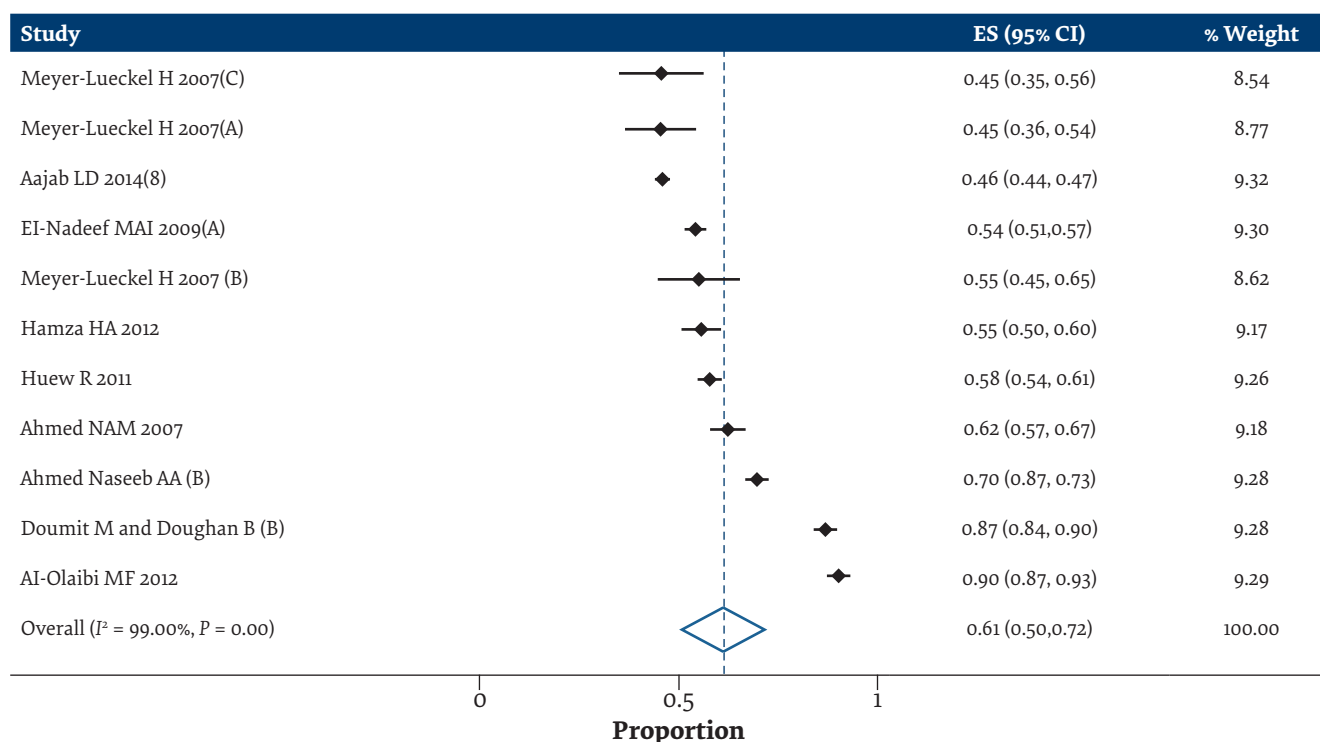
The most common dental caries indices used were WHO criteria 1987, 1997 and 2013 and the DMFT index proposed by Klein, Palmer and Knutson (1937). Castro et al. (8) conducted an interview to investigate the population-based caries detection methods and reported that DMFT index was the most known and used index. However, 95.7% were dissatisfied with the index yet continued to use it. It is recommended that researchers use the WHO Basic Oral Health Survey criteria for assessing caries, which will provide global uniformity and aid effective comparison.

Overall, the pooled prevalence of permanent dentition in children aged 6–15 years was 66%. There was huge

**Figure 2 Dental caries prevalence (deciduous dentition) in children aged 5 years in the Eastern Mediterranean Region**



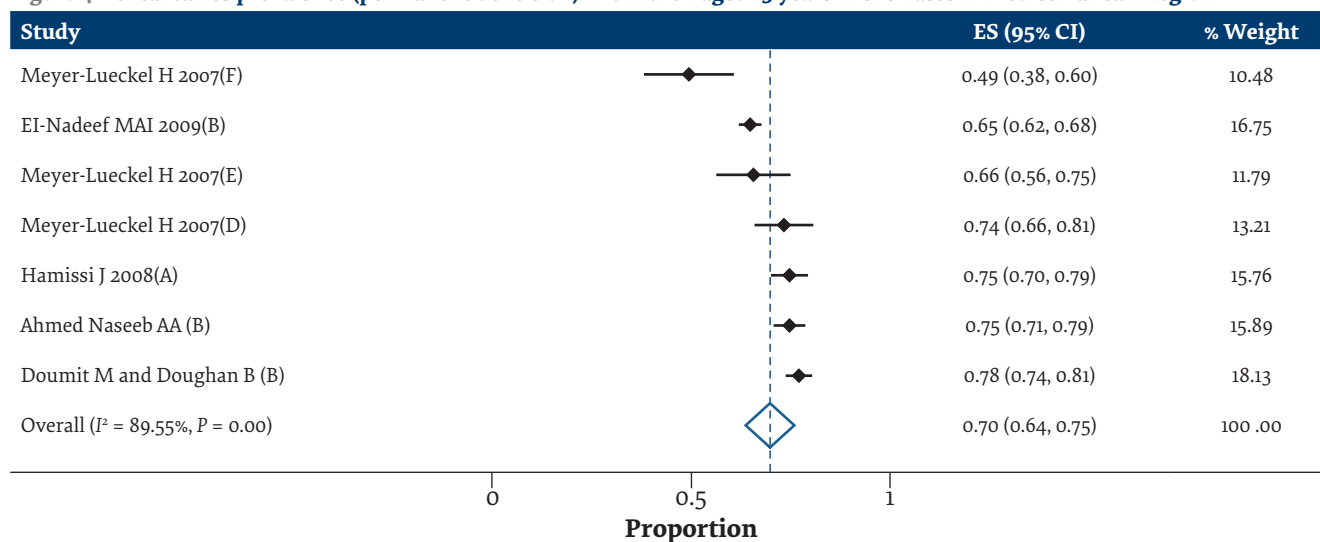
(A) and (ii) as in footnote to Table 1. CI = confidence interval; ES = estimate;  $I^2$  = heterogeneity.

**Figure 3 Dental caries prevalence (permanent dentition) in children aged 12 years in the Eastern Mediterranean Region**

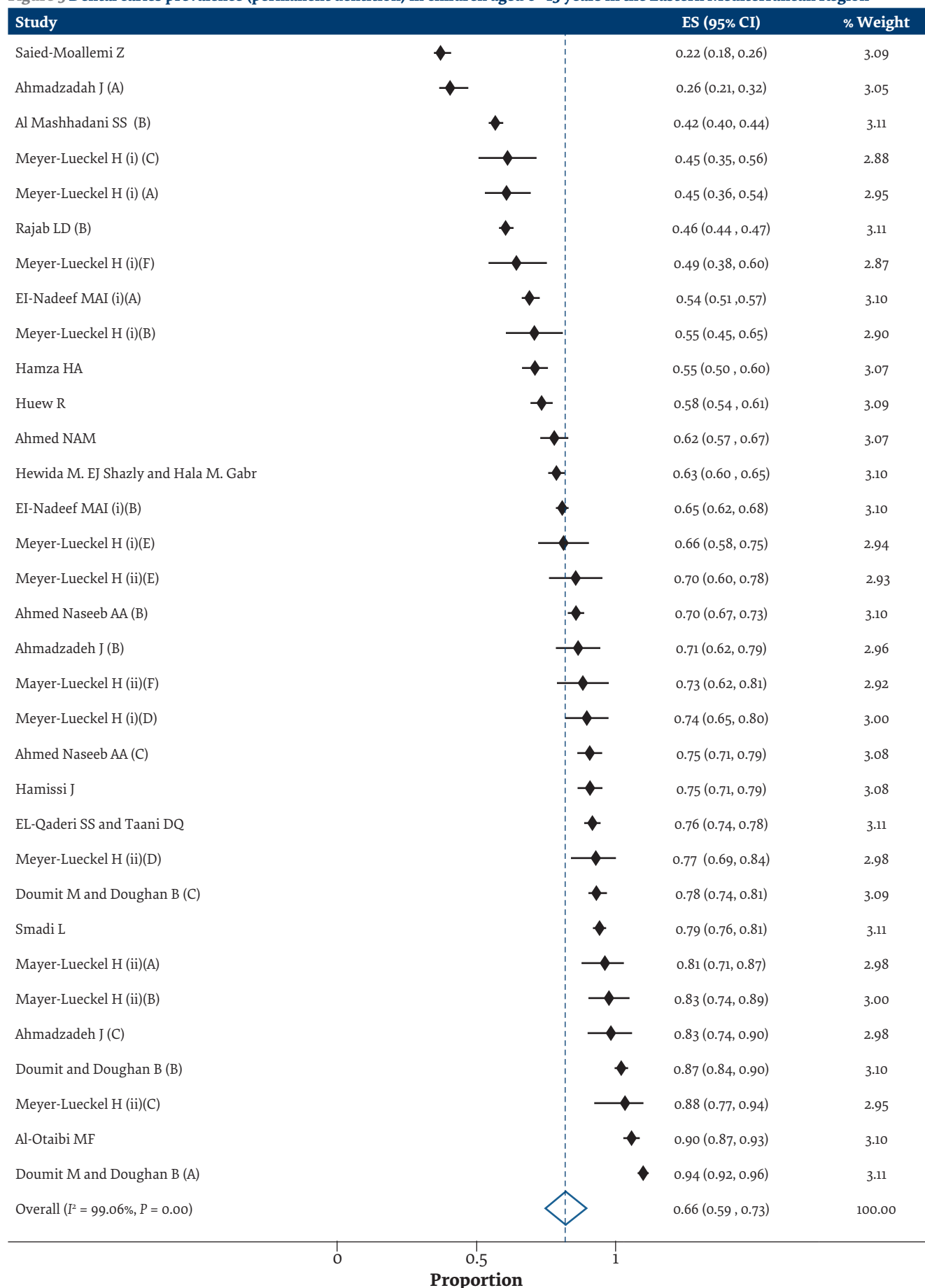
(A–C) as in footnote to Table 1. CI = confidence interval; ES = estimate;  $I^2$  = heterogeneity.

variation among the prevalence rates, with the lowest of 22% reported by Said-Moallemi et al. (11) and the highest of 94% reported by Doumit and Doughan (21). The reasons for high prevalence of caries were low socioeconomic status, cariogenic diet, low parental education, less accessibility to dental care services, and dental health negligence. The reasons for low prevalence of caries were widespread use of fluoridated toothpaste (18) and implementation of a national oral health programme (11). This variation can be attributed to different geographic

locations, differences in the individuals included in the study, variation in sample size, and the use of different indices for assessing caries. Oral health policies, community water fluoridation and oral hygiene products also play a role in the variation among countries. Low levels of water fluoridation are found in most provinces in the Islamic Republic of Iran and only 22% of the Libyan population receive fluoridated water (32). Until 2003, the United Nations had imposed sanctions on the amount of food provided to Iraq, which included freely available

**Figure 4 Dental caries prevalence (permanent dentition) in children aged 15 years in the Eastern Mediterranean Region**

(B–F) as in footnote to Table 1. CI = confidence interval; ES = estimate;  $I^2$  = heterogeneity.

**Figure 5 Dental caries prevalence (permanent dentition) in children aged 6–15 years in the Eastern Mediterranean Region**

(A–F) and (i and ii) as in footnote to Table 1. CI = confidence interval; ES = estimate;  $I^2$  = heterogeneity.

**Appendix 1 Characteristics of the included studies**

Study ID	Author and publication year	Country	Sample size (age/age group)	Dental caries index	Caries prevalence (dentition)	Caries attributable factors
1	Ahmed Naseeb, 2016(9)(A)	Bahrain	810 (12 yr)	WHO 2013, DMFT	70% (P)	Intake of fermentable carbohydrates
2	Ahmed Naseeb, 2016 (B)	Bahrain	428 (15 yr)	WHO 2013, DMFT	75% (P)	
3	El Shazly& Hala, 2016(10)	Egypt	1283 (13 yr)	Klein, Palmer and Knutson for DMFT	62.8% (P)	
4	Saied-Moallemi et al., 2006(11)	Islamic Republic of Iran	459 (9 yr)	WHO 1997, DMFT	22% (P)	Low caries due to implementation of comprehensive national oral health programme including fluoride mouth rinse and oral health education
5	Meyer-Lueckel et al., 2006(12)(ii)(A)	Islamic Republic of Iran	103 (6 yr)	Klein, Palmer and Knutson for DMFT	83% (P)	
6	Meyer-Lueckel et al., 2006 (ii)(B)	Islamic Republic of Iran	93 (6 yr)	Klein, Palmer and Knutson for DMFT	81% (P)	
7	Meyer-Lueckel et al., 2006 (ii)(C)	Islamic Republic of Iran	51 (6 yr)	Klein, Palmer and Knutson for DMFT	88% (P)	Socioeconomic background, dietary sources of fluoride, and urbanization
8	Meyer-Lueckel et al., 2006 (ii)(D)	Islamic Republic of Iran	106 (9 yr)	Klein, Palmer and Knutson for DMFT	77% (P)	
9	Meyer-Lueckel et al., 2006 (ii)(E)	Islamic Republic of Iran	90 (9 yr)	Klein, Palmer and Knutson for DMFT	70% (P)	
10	Meyer-Lueckel et al., 2006 (ii)(F)	Islamic Republic of Iran	80 (9 yr)	Klein, Palmer and Knutson for DMFT	72% (P)	
11	Meyer-Lueckel et al., 2007(13)(i)(A)	Islamic Republic of Iran	115 (12 yr)	Klein, Palmer and Knutson for DMFT	45% (P)	
12	Meyer-Lueckel et al., 2007 (i)(B)	Islamic Republic of Iran	89 (12 yr)	Klein, Palmer and Knutson for DMFT	55% (P)	
13	Meyer-Lueckel et al., 2007 (i) (C)	Islamic Republic of Iran	80 (12 yr)	Klein, Palmer and Knutson for DMFT	45% (P)	Socioeconomic class, parental education, consumption of refined carbohydrates
14	Meyer-Lueckel et al., 2007(i)(D)	Islamic Republic of Iran	129 (15 yr)	Klein, Palmer and Knutson for DMFT	74% (P)	
15	Meyer-Lueckel et al., 2007 (i)(E)	Islamic Republic of Iran	100 (15 yr)	Klein, Palmer and Knutson for DMFT	66% (P)	
16	Meyer-Lueckel et al., 2007 (i)(F)	Islamic Republic	80 (15 yr)	Klein, Palmer and Knutson for DMFT	49% (P)	Oral hygiene habits, socioeconomic conditions and cariogenic diet
17	Hamissi et al., 2008(14)	Islamic Republic of Iran	390 (15 yr)	WHO 1997, DMFT	75% (P)	
18	Ahmadzadeh et al., 2015(15) (A)	Islamic Republic of Iran	220 (6–8 yr)	WHO 1997, DMFT	25.9% (P)	
19	Ahmadzadeh et al., 2015(B)	Islamic Republic of Iran	104 (9–10 yr)	WHO 1997, DMFT	71.2% (P)	Sugar consumption and poor dental health
20	Ahmadzadeh et al., 2015 (C)	Islamic Republic of Iran	84 (11–12 yr)	WHO 1997, DMFT	83.3% (P)	
21	Ahmed, 2007(16)	Iraq	392 (12 yr)	WHO 1997, DMFT	62% (P)	?



**Appendix 1 Characteristics of the included studies (concluded)**

Study ID	Author and publication year	Country	Sample size (age/ age group)	Dental caries index	Caries prevalence (dentition)	Caries attributable factors
22	Hamza, 2012 (17)	Iraq	390 (12 yr)	WHO 1997, DMFT	55.4% (P)	?
23	EL-Qaderi and Taani, 2006(18)	Jordan	1362 (14–15 yr)	WHO 1987, DMFT	76% (P)	Low caries compared to previous study due to widespread use of fluoridated toothpaste and improvement in oral hygiene habits
24	Rajab et al., 2014(19)	Jordan	2560 (12 yr)	WHO 1997, DMFT	45.5% (P)	High caries associated with poor access to dental services, self-care practices, dental attitudes and consumption of sweets and sugary drinks. Caries high in low and middle socioeconomic classes as compared to upper class
25	Smadi et al., 2016(20)	Jordan	1286 (6–12 yr)	WHO 1997, DMFT	78.7% (P)	Oral health negligence, lack of dental care services
26	Doumit and Doughan, 2018(21) (A)	Lebanon	480 (6–8 yr)	WHO 1997, DMFT	94.43% (P)	?
27	Doumit and Doughan, 2018 (B)	Lebanon	480 (12 yr)	WHO 1997, DMFT	86.92% (P)	
28	Doumit and Doughan, 2018 (C)	Lebanon	480 (15 yr)	WHO 1997, DMFT	77.65% (P)	
29	Huew et al., 2011(22)	Libya	791 (12 yr)	WHO 1997, DMFT	57.8% (P)	Less exposure of fluoride due to limited toothbrushing, poor oral hygiene, consumption of sugar, lack of dental hygienist and oral health education programmes
30	El-Nadeef et al., 2009(23) (i)(A)	United Arab Emirates	1323 (12 yr)	WHO 1987, DMFT	54% (P)	?
31	El-Nadeef et al., 2009 (i)(B)	United Arab Emirates	1328 (15 yr)	WHO 1987, DMFT	65% (P)	
32	Hashim et al., 2010(24)	United Arab Emirates	524 (5 yr)	WHO 1997, dmft	72.9% (D)	?
33	El-Nadeef et al., 2010(25) (ii)	United Arab Emirates	1340 (5 yr)	WHO 1997, dmft	83% (D)	?
34	Al Mashhadani et al., 2017(26)	United Arab Emirates	2237 (12–14 yr)	WHO 2013, DMFT	41.6% (P)	Poor oral hygiene practice, lack of supervision while toothbrushing
35	AlKhayat, 2018(27)	United Arab Emirates	716 (5 yr)	WHO 1987, dmft	42.2% (D)	Negative attitude of parent towards children's dental health
36	Al-Otaibi et al., 2012(28)	Yemen	400 (12 yr)	WHO 1997, DMFT	90.2% (P)	Students with low socioeconomic conditions had least caries compared with students with medium socioeconomic status
37	Al-Mikhlaifi et al., 2017(29)	Yemen	202 (5 yr)	WHO 1997, dmft	62% (D)	?

D = deciduous dentition prevalence, P = permanent dentition prevalence, ? = factors not mentioned. (A–F) are same studies representing different age/age group data. (i, ii) represent two different studies reported by the same author in the same year.

sugar (33), but after 2003 the amount of sugar increased and thus consumption of sugar also increased, which is one of the key causative factors of caries. No literature was found with respect to the oral health policies of the countries included in this analysis.

There were some limitations to our meta-analysis. First, only 2 databases were searched. Second, only English-language articles were selected. In cases where

a combined prevalence (deciduous + permanent) was mentioned, such studies were excluded. Caries prevalence should be reported separately for deciduous and permanent dentition, which aids effective meta-analysis. The meta-analysis was intended to cover the Eastern Mediterranean Region; however, data were only available from 9 countries (Islamic Republic of Iran, Iraq, Yemen, Jordan, Libya, UAE, Bahrain, Lebanon and Egypt). No information was available for countries

like Djibouti and Oman. However, for other countries in the Region, some oral health information was available but these articles were not selected as they did not meet the inclusion criteria.

## Conclusion

Within the limitations of this meta-analysis, it can be

concluded that dental caries in children is still a major problem in the 9 countries studied in the Region. More studies reporting dental caries from all the countries in the Region are required to obtain an accurate picture of dental caries prevalence among children in the Region.

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## Prévalence des caries dentaires chez les enfants âgés de 5 à 15 ans originaires de neuf pays de la Région de la Méditerranée orientale : méta-analyse

### Résumé

**Contexte :** Les caries dentaires concernent tous les groupes d'âge, bien que les enfants soient plus largement touchés. Plusieurs études ont évalué la prévalence des caries dentaires dans la Région de l'Organisation mondiale de la Santé (OMS) pour la Méditerranée orientale. Cependant, les données sur la prévalence des caries dentaires n'ont pas été mises en commun pour l'ensemble des pays de la Région.

**Objectifs :** La présente étude avait pour objectif d'estimer par méta-analyse la prévalence globale des caries dentaires chez les enfants âgés de 5 à 15 ans dans la Région.

**Méthodes :** Le protocole d'étude a été enregistré dans PROSPERO sous le numéro CRD42016037157. Vingt-et-une études (37 estimations) ont été identifiées au moyen d'une recherche systématique des articles publiés entre le 1<sup>er</sup> janvier 2005 et le 5 juillet 2018. Les données requises pour chaque article ont été extraites puis reportées dans la fiche technique. Une méta-analyse à effets aléatoires a été réalisée pour l'ensemble de la classe d'âge et individuellement pour les groupes des 5, 12 et 15 ans.

**Résultats :** Les données étaient disponibles pour seulement neuf des 21 pays que compte la Région. L'hétérogénéité entre les études était élevée ( $I^2 > 98\%$ ). On a observé des variations considérables entre les pays en ce qui concerne la prévalence des caries dentaires à différents âges. La prévalence globale pour les dents de lait chez les enfants âgés de 5 ans était de 65 % (45-85 %) ; de 61 % (50-72 %) pour les dents définitives chez les enfants âgés de 12 ans ; de 70 % (64-75 %) chez les jeunes âgés de 15 ans et de 66 % (59-73 %) chez les enfants dont l'âge est compris entre 6 et 15 ans. L'indice le plus couramment utilisé pour l'examen bucco-dentaire destiné à évaluer les lésions carieuses était celui des Enquêtes sur la santé bucco-dentaire de l'OMS, méthodes fondamentales.

**Conclusions :** Les caries dentaires demeurent un problème de santé bucco-dentaire chez les enfants dans neuf pays de la Région.

## معدل انتشار تسوس الأسنان في صفوف الأطفال الذين تتراوح أعمارهم بين 5 سنوات و 15 سنة في 9 بلدان في إقليم شرق المتوسط: تحليل تلوي

سونال كالي، برادنيا كاكودكار، ساهان شيتيا، رضوان عبد القادر

### الخلاصة

**الخلفية:** يؤثر تسوس الأسنان على جميع الفئات العمرية، بالرغم من تأثر الأطفال بدرجة أكبر. وأجرت دراسات عديدة تقييماً لمعدل انتشار تسوس الأسنان في إقليم شرق المتوسط التابع لمنظمة الصحة العالمية. وبالرغم من ذلك، فلم تجمع بيانات معدل انتشار تسوس الأسنان لجميع البلدان في الإقليم.

**الأهداف:** هدفت هذه الدراسة إلى تقييم معدل انتشار تسوس الأسنان وفق البيانات المجموعة عن طريق التحليل التلوي في صفوف الأطفال الذين تتراوح أعمارهم بين 5 سنوات و 15 سنة في الإقليم.

**طرق البحث:** سُجِّل بروتوكول الدراسة في قاعدة بيانات بروسبيرو برقم CRD42016037157. واختيرت 21 دراسة (37 تقييماً) من خلال البحث المنهجي عن مقالات نُشرت ما بين الأول من يناير/ كانون الثاني 2005 والخامس من يوليو/ تموز 2018. واستُخلصت البيانات المطلوبة من كل مقالة في صحيفة بيانات. وأجري تحليل تلوي عشوائي الأثر في مجمل الفئة العمرية، ولأعمار 5 سنوات، و 12 سنة، و 15 سنة، كل على حدة.

**النتائج:** توافرت البيانات لتسعة بلدان وحسب من بين 21 بلداً في الإقليم. وكان عدم التجانس بين الدراسات مرتفعاً ( $I^2 < 98\%$ ). كان هناك تباين ملحوظ بين البلدان فيما يتعلق بمعدل انتشار تسوس الأسنان في أعمار مختلفة. وكان معدل الانتشار المجموع لتسنين السواقط (الأسنان اللبنية) في صفوف الأطفال البالغين من العمر خمس سنوات 65% (45%-85%)؛ 61% (50%-72%) لتسنين الأسنان الدائمة في الأطفال البالغين من العمر 12

عاماً 70% (64%-75%) للأطفال البالغين من العمر 15 عاماً؛ 66% (59%-73%) للأطفال الذين تتراوح أعمارهم بين 6 سنوات و 15 سنة. وكان المؤشر الأكثر استخداماً في فحص الفم لقياس تجربة التسوس هو «مقياس منظمة الصحة العالمية الأساسي لمسح صحة الفم، 1997». الاستنتاجات: يظل تسوس الأسنان ظاهرة تبعث على القلق في صفوف الأطفال في 9 بلدان في الإقليم.

## References

- Petersen PE. Continuous improvement of oral health in the 21st century – the approach of the WHO Global Oral Health Programme. Geneva: World Health Organization; 2003 ([https://www.who.int/oral\\_health/media/en/orh\\_report03\\_en.pdf](https://www.who.int/oral_health/media/en/orh_report03_en.pdf), accessed 20 December 2019).
- Al Agili DE. A systematic review of population-based dental caries studies among children in Saudi Arabia. *Saudi Dental J.* 2013 Jan; 25(1): 3–11. <http://dx.doi.org/10.1016/j.sdentj.2012.10.002> PMID:23960549
- Sharma A, Bansal P, Grover A, Sharma S, Sharma A. Oral health status and treatment needs among primary school going children in Nagrota Bagwan block of Kangra, Himachal Pradesh. *J Indian Soc Periodontol.* 2014 Nov–Dec;18(6):762–6. <http://dx.doi.org/10.4103/0972-124X.147421> PMID:25624634
- Fact sheets: oral health [website]. Geneva: World Health Organization (<https://www.who.int/news-room/fact-sheets/detail/oral-health>, accessed 20 December 2018).
- Oral health country/area profile project [website]. Malmö University (<https://www.mah.se/CAPP/Country-Oral-Health-Profiles/EMRO>, accessed 20 December 2019).
- Al Ayyan W, Al Halabi M, Hussein I, Khamis AH, Kowash M. A systematic review and meta-analysis of primary teeth caries studies in Gulf Cooperation Council States. *Saudi Dent J.* 2018 Jul;30(3):175–82. <http://dx.doi.org/10.1016/j.sdentj.2018.05.002> PMID:29942100
- Joseph C, Velley AM, Pierre A, Bourgeois D, Muller-Bolla M. Dental health of 6-year-old children in Alpes Maritimes, France. *Eur Arch Paediatr Dent.* 2011 Oct;12(5):256–63. PMID:21993066
- Castro ALS, Vianna MIP, Mendes CMC. The knowledge and use of population-based methods for caries detection. *BMC Oral Health.* 2018 Aug 29;18(1):153. <http://dx.doi.org/10.1186/s12903-018-0612-5> PMID:30157818
- Ahmed Naseeb AA. National oral health survey of oral health status of Bahraini school children aged 6, 12 & 15 year olds. *Dental News.* 19 July 2016 (<http://dentalnews-articles.blogspot.com/2016/07/national-oral-health-survey-of-oral.html>, accessed 20 December 2019).
- El Shazly HM, Hala MG. Prevalence and risk factors of dental caries among preparatory school children, Menoufia Governorate, Egypt. *Asian J Med Health.* 2016;1(6):1–11. <https://doi.org/10.9734/AJMAH/2016/30174>
- Saied-Moallemi Z, Virtanen JI, Tehrani A, Murtomaa H. Disparities in oral health of children in Tehran, Iran. *Eur Arch Paediatr Dent.* 2006 Dec;7(4):262–4. <http://dx.doi.org/10.1007/bf03262563> PMID:17164073
- Meyer-Lueckel H, Paris S, Shirkhani B, Hopfenmuller W, Kielbassa AM. Caries and fluorosis in 6- and 9-year-old children residing in three communities in Iran. *Community Dent Oral Epidemiol.* 2006 Feb;34(1):63–70. <http://dx.doi.org/10.1111/j.1600-0528.2006.00258.x> PMID:16423033
- Meyer-Lueckel H, Bitter K, Shirkhani B, Hopfenmuller W, Kielbassa AM. Prevalence of caries and fluorosis in adolescents in Iran. *Quintessence Int.* 2007 Jun;38(6):459–65. PMID:17625628
- Hamissi J, Ramezani GH, Ghodousi A. Prevalence of dental caries among high school attendees in Qazvin, Iran. *J Indian Soc Pedod Prev Dent.* 2008;26(Suppl 2):S53–5. PMID:19075448
- Ahmadzadeh J, Rezaeian S, Esmahili-Sani A, Lava B, Mobaraki K, Amini S and Amini S. Oral health status and behaviors of children aged 6-12 years old: a cross-sectional study. *Ann Public Health Res.* 2015;2:1017.
- Ahmed NA, Astrøm AN, Skaug N, Petersen PE. Dental caries prevalence and risk factors among 12-year old schoolchildren from Baghdad, Iraq: a post-war survey. *Int Dent J.* 2007 Feb;57(1):36–44. <http://dx.doi.org/10.1111/j.1875-595x.2007.tb00116.x> PMID:17378348
- Hamza HA. Oral health status and treatment needs among twelve year old school children in Babylon Governorate – IRAQ. *J Babylon Univ Pure Appl Sci.* 2012;20(3). <https://www.iasj.net/iasj?func=fulltext&aId=77862>
- El-Qaderi SS, Quteish Ta'ani D. Dental plaque, caries prevalence and gingival conditions of 14-15-year-old schoolchildren in Jerash District, Jordan. *Int J Dent Hyg.* 2006 Aug;4(3):150–3. <http://dx.doi.org/10.1111/j.1601-5037.2006.00184.x> PMID:16958744
- Rajab LD, Petersen PE, Baqain Z, Bakaeen G. Oral health status among 6- and 12-year-old Jordanian schoolchildren. *Oral Health Prev Dent.* 2014;12(2):99–107. <http://dx.doi.org/10.3290/j.ohpd.a31220> PMID:24624383
- Smadi L, Azab R, Khlaifat F, Rodan R, Abdalmohdi A, Rudina M, et al. Prevalence and severity of dental caries in school students aged 6-12 years in Mafraq governorate: Northeast of Jordan. *J Oral Health Oral Epidemiol.* 2017 Winter;6(1):40–7.
- Doumit M, Doughan B. Dental caries and fluorosis among children in Lebanon. *Indian J Dent Res.* 2018 May–Jun;29(3):317–22. [http://dx.doi.org/10.4103/ijdr.IJDR\\_475\\_17](http://dx.doi.org/10.4103/ijdr.IJDR_475_17) PMID:29900915
- Huew R, Waterhouse PJ, Moynihan PJ, Maguire A. Prevalence and severity of dental caries in Libyan schoolchildren. *Int Dent J.*

- 2011 Aug;61(4):217–23. <http://dx.doi.org/10.1111/j.1875-595X.2011.00060.x> PMID:21851354
23. El-Nadeef MAI, Hussani EA, Hassab H, Arab IA. National survey of the oral health of 12- and 15-year-old schoolchildren in the United Arab Emirates. *East Mediterr Health J*. 2009 Jul–Aug;15(4):993–1004. PMID:20187552
24. Hashim R, Williams SM, Thomson WM, Awad MA. Caries prevalence and intra-oral pattern among young children in Ajman. *Community Dent Health*. 2010 Jun;27(2):109–13. PMID:20648888
25. El-Nadeef MA, Hassab H, Al-Hosani E. National survey of the oral health of 5-year-old children in the United Arab Emirates. *East Mediterr Health J*. 2010 Jan;16(1):51–5. PMID:20214158
26. Al Mashhadani. SS, Khoory TA, Fargali K, Mathew R, Al Qasem N. National Survey of the Oral Health Status of School Children in Dubai, UAE. *EC Dent Sci*. 2017;8.2: 48–58. <https://www.econicon.com/ecde/pdf/ECDE-08-00258.pdf>
27. AlKhayat M. Caries survey in 3-5 year old children in Dubai Schools. *Inter Ped Dent Open Acc J*. 2018 Jan;1(1):1–7. <http://dx.doi.org/10.32474/IPDOAJ.2018.01.000101>
28. Al-Otaibi MF, Al-Mamari F, Baskaradoss JK. Oral health status of 12-year-old school children in Yemen. A cross-sectional survey. *Eur J Paediatr Dent*. 2012 Dec;13(4):324–8. PMID:23270293
29. Al-MikhlaifiAM, Al-Labani MA, Al-Haddad KA, Al-Serouri AA, Al-Ghazali N. The Prevalence of dental caries in kindergartens' and its associated factors among children in Sana'a City. *EC Dental Science*. 2017;7.5:206–11. <https://www.econicon.com/ecde/pdf/ECDE-07-0000243.pdf>
30. Kale SS, Kakodkar P, Shetiya SH, Rizwan SA. Dental caries prevalence among 5- to 15-year-old children from SEAR countries of WHO: A systematic review and meta-analysis. *Indian J Dent Res*. 2019;30(6):937–947. doi:10.4103/ijdr.IJDR\_654\_17
31. Aggeryd T. Goals for oral health in the year 2000: cooperation between WHO, FDI and the national dental associations. *Int Dent J*. 1983 Mar;33(1):55–9. PMID:6574111
32. Cochrane N, Poureslami H. Necessity of water fluoridation in Iran: A review on water fluoridation and prevention of dental caries. *J Oral Epidemiol*. 2014 Winter & Spring;3(1):1–7. [http://johoe.kmu.ac.ir/article\\_84790\\_4fbb66fa43f99523e7ff5be1469fd97a.pdf](http://johoe.kmu.ac.ir/article_84790_4fbb66fa43f99523e7ff5be1469fd97a.pdf)
33. Joury E, Al-Kaabi R, Tappuni AR. Constructing public health policies in post crisis countries: lessons to learn from the associations between free-sugars consumption and diabetes, obesity and dental caries before, during and after sanctions in Iraq. *J Public Health*. 2016;24:563–9. <https://link.springer.com/article/10.1007/s10389-016-0745-4>

# Difficulties in achieving a sustainable blood supply: report from the first national seminar on blood donation in Lebanon

Antoine Haddad,<sup>1,2\*</sup> Tarek Bou Assi,<sup>3,4\*</sup> Laura Haddad,<sup>5</sup> Perrine Wakim,<sup>6</sup> Rita Feghali,<sup>7,8</sup> Wissam Makki,<sup>9</sup> Mohammad Haidar,<sup>10</sup> Yorgui Teyrouz,<sup>11</sup> Hanadi Samaha,<sup>12</sup> Tamima Jisr,<sup>13</sup> Christian Haddad,<sup>14</sup> Elizabeth Baz,<sup>15</sup> Berthe Hachem,<sup>16</sup> Vanda Barakett<sup>17</sup> and Olivier Garraud<sup>1,18</sup>

<sup>1</sup>EA3064, Faculty of Medicine of Saint-Etienne, University of Lyon, Saint-Etienne, France (Correspondence to: Antoine Haddad: anthadd@gmail.com).

<sup>2</sup>Department of Clinical Pathology and Blood Banking, Hopital du Sacre Coeur, Baabda, Lebanon. <sup>3</sup>Department of Laboratory Medicine, Psychiatric Hospital of the Cross, Jaledib, Lebanon. <sup>4</sup>Department of Laboratory Medicine and Blood Bank, Saint Joseph Hospital, Dora, Lebanon. <sup>5</sup>Faculty of Medicine, University of Balamand, Beirut, Lebanon. <sup>6</sup>ESA Business School, Hamra, Lebanon. <sup>7</sup>Department of Laboratory Medicine and Blood Bank, Rafic Hariri University Hospital, Beirut, Lebanon. <sup>8</sup>Lebanese Red Cross, Beirut, Lebanon. <sup>9</sup>Department of Laboratory Medicine and Blood Bank, Military Hospital, Beirut, Lebanon. <sup>10</sup>Department of Laboratory Medicine and Blood Bank, Bahman Hospital, Beirut, Lebanon. <sup>11</sup>Donner Sang Compter, Beirut, Lebanon. <sup>12</sup>Department of Laboratory Medicine and Blood Transfusion Unit, Saint George Hospital-University Medical Center, Beirut, Lebanon.

<sup>13</sup>Department of Laboratory Medicine and Blood Bank, Makassed General Hospital, Beirut, Lebanon. <sup>14</sup>Department of Laboratory Medicine and Blood Bank, Centre Hospitalier Universitaire Notre Dame de Secours, Jbeil, Lebanon. <sup>15</sup>Department of Blood Bank, American University of Beirut, Lebanon.

<sup>16</sup>Department of Blood Bank, Middle East Institute of Health, Bsalim, Lebanon. <sup>17</sup>Department of Laboratory Medicine, Hôtel Dieu de France Hospital, Beirut, Lebanon. <sup>18</sup>Institut National de la Transfusion Sanguine, Paris, France.

\*Equal contributors.

## Abstract

**Background:** Lebanon has a decentralized/fragmented transfusion system. The current blood supply does not meet the World Health Organization target of achieving 100% voluntary non-remunerated blood donation (VNRD). There are currently 3 types of donors/donations in Lebanon: replacement/family donations (70–75%), VNRD (20–25%), and compensated donations (5–10%). Remunerated donations are illegal.

**Aims:** This report summarizes the content of presentations given during the first World Blood Donor Day seminar in Lebanon in June 2017. The aim is to describe the current Lebanese blood supply system and the major road blocks and to suggest practical recommendations that may assist in achieving 100% VNRD.

**Methods:** The content of presentations given during the first World Blood Donor Day seminar in Lebanon in June 2017 were summarized.

**Results:** The seminar was attended by all major stakeholders involved in transfusion medicine (Lebanese National Committee of Blood Transfusion, Hospital Blood Banks directors, Lebanese Army Blood Bank, Lebanese Red Cross and Donner Sang Compter).

**Conclusions:** The Ministry of Public Health should focus on performing regular audits regarding the implementation of national guidelines. There is a need for a national blood supply committee, unifying all stakeholders in the transfusion and donation fields. Transfusion medicine should be declared by law as a public health issue and considered a priority for patient safety.

**Keywords:** Blood supply, Blood donation, voluntary non-remunerated donors, Lebanon

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## Introduction

This study summarizes the content of the presentations that occurred during the first World Blood Donor Day seminar in Lebanon, held 14 June 2017 at one of the major health care facilities in Beirut-Hôpital du Sacré Coeur. This seminar was under the patronage of the Lebanese National Committee of Blood transfusion (LNCBT) during which all major stakeholders in transfusion medicine analysed the various difficulties occurring in the field of blood supply.

Blood is essential in assisting and providing the optimal patients' health care (1). In spite of many advances in immuno-haematology, blood components are still produced from human origin and thus considered as a rare source. In many high-income countries, patient blood management and optimal use of blood programmes reduced the red blood cell components demand and supply (2). Whereas low and

middle-income countries are facing increased need in blood components as more patients require transfusion due to ageing, development of surgical and specific medical care procedures and to high prevalence of haemoglobinopathies in certain regions (3). Amongst these countries, Lebanon has a decentralized/fragmented blood transfusion system and the blood donation is mainly hospital based with a small part performed by nongovernmental organizations, either alone (Lebanese Red Cross) or in association with hospital blood banks (Donner Sang Compter Association, etc.). Thus, blood supply is mainly based on replacement/family donation (around 75%) and cannot meet the WHO request. Indeed, WHO recommended regularly that blood supply in each country entirely should be based on voluntary non-remunerated donors (VNRD) because this type of donation is the most sustainable and safest for both donors and patients (4).



Effectively, a volunteer-regular donor is committed to ensure blood sustainability and possess enough knowledge to recognize risky behaviours that can potentially cause harm for self and recipients. This is very critical especially in transfusion systems that do not perform nucleic acid testing, which is the case in most Middle Eastern countries including Lebanon (5). In fact, each country has its own blood transfusion system and blood donation vary from what is nearly a national service like the United Arab Emirates, to a completely hospital-based blood banking system such as Saudi Arabia and Palestine, and mixture of partial unified to hospital-based blood banking system as in Egypt and Jordan (6). That is why, in the last meetings of the WHO Regional Committee (2009 and 2016) (7,8) members urged Middle Eastern countries to establish and implement a national blood system with well-coordinated blood transfusion activities and to make attempts towards reaching 100% VNRD in 2020 (7), later postponed to 2025 (8).

Having identified the hurdles and road-blocks preventing the achievement of the WHO goal, Lebanon is still seeking the best strategy/plan to improve its blood supply in the time frame set by the WHO. The seminar had the objective of detailing the currently available Lebanese blood supply system, the major road blocks as listed by the national professionals/experts and suggests practical recommendations for national authorities that could assist them in achieving 100% VNRD.

## The current Lebanese blood transfusion service

### Overview

Lebanon is characteristically ruled by a liberal economic system that values most private initiative and the right of private property (9). However, it is particularly difficult to set up a public plan to overview transfusion medicine (TM) as the health care system is by essence chiefly within the private sector. As a matter of fact, TM is not considered a “Public Health Affair”, in opposition to what WHO recommends (10). Actually, around 83% of the health care activities take place in private facilities while only 17% in public ones (11). There are 140 hospital-based blood banks (HBBs); around 60 are licensed by the MoPH of whom only 9 collect more than 4000 units per year and 36 collect single donor apheresis platelets (unpublished data MoPH). Each health care facility runs its own HBB, usually integrated in the Department of Clinical Laboratory Medicine or Pathology; HBBs are overseen and under the responsibility of physicians (either clinical pathologists or haematologists) (5), of whom only a minority are specialized in TM. HBBs collect mainly whole blood, process it according to a national standard that comprises universal leukoreduction (in force as of 2013), then proceed to the quality and safety testing according to a national standard (HIV1/2 Ag/Ab, HCV Ab, HBs Ag, Anti-HBc and PRP) and finally establish their own inventory with the ABO and RH:1 (RhD) groups; other blood groups are not standard. Patients are then tested in the same department

that proceeds to the indirect Coombs (anti-globulin) test and cross-match. Blood products in Lebanon are invoiced as laboratory tests and reimbursed by public and private insurance while patients pay a part of the hospitalization bill. Consequently, the national blood transfusion service is extremely fragmented and decentralized (12).

There are currently in Lebanon three different types of donors/donations in Lebanon: 1) Replacement/family donations are estimated to be around 70 to 75 %; (2) VNRDs represents around 20 to 25%; 3) and compensated donations are estimated to be around 5 to 10% (5). Remunerated donations are officially forbidden by the Lebanese law since 2006; penalty can be put on donors or patients if financial incentive was proved during donor recruitment. However, this law does not specifically mention any third-party payers (13). Thus, theoretically no donors are remunerated but it came to public knowledge that cases of recruited donor remuneration can occur in Syrian or Palestinian refugee camps and in situations when patients outside a defined community have reduced family and friend or relative circles.

### The replacement/family donors/HBBs donors

Replacement/family donors are those who give blood upon request by a member of their own family or community or a friend; thus, replacement donation involves the patient directly in donor recruitment and the mobilization is based on principle of restricted solidarity either in the family or friend circles and acquaintances/community members (14). Usually, these donors arrive in a group accompanied/encouraged by friends/family members. They are motivated by the belief in “giving a service” and in some way they may feel obliged to donate. Even though the donation is for the HBB and not directed to the patient him/herself, the latter is placed under a “debt of gratitude” due to his/her proximity to the replacement donors. In addition, the issue of anonymity arises in such donations since donors and patients know each other even though the donation is a replacement one (5).

Most Lebanese HBBs consider such donors as their main source to procure blood, and thus by requiring a replacement donation from the patient family – relying on replacement donations only – they place this system in a vicious circle and refrain from the switch to VNRD. Actually, some HBB try to convert some replacement donors to VNRD even in the absence of a relative in need, though with limited success as most candidates prefer awaiting that a real need is specifically addressed, thereby fuelling the vicious circle as well.

### The role of the Lebanese Red Cross

The Lebanese Red Cross represents one of the largest humanitarian organizations in Lebanon and a key factor in fulfilling the blood demand for transfusion purposes. Through a 13-blood centre-network spread over the whole Lebanese territory, the Lebanese Red Cross is instrumental in the transfusion field. All centres are equipped to efficiently provide a full service in blood transfusion, from collection to processing and testing. The LCR envision

regarding its role in the transfusion process is that each patient in need in Lebanon receives blood products timely, safely and efficiently.

The Lebanese Red Cross accounted for around 15% of the national blood supply in 2016. Meanwhile, the Lebanese Red Cross is facing the same difficulties in targeting blood donors as do HBBs. While delivering blood products components to HBBs upon request of the patient's family, the Lebanese Red Cross has to replenish the inventory and, to achieve this task, it addresses replacement donations. Actually, the majority of donations in the Lebanese Red Cross centres yet originate from family/replacement donors and not VNRD (around 9.65%). One of the main Lebanese Red Cross objectives is to promote VNRD in order to increase their contribution to the HBBs need and to achieve a blood supply based exclusively on VNRDs. A short-term objective has been set to attain 5,000 VNRBD meaning around 25% of total donations by 2020.

Recently, the Lebanese Red Cross launched a blood donor recruitment form, which is an online portal where prospective voluntary donors can make an appointment to give blood at their convenience. These donors can even specify how many times per year they wish to donate. Another major goal of LRC is to increase the capacity of blood centres for welcoming blood donors. Therefore, it sought to set up unique units, dedicated exclusively for donor recruitment. Next, the LRC is currently implementing a quality management organization to optimize, among other tasks, the coordination with health care facilities. The LCR is eager to alleviate the psychological burden put on patients' families begged to bring replacement donations.

### ***The role of nongovernmental organizations: the case of the “Donner Sang Compter” Association***

Without a specific need, Lebanese citizens remain reluctant to donate blood and ignore the media demand, which is a very serious issue. To overcome this negative attitude, a nongovernmental organization was established 12 years ago with the goal to help meeting all blood demands, and goes by the name “Donner sang Compter” (DSC) with the aim of creating a network of voluntary donors willing to freely give blood around the clock throughout the year. Donor identities are kept strictly confidential through the call centre to preserve privacy and anonymity and to avoid social or financial coercion. This network of voluntary donors is supposed to be efficient even in cases of over-demand. However, it is currently overstressed as not only HBBs but also Lebanese citizens rely more and more on DSC. While the patient family used to procure, for example, four out of five needed blood units and rely for the fifth on DSC, it is not unusual currently that family ask DSC to provide all needed BCs instead of complementing the missing one of five. It is acknowledged that DSC substitutes for replacement donors; this nevertheless weakens the global inventory as it is clearly not enough: DSC is only fulfilling 30–40% of its current demand and the cooperation of all stakeholders is thus highly needed.

The DSC started recruiting donors on social media where most young potential donors are active. In addition, numerous blood drives were conducted in partnership with HBBs all over the year in many public places such as universities, shopping malls, business premises in order to increase their inventory and ultimately decrease the burden placed on patients' to provide blood units/donors. Awareness campaigns and events were also conducted in these public places in order to increase the donor's database and to dispel some of the many misconceptions surrounding blood donation in Lebanon. DSC donors are genuine VNRDs donating anonymously and motivated only by the donation experience in contrast to the replacement donor.

DSC considers that even if blood components are regularly reachable, the problem consists of the stress burden that affects the whole system with specific pressure on hospitals, families and donors. Moreover, the DSC faces some serious problems such as discrepancies between HBBs regarding guidelines and eligible criteria for donating; waiting times are too long in some facilities due to organizational issues, and if the first donation experience has not been successful, then donors may be reluctant to take part in future donations. Thus, the DSC is currently focusing its practice on the donation experience by providing a comfortable air-conditioned bus, certificates, entertaining videos while donating and memorabilia (information leaflets, stickers, memory card, bracelets, etc.) to signify their affiliation with belonging to donor groups.

In summary, DSC believes that further collaboration with HBBs is needed as well as a merger with other NGOs to create a national Federation for blood donors supervised by the MoPH. Another suggestion would be the development of quality management system including collect donors' feedback and complaints in order to improve donor satisfaction and thus maintain regular donation.

### ***Specifics with the Shiite community: the “Ashoura” donation experience***

Lately, the Shiite community has been working to improve the image of Ashoura by discouraging practices of self-flagellation and having surrogate gestures in mourning towards making blood donation. Self-flagellation is the traditional commemoration of mourning the murder of the imams Hassan and Hussein; having worshippers inflicting self-bleeding commemorates in particular the 10th day of this annual celebration. A considerable change regarding this ritual was made in 2009 when one of the most respected Ulama in the Shiite community encouraged the replacement of self-flagellation with voluntarily donation. However, in 2009, a major hospital (affiliated to the Shiite community) faced an emergency situation precisely on the 10th day of Ashoura and the HBB was mobbed by dozens of donors. With the help of the nursing staff, the HBB collected around 130 donations but still could not manage to have them volunteers donating. Since then, the 10th day of Ashoura became an opportu-

nity to donate spontaneously in the Shiite community at this hospital. This experience raised awareness regarding the impact of religious motivation in this hospital administration; it was then considered that year long regular offerings of donating blood would better meet the demand (such as specific occasions, Friday prayers, etc.). These strategies have had a significant impact on the supply of the relevant HBBs.

### **The Lebanese army blood bank: role and responsibilities**

The Lebanese Army holds one of the biggest HBBs in Lebanon, which collects around 10,000 blood donations per year. From the Army's point of view, other problems exist such as:

1. A lack of national transportation procedures to ensure the safety of blood products;
2. A lack of efficient and trustable networks among HBBs for exchanging blood units.

Consequently, the quality and safety of blood products issued by the Lebanese Army to health care facilities to transfuse hospitalized soldiers/families is exposed. In addition, as some of these facilities tend to repeat all screening tests, the financial burden over the health care system is increased. The vast majority of donors with the Army HBB are soldiers agreeing to donate blood "voluntarily" as a national duty and part of their commitment to the army. The donor recruitment is driven by the demand of specific blood groups. Those who donate can receive as compensatory day off, or a reimbursement of transportation costs if any, as well as a moderate fee to cover meal expenses; this is collectively aimed at manifesting gratitude. Thus, soldiers cannot donate whenever they want but only when they are requested to, which depends on the demand. Soldiers usually donate twice a year. Anonymity between donor and recipient is guaranteed.

Most of army donors are males, aged 18 to 40 and originate from the very many confessions. The Army meets all blood demands for Lebanese soldiers and families. The Army stands as a model of integration of donation by all religious groups and a standard for regular donation outside of the replacement donation within communities.

### **Availability and safety of blood during humanitarian emergency management**

Managing blood donation during emergency situations started raising discussions in scientific communities especially after the September 11, 2001 attacks in New York, where only few units were transfused while several thousand had to be lately disposed of. This experience contributed significantly to the improvement of blood management during humanitarian emergencies. Similar situations were also reported three years later during the Madrid train attack and in France during the 2015 winter and autumn terrorist attacks (15–17). As one can notice, the majority of injured people during terrorist attacks or natural disasters either dies before arriving to the hospi-

tal or has superficial injuries and don't need transfusion.

As for Lebanon, the 2006 war experience and the last terrorist incident on 12 November 2015, (where respectively 15% and 24% of injured civilians were transfused), call for two commentaries: First, the percentage of injured people needing transfusion was higher compared to Western tragedies, perhaps because of the nature of injuries and weapons. Second, the number of collected units is almost the same as to those actually transfused; this demonstrates that management of blood collection was adequate, at least for the moment. Indeed, in the South Eastern suburban of Beirut (where last terrorist incident took place) there are five middle size hospitals complying with a local emergency preparedness plan, which consists in having a target minimal stock of blood and applying an efficient networking blood supply system. This plan has proven its efficacy since blood was available for all injured patients.

Based on these two Lebanese experiences, numerous challenges during emergency situations were identified as follow:

- To face a war situation: it is essential to procure blood for fighters or soldiers on the battlefield even when the infrastructure has collapsed and to cope with an increasing demand merging both an influx of injured people and loss of donors at the same time.
- To face a terrorist attack: it is essential to maintain an adequate stock of blood products, organizing accurate schedules for the on-call staff in order to be able to absorb the influx of donors, and organize a network for adequate transportation between nearby healthcare facilities.

Consequently, it is now central to conduct a study in order to define the needed inventory in case of terrorist attack (based on previous experiences) and how to avoid spillage. Furthermore, a "media coordinator" available in case of casualties is needed to assign donors to the diverse healthcare facilities or re-orientate them, and to eventually stop the rush once enough blood is collected. Not only donor candidacies are the problem to be solved but also the logistics to collect them according to the needs, both in terms of devices, goods and human resources.

Of particular note concerning those dramatic events was the fact that the Lebanese donate voluntarily and massively in emergency situations reflecting a sense of national solidarity. The challenge is how to manage the rush of donors in such situations which would demand an efficient network between HBBs and organizations (Lebanese Red Cross, Army, NGOs ...) to collect optimally.

However, when looking back to the impact of emergency donations on the sustainability of blood supply, the studies carried out in Lebanon (2006 war), USA (11th September) (18) and Iran (earthquake 2009) (19), show a common feature which is a low return rate when the situation returns to normal. This means that most first time, occasional, donors will not return, irrespectively of culture. Further, HBBs in Lebanon also learnt that those donors upon arrival in the facility express some reluctance to comply with the situation is not perceived



as exceptional (e.g. chronic patient with a need for platelet) if the need for emergency has been fulfilled. This echoes well with what was observed in the USA after the September 11 2001 attack, the American Association of Blood Banks (AABB) director stated at that time that the current issue was no longer the availability of sufficient blood donors, but disruption to the blood supply system itself. Consequently, in Lebanon there is a still need to combat the misconception of donating voluntarily only in the emergency circumstances by educating people and introducing the values of voluntary donation.

## Relevant questions (Background)

In order to improve safety in TM and to achieve a safe, reliable and sustained national blood supply, the Lebanese authorities represented by MoPH established the LNCBT in 2011 and contracted during the same year the French blood facility Établissement Français du Sang (EFS) to assist this committee in addressing this task. The agreement was arranged through the Beirut-based French-Lebanese Business School, Ecole Supérieure des Affaires (ESA). Since then, despite the several advancements made over years regarding blood processing/testing and safety (see below), the issues of achieving a VNRD-based recruitment and ensuring nationwide sufficiency have still not been met.

Lebanon is a country which has suffered civilian and military strife over the past decades, preventing the creation of a reliable and uniform healthcare organization nationwide; furthermore, Lebanon relies mainly on a private sector economy, and the current status of the blood supply in Lebanon is mainly based on replacement/family donors overseen by HBBs for their own internal use (5); this clearly does not fulfill WHO recommendations. Hence, two important questions need to be addressed: 1) how can such a decentralized system progress in making a blood supply capable of meeting the demand?; and 2) what would be the most important steps to address? In parallel to the joint collaborative and practical program with EFS, an academic investigation has been launched with the National Institute for Blood Transfusion in Paris, France (INTS) in collaboration with the University of Lyon/Saint-Etienne. The latter program is aimed at addressing epidemiological and sociological issues to better understand Lebanon's needs in blood supply and transfusion safety. The program has been expanded to all countries of the Maghreb and Levant (20).

## World blood donor day celebration: an opportunity to cease to engage discussions

The LNCBT took the opportunity of celebrating World Blood Donor Day (WBDD), 14 June 2017, to host a half day seminar and organize round table discussions involving all main stakeholders of the blood donation process in Lebanon. Each year since 2004, and upon the invitation of WHO, one country is chosen as the official celebration host and a slogan is released, aimed at attracting the attention of populations and country health authorities. In

2017, the host country was Vietnam and the action slogan was: "What can you do? Give blood. Give now. Give often." (21). This was felt to be a great opportunity for one Beirut hospital through its HBB to host this national seminar in order to: 1) spread awareness for the need of safe blood and blood products; 2) thank blood donors for their life-saving blood gifts; 3) promote regular donations; and 4) make it visible nationwide. It was also a great opportunity to explain nationwide why donating is crucial because blood products have expiry dates, imposing a regularly renewed inventory to avoid blood shortage.

The event's more specific aims were also: 1) to enlist the current types of donations in the country; 2) to discuss reciprocal advantages and disadvantages; 3) to identify the main roadblocks in achieving a VNRD-based blood supply; and 4) to draft a consensus-based road map that can be forwarded to the MoPH. The long-term objective of this seminar was to help the MoPH to take actions in favor of a more generalized VNRD in the country.

## Moving forward in improving the transfusion process: the MoPH's project

The MoPH is responsible by law for the efficient supply of blood products and for the overall quality, safety, availability and equitable distribution of these products. This task is particularly difficult to achieve in the absence of a well-organized national blood transfusion service governed by a national public health policy (WHO recommendations) (10). The MoPH director advised by French experts/LNCBT has identified that at a minimum, a quality and safety system should oversee good transfusion practices in the whole chain, including blood grouping, compatibility, viral screening and processing, standardization of donor selection and reporting system. This was assigned to LNCBT. Next, the LNCBT should consider the promotion of VNRD (difficult to achieve because of the absence of human resources in the Ministry) and setting up of patient blood management and optimal blood use programs.

Several actions were undertaken by the MoPH, delegated to LNCBT in collaboration with ESA/ EFS (11), specifically: 1) the development of good transfusion practices (2012); 2) the introduction of additional safety measures such anti-HBc screening and universal leukoreduction (2013) applicable to every HBB processing blood components; 3) the release of software requirement specifications for a HBB management system (2014); and 4) the progressive development of a national haemovigilance program (as of 2015), that comprises a national blood donor questionnaire, the definition of blood donor selection criteria, the release of pre- and post-donation information leaflets, the setup of a transfusion related adverse reaction notification form and of donors' adverse reactions reporting form. These documents are released on the MoPH website but HBBs are not yet inspected (22).

On June 14, 2016, the first national campaign for the promotion of VNRD was launched at ESA location in the presence of the MoPH and the media. The campaign was disseminated in three languages (French, English

and Arabic) through video TV ads, radio, billboards and posters. A hotline number “1214” was also settled to direct motivated donors towards the nearest blood centers.

The MoPH is well aware that those actions were not sufficient to meet the WHO goals regarding 100% VNRD. It aims at further elaborating strategies for strengthening applicable laws and organizing orientation/educational sessions for HBB professionals. The MoPH is now considering implementing a national certification program for blood transfusion centers and a national procedure/network transportation system for blood products, despite political and economic struggles.

#### **Road blocks to achieving 100% voluntary blood donation**

All stakeholders met to reflect on blood donation and collection in Lebanon, and taking into consideration peace and wartime, and identified a number of roadblocks preventing a safe and sustainable inventory, as follows:

1. Culturally, the Lebanese expect some form of benefit from donating blood and more specifically if the patient is outside their family and friend or relative circles. One of their commonest replies when asked to donate blood is “What’s in it for me?”
2. Donating is costly and time consuming because of frequent traffic jams in the city and the remoteness of the HBBs, which in addition do not operate after hours when traffic has eased. Donors would thus need or request time off just to donate. Moreover, free-of-charge parking and the post-donation canteen are not available in all HBBs.
3. Blood transfusion is not considered a public health issue; hence, a strict control, supervision, and inspection by Lebanese national authorities is lacking. The government may consider delegating to organizations such as the Lebanese Red Cross while providing financial support and overseeing their activities.
4. There are still Lebanese not aware about when and how to donate voluntarily, which calls for widespread information campaigns. It will also help to dispel some of the misconceptions regarding blood donation such as fears of harm to their health (ranging from fear of needles to loss of virility in males) or that receiving blood from family members or friends is safer and will eliminate the risk of transfusion-transmissible infection.
5. Laboratory workers do not possess a sufficient understanding of the psychology of people in order to attract and retain volunteer blood donors; they need specific education on how to improve their personal skills.
6. Staffing also poses a problem that range from a mild deficit in HBB technologists to the complete absence of donor recruiters. The latter must be enthusiastic and competent, not necessarily from medical or HBB background, but possesses an ability to lead and persuade. However, such positions are often not regarded highly by administrators nor have financial incentives/salaries. In fact, these are seen as a waste of resources and attention is often directed towards buying sophisticated technical equipment rather than upgrading and adequately staffing a donor system. Other difficulty related to staffing is that most laboratory and HBB directors are not adequately trained in transfusion medicine and only a few had direct experience or training in blood donor recruitment. Much more effort needs to be directed to ensure that HBB directors are fully informed on different methods of donor recruitment and motivation.

#### **Concluding perspectives**

- The MoPH should focus on performing regular inspections/audits regarding the implementation of all available national guidelines, and especially those which might affect the experience and retention of donors such as good practice for phlebotomy and blood donor selection criteria.
- A need for a blood supply committee under the auspices of the MoPH that would reunify all stakeholders in the blood transfusion and donation fields. Its mission would be (among others): 1) to provide an audit on the current situation; 2) to promote VNRD through campaign media and education; 3) to promote a successful network between LRC, NGOs, the Army and HBBs; 4) to elaborate preparedness plans for emergency situations; 5) to approach ethical issues related to donors and donations; 6) to implement a national data system management and to make possible the establishment of a national blood donor card; 7) to develop regular blood drives; and 8) to support scientific forums and seminars and education initiatives on blood donation and supply.
- Further roles for the MoPH have been proposed, including allocating adequate resources to this blood supply committee. MoPH should also be further engaged in the improvement process of transfusion activities in general, and transfusion medicine should be declared by law as a public health issue and should be considered a national priority for patient safety especially in critical situations.

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## Difficultés à assurer un approvisionnement en sang durable : compte rendu du premier séminaire national sur le don de sang au Liban

### Résumé

**Contexte :** Le Liban dispose d'un système de transfusion décentralisé et fragmenté. L'approvisionnement en sang actuel ne répond pas à l'objectif de l'Organisation mondiale de la Santé, à savoir atteindre 100 % de dons de sang volontaires et non rémunérés. Actuellement, il existe trois types de donateurs/dons au Liban : dons de compensation/familiaux (70-75 %), dons de sang volontaires et non rémunérés (20-25 %) et dons compensés (5-10 %). Les dons rémunérés sont illégaux.

**Objectifs :** Le présent compte rendu résume le contenu des présentations effectuées lors du premier séminaire ayant eu lieu au Liban en juin 2017 à l'occasion de la Journée mondiale du donneur de sang. L'objectif était de décrire le système d'approvisionnement en sang en place au Liban ainsi que les principaux obstacles associés, et de suggérer des recommandations pratiques susceptibles d'aider à atteindre l'objectif de 100 % de dons de sang volontaires et non rémunérés.

**Méthodes :** Le contenu des présentations effectuées lors du premier séminaire ayant eu lieu au Liban en juin 2017 à l'occasion de la Journée mondiale du donneur de sang a été résumé.

**Résultats :** Les principaux partenaires impliqués dans la médecine transfusionnelle ont assisté au séminaire (Comité national libanais de transfusion sanguine, directeurs des banques de sang des hôpitaux, banque de sang de l'armée du Liban, Croix-Rouge libanaise et Donner Sang Compter).

**Conclusions :** Le ministère de la Santé publique devrait se concentrer sur la réalisation des vérifications régulières concernant l'application des lignes directrices nationales. Il est nécessaire de mettre en place un comité national pour l'approvisionnement en sang rassemblant tous les partenaires impliqués dans la transfusion et le don de sang. La médecine transfusionnelle devrait être déclarée par la loi comme une question de santé publique et considérée comme une priorité pour la sécurité des patients.

### صعوبات تواجه تحقيق إمدادات مستدامة بالدم: تقرير صادر عن الحلقة الدراسية الوطنية الأولى حول التبرع بالدم في لبنان

أنطوان حداد، طارق بو عاصي، لورا حداد، بيرين مالود واكيم، ريتا فغالي، وسام مكّي، محمد حيدر، يورجي تيروز، هنادي سباحة، تيممة الجسر، كريستيان حداد، إليزابيث باز، برث هاشم، فاندرا بركات، أوليفيه جاردو

### الخلاصة

**الخلفية:** يتسم نظام نقل الدم في لبنان باللامركزية أو التفتت. ولا تتواءم الإمدادات الحالية من الدم بما تستهدفه منظمة الصحة العالمية من تحقيق 100٪ من التبرع بالدم الطوعي غير مدفوع الأجر. وهناك في الوقت الحالي ثلاثة أنواع من المتبرعين/ التبرع بالدم في لبنان: تبرع الأسرة أو التبرع تعويضاً للدم الذي تبرع به أعضاء الأسرة (70-75٪)، والتبرع بالدم الطوعي غير مدفوع الأجر (20-25٪) والتبرعات في مقابل تعويض (5-10٪). أما التبرعات المدفوعة الأجر فهي غير قانونية.

**الأهداف:** يوجز هذا التقرير لمحتوى العروض التي قُدمت خلال الحلقة الدراسية حول اليوم العالمي للمتبرعين بالدم، والتي عُقدت في لبنان عام 2017. ويتمثل الهدف في وصف النظام الحالي للإمداد بالدم في لبنان والعقبات الرئيسية التي تواجهه، واقتراح توصيات عملية يمكنها المساعدة في تحقيق 100٪ من التبرع بالدم الطوعي غير مدفوع الأجر.

**طرق البحث:** لخص محتوى العروض التي قُدمت خلال الحلقة الدراسية حول اليوم العالمي للمتبرعين بالدم، والتي عُقدت في لبنان عام 2017. **النتائج:** حضر الحلقة الدراسية جميع الأطراف الأساسية المعنية بطب نقل الدم (اللجنة الوطنية اللبنانية لنقل الدم، ومديري بنوك الدم بالمستشفيات، وبنك الدم بالجيش اللبناني، والصليب الأحمر اللبناني، ومؤسسة «دونية سون كوتيه»).

**الاستنتاجات:** يجب على وزارة الصحة العامة إيلاء التركيز إلى إجراء مراجعات منتظمة بشأن تنفيذ المبادئ التوجيهية الوطنية. وهناك حاجة إلى إنشاء لجنة وطنية معنية بالإمداد بالدم، تتوحد في ظلها جميع الأطراف المعنية بنقل الدم والتبرع به. كما ينبغي أن يعرّف القانون طب نقل الدم باعتباره أحد قضايا الصحة العامة وأن يُنظر إليه كأولوية من أولويات تحقيق سلامة المرضى.

### References

1. Garraud O, Tissot J-D, Osselaer J-C, Folléa G, Vernant J-P, Lefrère J-J. Transfusion safety from the viewpoint of a musical quintet. *Blood Transfusion*. 2015;13(4):687. <https://doi.org/10.2450/2015.0297-14>.
2. Sadana D, Pratzler A, Scher LJ, Saag HS, Adler N, Volpicelli FM, et al. promoting high-value practice by reducing unnecessary transfusions with a patient blood management program. *JAMA Intern Med*. 2018 Jan 1; 178(1):116–122. <https://doi.org/10.1001/jamainternmed.2017.6369>

3. Kohne E. Hemoglobinopathies: Clinical manifestations, diagnosis, and treatment. *Deutsches Ärzteblatt International*. 2011;108(31–32):532–40. <https://doi.org/10.3238/arztebl.2011.0532>.
4. WHO Expert Group. Expert consensus statement on achieving self-sufficiency in safe blood and blood products, based on voluntary non-remunerated blood donation (VNRBD). *Vox Sang*. 2012 Nov;103(4):337–42. <https://doi.org/10.1111/j.1423-0410.2012.01630.x>.
5. Haddad A, Bou Assi T, Garraud O. Can a decentralized blood system ensure self-sufficiency and blood safety? The Lebanese experience. *J Public Health Policy*. 2017;38:359–65. <https://doi.org/10.1057/s41271-017-0076-x>.
6. Regional meeting of directors of blood transfusion services. Alexandria: World Health Organization, Regional office for the Eastern Mediterranean; 2000 ([http://applications.emro.who.int/docs/who\\_em\\_lab\\_327\\_e\\_1\\_en.pdf](http://applications.emro.who.int/docs/who_em_lab_327_e_1_en.pdf), accessed 27 August 2018).
7. The Melbourne Declaration on 100% Voluntary Non-Remunerated Donation of Blood and Blood Components. Geneva: World Health Organization; 2009 (<http://www.who.int/worldblooddonorday/MelbourneDeclarationWBDD09.pdf>, accessed 04 January 2018).
8. Strategic Framework for Blood Safety and Availability 2016–2025. Cairo: World Health Organization, Regional Office for the Eastern Mediterranean; 2016 (<http://www.who.int/iris/handle/10665/250402>, accessed 25 January 2018).
9. The Lebanese constitution. Beirut: Presidency of the Republic of Lebanon; 1926 (<http://www.wipo.int/edocs/lexdocs/laws/en/lb/lb018en.pdf>, accessed 03 September 2017).
10. Blood safety. Geneva: World Health Organization; 2014 ([http://www.who.int/bloodsafety/transfusion\\_services/en/Blood\\_Safety\\_Eng.pdf?ua=1/](http://www.who.int/bloodsafety/transfusion_services/en/Blood_Safety_Eng.pdf?ua=1/), accessed 14 January 2018).
11. Recueil national des statistiques sanitaires au Liban. Beirut: Institut de Gestion de la Santé et de la Protection Sociale; 2016 (<http://www.igsp.usj.edu.lb/docs/recherche/recueil2fr.pdf/>, accessed 8 December 2017).
12. Haddad A, Bou Assi T, Ammar W, Baz E. Does a liberal national transfusion law assure blood safety? A survey of blood bank directors perspectives in Lebanon. *J Public Health Policy* 2013; 34(4): 515–27 (<https://doi.org/10.1057/jphp.2013.33>).
13. Act 766 published on 16/11/2006 in the Lebanese Official Journal. Beirut: Lebanese Government; 2006 (<http://www.pcm.gov.lb/arabic/subpgoldJo.aspx?pageid=3836>, accessed 01 February 2018).
14. Titmuss, R. The gift relation ship: from human blood to social policy. London: Penguin Books Ltd; 1973.
15. Korcok M. Blood donations dwindle in US after post-Sept. 11 wastage publicized.: *Canadian Med Assoc J*. 2002;167(8):907. PMID:12406957
16. De Ceballos JPG, Turégano-Fuentes F, Perez-Diaz D, Sanz-Sanchez M, Martin-Llorente C, Guerrero-Sanz J. 11 March 2004: The terrorist bomb explosions in Madrid, Spain – an analysis of the logistics, injuries sustained and clinical management of casualties treated at the closest hospital. *Critical Care*. 2005;9(1):104–111. <https://doi.org/10.1186/cc2995>.
17. Tresson P, Touma J, Gaudric J, Pellenc Q, Le Roux M, Pierret C, Kobeiter H et al. Management of vascular trauma during the Paris terrorist attack of November 13, 2015. *Ann Vasc Surg*. 2017;40:44–9. <https://doi.org/10.1016/j.avsg.2016.09.011>.
18. Glynn SA, Busch MP, Schreiber GB, Murphy EL, Wright DJ, Tu Y, et al. Effect of a national disaster on blood supply and safety: the September 11 experience. *JAMA*. 2003 May 7;289(17):2246–53. <https://doi.org/10.1001/jama.289.17.2246>
19. Abolghasemi H, Radfar MH, Tabatabaee M, Hosseini-Divkolayee NS, Burkle FM Jr. Revisiting blood transfusion preparedness: experience from the Bam earthquake response. *Prehosp Disaster Med*. 2008 Sep–Oct;23(5):391–4. PMID:19189607
20. Haddad A, Bou Assi T, Garraud O. How can eastern/southern Mediterranean countries resolve quality and safety issues in transfusion medicine? *Front Med*. 2018;5:45. <https://doi.org/10.3389/fmed.2018.00045>
21. World Blood Donor Day. Geneva: World Health Organization; 2017 (<http://www.who.int/campaigns/world-blood-donor-day/2017/event-announcement-english.pdf?ua=1>, accessed 04 February 2018).
22. Blood Transfusion. Beirut: Republic of Lebanon, Ministry of Public Health; 2015 (<http://www.moph.gov.lb/en/Pages/4/3262/blood-transfusion-#/en/Pages/4/3262/blood-transfusion>, accessed 07 January 2018).

# First report of Chikungunya fever in Rawalpindi, Pakistan

Lubna Meraj,<sup>1</sup> Junaid Saleem,<sup>2</sup> Shahzad Manzoor,<sup>1</sup> Asfaa Ashfaq<sup>1</sup> and Mohammad Khurram<sup>3</sup>

<sup>1</sup>Department of Medicine, District Headquarter Hospital Rawalpindi, Rawalpindi Medical University, Rawalpindi, Pakistan. <sup>2</sup>Department of Medicine, Hearts International (Pvt) Hospital, affiliated with Islamic International Medical College, Rawalpindi, Pakistan (Correspondence to: J. Saleem: jslallar@gmail.com). <sup>3</sup>Department of Medicine, Benazir Bhutto Hospital, Rawalpindi Medical University, Rawalpindi, Pakistan

## Abstract

**Background:** Chikungunya shares many clinical features with dengue fever, but to date, no case has been reported in Rawalpindi and surrounding areas.

**Aims:** To detect the presence in Rawalpindi of chikungunya masquerading as dengue fever.

**Methods:** An observational study was conducted at Rawalpindi Medical University from July to December 2017. Patients with clinical features suggestive of dengue fever, but negative for dengue virus NS1 antigen were included and tested at the National Institute of Health Islamabad, Pakistan, for chikungunya using reverse transcription polymerase chain reaction.

**Results:** We tested 129 patients and 28 were positive for chikungunya. There were 17 (60.7%) men and 11 (39.3%) women, with a mean age of 32.53 years (range 16–60 years). All had fever at presentation. Other clinical features at presentation were noted, such as fever, chills, fatigue, headache, myalgia, arthralgia, retro-orbital pain, abdominal pain, nausea, and diarrhoea. No long-term sequelae or bleeding diatheses were seen and there was no mortality reported.

**Conclusions:** The clinical features observed and investigated confirmed our reporting of the first case of chikungunya in Rawalpindi, Pakistan.

Keywords: chikungunya, clinical features, dengue fever, Rawalpindi, reverse transcription polymerase chain reaction

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## Introduction

Chikungunya is a viral illness caused by the positive-sense single-stranded RNA chikungunya virus (CHIKV), belonging to the genus *Alphavirus*, and family *Togaviridae*. It is transmitted by the bite of infected *Aedes aegypti* and *Aedes albopictus* mosquitoes. The disease was first documented in 1952 as an outbreak in Makonde Plateau, on the border of Mozambique and Tanzania. The word chikungunya has been taken from Mokonde language, and means the “contorted or bent appearance” that occurs in affected patients. Since then, many outbreaks have been noted in 60 countries on four continents, namely Asia, Africa, South America and Europe (1). In Pakistan, chikungunya was first documented in 4 rodent and 1 human sample in 1983 (2). The first recorded human case in Pakistan was reported in 2011 in Lahore (3). Outbreaks have been described in India and Karachi, Pakistan in the last two years (2016–2017) (4, 5).

Chikungunya has not been described previously in Rawalpindi, Pakistan. We have been dealing with dengue epidemics for the last few years (6). With knowledge of recent outbreaks of Chikungunya in India (4) and Karachi (5) and a high index of suspicion, we planned this study to detect the presence of CHIKV and its clinical features in Rawalpindi.

## Methods

This cross-sectional observational study was conducted at the Department of Medicine, District Headquarter

Hospital, Rawalpindi Medical University. Due to a Government initiative against dengue fever, all patients presenting with acute onset of fever (duration 2–10 days) and suspected to have dengue fever were admitted to the hospital. Patients who were negative for dengue markers (NS1, IgG and IgM) from 1 July to 31 December 2017 were evaluated for possible CHIKV infection.

The study was approved by the Ethical Committee of the District Headquarter Hospital, and consent was obtained from all patients before sampling. A detailed history was recorded, and clinical examination was performed, including, blood cultures, and thick and thin blood smear testing for malarial parasites and hepatitis. Patients with clinical features of urinary tract infection, pneumonia, throat infection, and acute gastroenteritis were excluded. Patients with conditions associated with cytopenia on complete blood counts, such as liver disease, haematological disease, and autoimmune disorders, as well as patients receiving immunomodulatory medication were also excluded.

Blood samples (2 ml) from the antecubital fossa collected into vacuum containers were sent to the National Institute of Health (NIH) Islamabad, Pakistan, our local reference laboratory, for detection of CHIKV. Virus was detected by polymerase chain reaction (PCR) using US-CDC Triplex Real-Time RT-PCR kit (US Centers for Disease Control and Prevention, Atlanta, GA, USA), which is the diagnostic kit recommended by

the World Health Organization (WHO). Patients who were positive for chikungunya by PCR were included in this study. All patients were treated conservatively with antipyretics and analgesics, and where needed, intravenous infusions. Patients who were asymptomatic at discharge were not called back for follow-up. Those who had persistent symptoms were followed up in the outpatient department, but none had persistent arthralgia or any other symptom after 2 weeks.

Age, sex, occupation, address, clinical features, duration of illness, main symptoms, findings on clinical examination, and complete blood counts of the included patients were noted on a specifically designed form, with personal details, symptoms present at the time of admission, and laboratory test results on days 1–3. The  $\chi^2$  test was used for statistical analysis.

## Results

A total of 129 patients were tested for chikungunya and 28 (21.7%) were positive. Seventeen (60.7%) of them were male and 11 (39.3%) female, with a mean age of 32.53 years (range 16–60 years). Nineteen (67.8%) patients were from Rawalpindi, 1 (3.57%) was from Islamabad, and the remaining 8 (28.5%) were from towns around Rawalpindi/Islamabad twin city complex. There were no cases presently living in rural areas (although some had a history of migrating from rural areas), and only 1 (3.57%) gave a history of travel to a rural area in the recent past.

All 28 patients had fever at presentation ranging from 37.7 to 38.9°C. The duration of fever was 2–8 days in 25 (89.28%) cases. Two (7.14%) patients had fever of < 2 days duration and 1 (3.57%) had a history of 16 days of fever. Seven (25.0%) patients experienced chills before fever. Mean duration of fever was 5.04 days (range 0–16 days). Fatigue was reported by 27 patients (96.4%), and headache by 22 (78.6%). Nineteen patients had myalgia (67.6%), and 16 (57.1%) complained of arthralgia. Other clinical features were: retro-orbital pain ( $n = 11$ ; 39.2%), chills ( $n = 7$ ; 25.0%), abdominal pain at presentation ( $n = 7$ ), rash on the body ( $n = 4$ ; 14.3%), nausea ( $n = 3$ ; 10.7%), cough ( $n = 2$ ; 7.14%) and diarrhea ( $n = 2$ ).

Physical examination revealed average systolic blood pressure (BP) of 102.14 (range 90–150) mmHg and a diastolic BP of 66.25 (range 50–80) mmHg. Five (17.8%) patients had BP of 90/60 mmHg and 1 (3.57%) had BP of 90/50 mmHg. The average pulse rate was 87.71 (range 76–102) beats/min. Out of the 15 cases with temperature above 37.8°C (range 37.8–38.9°C), 4 had a pulse rate of  $\geq 100$  beats/min, 6 had a pulse rate between 90 and 99 beats/min, and 5 had relative bradycardia with a pulse rate of  $\leq 89$  beats/min.

Laboratory reports were available for days 1–3 after admission to the hospital (Table 1). There was a tendency toward pancytopenia. Haematocrit was < 40 in 14 of 26 (53.8%) patients on day 1, in 13 of 22 (59.0%) on day 2 and in 12 of 18 (66.6%) on day 3. Total leukocyte count on day 1 was <  $4 \times 10^9/L$  in 8/26 (30.7%) patients, and >  $11 \times 10^9/L$  in 2 patients (7.6%). On day 2, 7 of 22 (31.8%) had leukopenia,

**Table 1** Laboratory results in patients positive for chikungunya virus

Test	Day 1 (26 patients)	Day 2 (22 patients)	Day 3 (18 patients)
Haematocrit, %	37.89 (23.0–47.8)	37.56 (27.5–44.9)	37.33 (24.6–48.8)
Total leukocyte count ( $\times 10^9/L$ )	6.69 (1.8–47.0)	3.96 (1.3–7.7)	3.99 (1.9–7.5)
Platelet counts ( $\times 10^9/L$ )	105.4 (19.0–231.0)	124.8 (30.0–333.0)	140.1 (38.0–273.0)

Results measured on 3 consecutive days; presented as average (range).

and on day 3, 10 of 22 (44.4%). No leukocytosis was noted on days 2 and 3. Platelet count showed a steady rise over the 3-day observation period. On day 1, 18/26 (59.2%) patients had thrombocytopenia (platelet count <  $150 \times 10^9/L$ ), and 3 (11.5%) had severe thrombocytopenia (platelet count <  $50 \times 10^9/L$ ). On day 2 the corresponding figures were 13/22 (59.0%) and 2/22 (9.09%), and for day 3 they were 10/18 (55.5%) and 2/18 (11.1%).

## Discussion

Chikungunya is a viral illness that is spread by the bite of infected *A. aegypti* or *A. albopictus* mosquitoes. It is rarely a fatal condition and due to its nonspecific symptoms and nonlethal nature, it is underdiagnosed in the community even in areas where it is endemic (6). Presentation is mainly with high-grade fever and severe arthralgia, and it may be difficult to differentiate it on clinical grounds alone from dengue fever, Rift Valley fever or malaria in endemic areas. There may be other associated symptoms such as myalgia, nausea, headache, fatigue and rash. Treatment in most cases is symptomatic. Hospitalization may be needed for severe disease. Symptoms usually resolve within a week but arthralgia is reported to last for several months in up to 4% of patients (7).

Even though Pakistan is located in the endemic area for chikungunya, it was not until 2011 that the first recorded human case was reported during a dengue outbreak in Lahore (3). We do not know how many undiagnosed cases occurred, but the current documented outbreak started in week 2 of November 2016 and continued until March 2017 (5), although the number of cases reported was erroneously high (4,8). This outbreak was mainly localized in Karachi, Southern Pakistan. Outbreaks of chikungunya have already been reported in India in the past 2 years (9). There is an increasing trend in the incidence of mosquito-borne illnesses in Pakistan, which is attributed to climate change. The winters are getting milder and shorter while the summers are getting harsher and longer, leading to an increase in breeding span for the disease vectors (7,10).

No case of chikungunya has been reported in Rawalpindi to date. We decided to look for CHIKV infection in Rawalpindi, enrolling all suspected cases of fever that were negative for dengue serology. We found 28 cases that were positive for CHIKV infection, confirmed by NIH using WHO-recommended kits. As the viraemia



is usually short lived and we only performed PCR, and did not check for IgM antibodies, we may have missed a few cases, which was a possible limitation to this study.

We found differences in the clinical features of the disease between our patients and those from a previous study in Karachi (7) (Table 2). Our patients had a lower incidence of high fever (38.9°C), arthralgia and rash, and none had arthritis/joint swelling, compared with patients in Karachi. The incidence of headache, myalgia and thrombocytopenia was nearly the same. In addition to the above, we found a high incidence of fatigue at presentation (96.4%), as well as retro-orbital pain (39.2%), unexplained abdominal pain (25.0%), chills (25.0%), nausea (10.7%), cough (7.14%) and diarrhoea (7.14%). These are not among the listed classical features of the disease (11) and may have been coincidental findings.

## Conclusion

Chikungunya may be the cause of many undiagnosed acute febrile illnesses that may clinically resemble dengue fever. For the past 2 years many cases have been described in Karachi and Hyderabad, and the infection seems to be rapidly travelling up from the south. This is the first time that chikungunya has been reported in

**Table 2 Comparative incidence of clinical features in present study and previous study from Karachi (7)**

Clinical feature	Present study	Karachi study
Fever (> 38.9°C)	10.7	85.9
Rash	14.3	29.1
Arthritis/joint swelling	0	78.9
Arthralgia	57.1	88.4
Headache	78.6	72.4
Myalgia	67.6	69.3
Thrombocytopenia	59.2	69.3

Results presented as percentages.

Rawalpindi. Presently, the diagnostic tools are available at NIH Islamabad only. We need to keep a high index of suspicion for detecting and reporting these cases and developing diagnostic ability at local levels. We also noted some differences in the clinical features of the disease from the south of the country; mainly a lower incidence of high fever and joint swelling, and a higher incidence of fatigue at presentation.

**Funding:** None.

**Competing interests:** None declared.

## Première notification d'un cas de fièvre à virus Chikungunya à Rawalpindi (Pakistan)

### Résumé

**Contexte :** La fièvre à virus Chikungunya partage de nombreuses caractéristiques cliniques avec la dengue, mais à ce jour, aucun cas n'a été notifié à Rawalpindi ni dans les zones alentours.

**Objectifs :** La présente étude visait à détecter la présence de fièvre à virus Chikungunya à Rawalpindi confondue avec la dengue.

**Méthodes :** Une étude d'observation a été menée à l'Université médicale de Rawalpindi entre juillet et décembre 2017. Les patients présentant un tableau clinique évocateur de dengue, mais dont les résultats du dépistage de l'antigène NS1 du virus de la dengue étaient négatifs, ont été inclus et ont fait l'objet d'un dépistage du Chikungunya à l'Institut national de la santé d'Islamabad (Pakistan) selon la méthode de transcription inverse suivie d'une réaction d'amplification génique.

**Résultats :** Nous avons effectué un dépistage du Chikungunya auprès de 129 patients. Parmi eux, 28 ont été testés positifs. Il s'agissait de 17 (60,7 %) hommes et 11 (39,3 %) femmes, pour un âge moyen de 32,53 ans (fourchette comprise entre 16 et 60 ans). Tous avaient de la fièvre lorsqu'ils s'étaient présentés. D'autres signes cliniques à l'arrivée des patients ont été relevés : frissons, fatigue, céphalées, douleurs musculaires, douleurs articulaires, douleurs rétro-orbitaires, douleurs abdominales, nausées et diarrhée. Aucune séquelle à long terme ou diathèse hémorragique n'a été observée et aucun décès n'a été signalé.

**Conclusions :** Les caractéristiques cliniques observées et examinées ont permis de confirmer qu'il s'agissait donc de la notification du premier cas confirmé de fièvre à virus Chikungunya à Rawalpindi (Pakistan).

## التقرير الأول حول حمى الشيكونجونيا في راولپندي، باكستان

لبنى معراج، جنيد سليم، شهزاد منظور، أصفى أشفاق، محمد خرم

### الخلاصة

الخلفية: يشترك داء الشيكونجونيا في العديد من السمات السريرية مع حمى الضنك، غير أنه لم يُبلغ حتى يومنا هذا بوجود أي حالة في راولپندي والمناطق المجاورة لها.

الأهداف: هدفت هذه الدراسة إلى الكشف عن وجود داء الشيكونجونيا متخفياً في صورة حمى الضنك في راولپندي.



**طرق البحث:** أُجريت دراسة بالملاحظة في جامعة راوالبيندي الطبية في الفترة من يوليو/ تموز وحتى ديسمبر/ كانون الأول 2017. ضمت الدراسة مرضى تظهر عليهم سمات سريرية توحى بإصابتهم بحمى الضنك، غير أن نتيجة اختبار فيروس الضنك 1NS لديهم جاءت سلبية، وجرى اختبارهم في المعهد الوطني للصحة في إسلام آباد، باكستان، ليان إصابتهم بداء الشيكونجونيا باستخدام اختبار التنسخ العكسي لتفاعل البوليميراز المتسلسل.

**النتائج:** أخضع الباحثون 129 مريضاً للاختبار وتبين أن 28 مريضاً كانوا إيجابيين لداء الشيكونجونيا. كان هناك 17 (7, 60%) رجلاً و 11 (3, 39%) امرأة، بمتوسط عمر 32, 53 عاماً (تراوحت الأعمار ما بين 16 و 60 عاماً). ولقد ظهرت أعراض الحمى على جميع المرضى. كما لوحظت سمات سريرية أخرى على المرضى، مثل الحمى، والارتعاشات، والتعب، والصداع، والألم العضلي، والألم المفصلي، والألم خلف مجرى العين، وألم البطن، والغثيان، والإسهال. ولم يُلاحظ وجود عقابيل أو أهبات نزفية طويلة الأمد، كما لم يُبلغ بوقوع وفيات.

**الاستنتاجات:** يعلن الباحثون عن أول حالة مؤكدة لداء الشيكونجونيا في راوالبيندي، باكستان.

## References

1. Chikungunya, 12 April 2017 [website]. World Health Organization; 2019 (<http://www.who.int/mediacentre/factsheets/fs327/en/>, accessed 3 December 2019).
2. Darwish MA, Hoogstraal H, Roberts TJ, Ahmed IP, Omar F A. A sero-epidemiological survey for certain arboviruses (Togaviridae) in Pakistan. *Trans R Soc Trop Med Hyg.* 1983;77(4):442–5. [http://dx.doi.org/10.1016/0035-9203\(83\)90106-2](http://dx.doi.org/10.1016/0035-9203(83)90106-2) PMID:6314612
3. Afzal MF, Naqvi SQ, Sultan MA, Hanif A. Chikungunya fever among children presenting with nonspecific febrile illness during an epidemic of dengue fever in Lahore, Pakistan. *Merit Res J Med Med Sci.* 2015 Mar;3(3):69–73. <http://www.meritresearchjournals.org/mms/index.htm>
4. Mallhi TH, Khan YH, Khan AH, Tanveer N, Qadir MI. First chikungunya outbreak in Pakistan: a trail of viral attacks. *New Microbes New Infect.* 2017 Jun 1;19:13–14. <http://dx.doi.org/10.1016/j.nmni.2017.05.008> PMID:28663798
5. Rauf M, Zahra F, Manzoor S, Mehmood A, Bhatti S. Outbreak of chikungunya in Pakistan. *Lancet Infect Dis.* 2017 Mar;17(3):258. [https://doi.org/10.1016/S1473-3099\(17\)30074-9](https://doi.org/10.1016/S1473-3099(17)30074-9)
6. Naqvi S, Bashir S, Rupareliya C, Shams A, Giyanwani PR, Ali Z. Clinical spectrum of chikungunya in Pakistan. *Cureus.* 2017 Jul 6;9(7):e1430. <http://dx.doi.org/10.7759/cureus.1430> PMID:28924518
7. Lo Presti A, Cella E, Angeletti S, Ciccozzi M. Molecular epidemiology, evolution and phylogeny of Chikungunya virus: an updating review. *Infect Genet Evol.* 2016 Jul;41:270–8. <http://dx.doi.org/10.1016/j.meegid.2016.04.006> PMID:27085290
8. Aamir UB, Badar N, Salman M, Ahmed M, Alam MM. Outbreaks of chikungunya in Pakistan. *Lancet Infect Dis.* 2017 May;17(5):483. [http://dx.doi.org/10.1016/S1473-3099\(17\)30191-3](http://dx.doi.org/10.1016/S1473-3099(17)30191-3) PMID:28447956
9. Wasif S. Chikungunya outbreak traced back to India. *The Express Tribune, Pakistan.* 26 December 2016 (<http://tribune.com.pk/story/1274991/no-preventive-measures-chikungunya-outbreak-traced-back-india/>, accessed 3 December 2019).
10. Rehman, S. Rising trend of vector-borne diseases in Pakistan reported: WHO. *Business Recorder.* 25 April 2014 (<https://www.brecorder.com/2014/04/25/169191/rising-trend-of-vector-borne-diseases-in-pakistan-reported-who/>, accessed 3 December 2019).
11. Weaver SC, Lecuit M. Chikungunya virus and the global spread of a mosquito-borne disease. *N Engl J Med.* 2015 Mar 26;372(13):1231–9. <http://dx.doi.org/10.1056/NEJMra1406035> PMID:25806915

# A comparison between the age patterns and rates of suicide in the Islamic Republic of Iran and Australia

John Snowdon,<sup>1</sup> Seyed Mehdi Saberi<sup>2</sup> and Ehsan Moazen-Zadeh<sup>3,4</sup>

<sup>1</sup>Sydney Medical School and Concord Hospital, Sydney, Australia (Correspondence to: John Snowdon: john.snowdon@health.nsw.gov.au). <sup>2</sup>Legal Medicine Research Centre, Legal Medicine Organization, Tehran, Islamic Republic of Iran. <sup>3</sup>Psychiatric Research Centre, Roozbeh Hospital and Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran. <sup>4</sup>Institute of Mental Health, Department of Psychiatry, University of British Columbia, Vancouver, Canada.

## Abstract

**Background:** When planning interventions aimed at preventing suicide, it is important to consider how socioeconomic and cultural factors may affect suicide rates. There has been variability in the accuracy of recording suicide deaths, leading to varying levels of underestimation. Social, cultural and religious elements affect whether deaths resulting from suicide are reported as such and those responsible for reporting a death may avoid providing information that would suggest the death was due to suicide.

**Aims:** The aim of this study was to document Iranian suicide patterns in 2006–2010 and 2011–2015, compare them with those in a “Western” country (Australia) and explore whether differences point to factors that affect suicide rates.

**Methods:** Data were obtained from Iranian and Australian national statistics offices.

**Results:** Peak Iranian male suicide rates were in young adulthood. There was a modest increase between the 2 quinquennials studied. Australian male rates were much higher, with age peaks in middle age and very late life. From age 30, the female rate was twice as high in Australia, graphs of the age patterns being relatively flat in both countries. Male:female ratios were 2.34 (Islamic Republic of Iran) and 3.25 (Australia).

**Conclusion:** The suicide rate in the Islamic Republic of Iran is low, as in most other predominantly Muslim countries. Higher rates in youth are of concern. A case–control psychological autopsy study comparing cases in Iran and Australia could help answer questions about suicide causation.

Key words: suicide rates, age patterns, Iran, Australia

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## Introduction

Asia is an ethnically and culturally diverse region, and patterns and rates of suicide vary considerably between countries and over time. When countries or regions are planning interventions aimed at preventing suicide, it is important to consider how socioeconomic and cultural factors may be affecting suicide rates (1).

A crucial challenge when studying suicide in Asia is to optimise the availability and accuracy of data used for monitoring and surveillance of cause of death. Some Asian nations provide no mortality statistics, but even among those that do, there has been variability in the accuracy of ascertainment and recording of suicide deaths, leading to varying levels of underestimation of rates of suicide. Social, cultural and religious elements affect whether deaths resulting from suicide are reported as such (2). In countries where suicide is deemed a criminal offence (3) or where the dominant religion dictates that suicide is a sin, or among populations where there is greater likelihood that suicide within a family will lead to stigmatization, those responsible for reporting a death may well want to avoid providing information that would suggest that the death was due to suicide.

Suicide data from the Islamic Republic of Iran have been provided by the World Health Organization (WHO) since at least 1991, but their accuracy has been questioned (4). Data on the annual number of deaths caused by suicide in each province have been published in reports from the Iranian Forensic Medicine Organization (IFMO), which is affiliated to the Judicial Authority. The IFMO has established a forensic medicine centre in the capital of each province, together with additional centres in remote areas. Deaths are referred to such centres either by family members or when the doctor responsible for issuing a death certificate suspects it might be a suicide case (and then is required to refer the case to the IFMO, which arranges an autopsy on all referred cases). The IFMO is reportedly the most reliable source of mortality data in the Islamic Republic of Iran (5). In the literature on suicide studies in Asia published between 2000 and early 2011, Chen et al. noted 92 articles from the Islamic Republic of Iran (2); among these and articles written since then were a number giving information about Iranian suicide rates and others that compared the suicide rates in the 31 Iranian provinces. Little has been written about Iranian age patterns of male and female suicide rates, and how they differ from patterns in other countries in or beyond Asia.

There is good reason to explore whether the rates and patterns of suicide in the Islamic Republic of Iran have changed in the last decade, and to examine how they differ from those reported from other jurisdictions. There is reason to think that there might be more similarities between the suicide patterns and rates in Muslim countries than those reported from non-Muslim Asian countries (3). Even more dissimilarity might be expected between rates and patterns of suicide in Muslim countries and in so-called “Western” nations.

The aims of the present study were: to document Iranian suicide rates (the most recent available) over the decade 2006–2015, using the Gregorian calendar, to compare rates and age patterns between 2006–2010 and 2011–2015, and to obtain and graph the age patterns of suicide rates in Australia for 2006–2010 and 2011–2015, thus allowing a comparison between age patterns in the Islamic Republic of Iran and a representative “Western” country and, using data reported in the literature about suicide rates in different Iranian provinces, and referring to the above-mentioned comparisons, to explore whether differences between provinces, between countries, and over time would point to factors that affect suicide rates, and thus allow exploration of interventions that might reduce suicide rates in particular populations.

## Methods

Information was obtained from the IFMO, regarding numbers of suicides in each year, in each 5-year age group from 10–14 years up to 80–84 and 85+ years, males and females separately. Iranian census figures were available for 2006, 2011 and 2016, and from these we estimated population figures for each 5-year age group, male and female, for each year (2006–2015). Thus, annual suicide mortality rates per 100 000 in each male and female 5-year age group could be calculated. We then calculated the average annual suicide rates during each 5-year period.

Comparable data on Australian male and female suicide rates across the age-range were available from work previously conducted in Australia (6), the information having been provided by the Australian Bureau of Statistics. The rates were graphed to show differences between patterns in 2006–2010 and 2011–2015. Comparisons could then be made between graphs of Iranian and Australian rates.

## Results

During 2006–2015, 25 387 males and 10 647 females were reported to have died by suicide in the Islamic Republic of Iran. The male suicide rate in 2006–2010 was 7.3 per 100 000 and in 2011–2015 it was 8.6. The corresponding female rates were, respectively, 3.1 and 3.7 per 100 000. The male:female ratio was 2.34, and the average annual suicide rate was about 5.7 per 100 000 individuals.

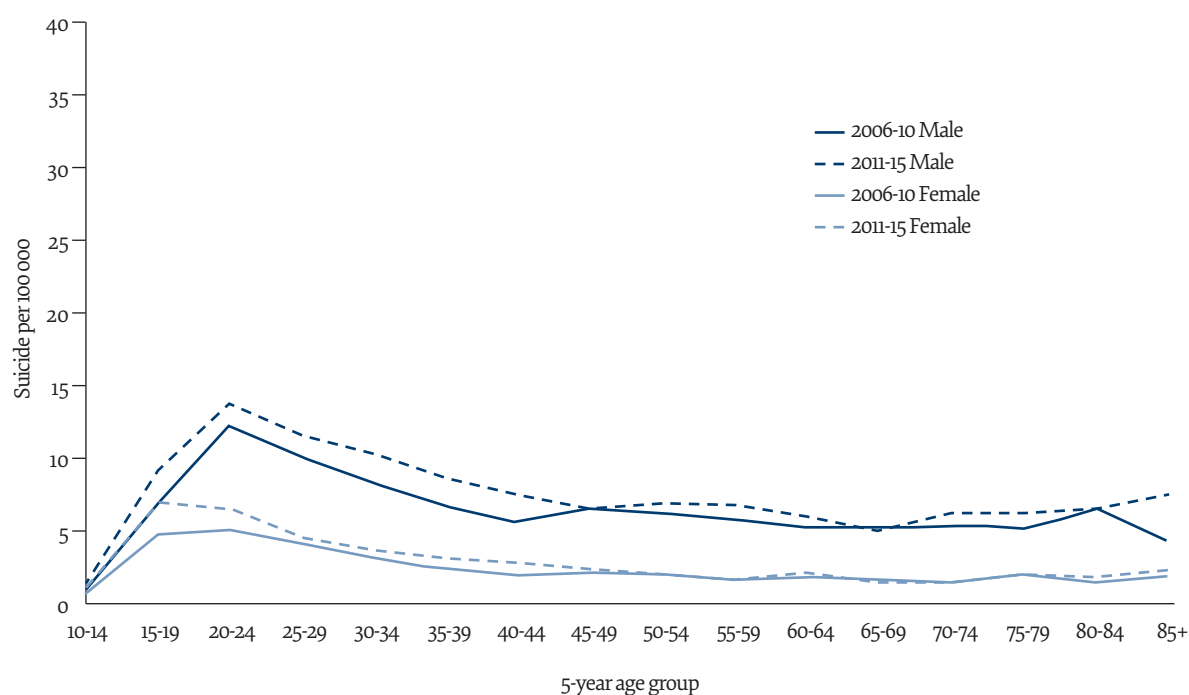
Iranian male rates were more than twice the female rates across the age-range, except at 10–14 years (Figure 1).

The male age pattern for suicide was downward-sloping in both 5-year periods, with peaks at 20–24 years. Male age groups 15–19 years and 40–44 years showed rates that were 20% higher on average in 2011–2015 than in 2006–2010. Older male age groups had suicide rates that were, on average, 14% higher in 2011–2015. Female age patterns for suicide were also downward-sloping, with peaks at age 20–24 years in 2006–10 and 15–19 years in 2011–15. The rate was 33% higher at age 15–24 years in the later quinquennium, with little difference between the 5-year periods at age 25–49 years, and a flat graph with almost no difference between 2006–2010 and 2011–2015 at 50 years and older.

Australian male and female suicide rates were higher than the corresponding Iranian rates except that at age 15–19 years in both time periods the female rates in Iran were higher than those in Australia (Figure 2). Australian male patterns were bimodal in both time periods, with middle-age peaks at age 35–39 years (26.4 per 100 000) in 2006–2010 and 40–44 years (27.1 per 100 000) in 2011–2015, troughs at age 65–69 years (15.7 and 16.8 per 100 000, respectively), and the highest peaks at age 85+ years (31.1 and 37.6 per 100 000, respectively). Suicide rates at age 40–59 years were somewhat higher during the later time period. Graphs of the Australian female age patterns appeared different to the corresponding Iranian patterns, apart from similarities at age 15–24 years: as in the Islamic Republic of Iran, the suicide rate at 15–24 years was higher during the later quinquennium (6.6 versus 4.7 per 100 000). The Australian female graphs showed plateaux at age 35–59 years, the rates averaging 7.2 and 8.2 per 100 000 in 2006–10 and 2011–2015, respectively. Rates were then somewhat lower at age 60 years and older, averaging 5.2 per 100 000, but with a rise at 80+ years to 6.2 per 100 000 in the later period. The male:female ratio was 3.25.

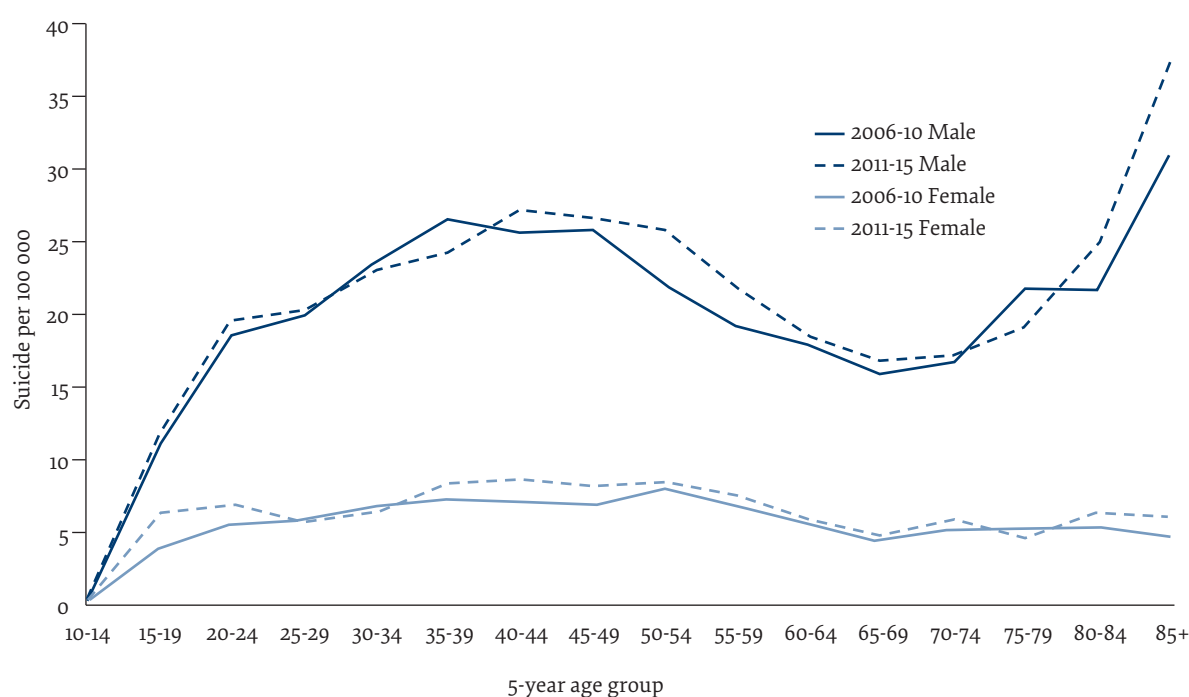
## Discussion

There has been a modest increase in the suicide rates of young males and females in the Islamic Republic of Iran during the last decade. Using the same database, others reported the sex ratio and overall suicide rates of males and females in 2006–2010, the data for that quinquennium were virtually (and unsurprisingly) identical to those reported in the present study (7). It is possible that the apparent increase has resulted from more assiduous reporting of suicides although the fact that the graph for suicides among females aged over 50 years remained unchanged over the decade counts against the possibility that improvements in reporting processes accounted for the change. Equally, increased middle age suicide rates in Australia over the decade are likely to be real rather than a result of improved data collection. It has been suggested that the increased Australian male middle age rate could be a cohort effect, the peak suicide rate having moved from age 20–29 years in the 1990s to age 40–49 years in 2009–2013 (6), but this did not apply in the Islamic Republic of Iran.

**Figure 1** Age patterns for male and female suicide rates in the Islamic Republic of Iran, 2006–2010 and 2011–2015

Graphs of age patterns of both male and female suicide rates in the Islamic Republic of Iran are downward-sloping, the male rate being over twice the female rate (Figure 1). Graphs of male suicide rates in Australia demonstrate a bimodal pattern, the highest peak being in late old age – markedly different from Iranian males (Figure 2). The Australian female age pattern also differs

from the corresponding Iranian pattern, the increase at age 30–39 years being similar in size to the decrease in the Iranian female rate between ages 25 and 39 years. The Australian age patterns and suicide rates are more like those recorded in the United States and other Western countries, supporting concepts of a “Western” pattern that differs from the East Asia pattern (2). The sex ratio

**Figure 2** Age patterns for male and female suicide rates in Australia, 2006–2010 and 2011–2015

is usually more than 2.5:1 in the West and less than 2.5:1 in East Asia; graphs of male and female age patterns in most East Asian nations with data available are upward-sloping (see 8). Western male suicide age patterns are generally bimodal while Western female patterns are commonly relatively flat or shallowly convex (8).

The Iranian patterns and rates differ in various respects from both Western and East Asian patterns. The sex ratio is < 2.5, unlike in English-speaking Western countries. Rates are low, though, with peaks in young adulthood in both sexes. There is little increase in Iranian suicide rates in late life (Figure 1), unlike in the majority of East Asian and Western countries. The higher suicide rate among Iranian youths (both male and female) is similar to the pattern seen in Sri Lanka in the 1980s, but the male (not the female) pattern in Sri Lanka changed to upward-sloping in the 1990s (9). Nepal has also had downward-sloping graphs but with higher rates among females in their twenties (10). In an Indian city of 2.4 million, where the suicide rate was 21.7 per 100 000 in 2013 with a sex ratio (males to females) of 2.5, 52% of suicides among females, but only 34% among males, were in the 15–29 years age group (11).

There is good evidence that suicide rates are lower among Muslim populations (12). Rezaeian reported data gathered in 2000 from countries of the Eastern Mediterranean Region (EMR), where Islam is the religion of about 90% of the population (13). Among those aged 15–19 years in low- or middle-income countries (including the Islamic Republic of Iran), the overall female rate was higher than the male rate (8.6 versus 7.6 per 100 000), but the suicide rate among males was higher and that among females was lower in older age groups. The Islamic Republic of Iran is an upper middle-income EMR country: in 2006–2015, the suicide rate of males aged 15–29 years was higher and that of females was lower than corresponding rates across the EMR in 2000. As shown in Figure 1, suicide rates of both sexes in the Islamic Republic of Iran have recently remained relatively low in later life. The graphs are downward-sloping. Similar age patterns of suicide are evident in Iraq (14). Data published by WHO ([www.emro.who.int/media/news/suicide-prevention-strategies.html](http://www.emro.who.int/media/news/suicide-prevention-strategies.html)) indicate that suicide rates in most of the 6 Asian EMR countries peak in young adulthood, as in the Islamic Republic of Iran, with downward-sloping graphs of age patterns (up to age 60), unlike graphs of suicide age patterns in East Asian and Western jurisdictions. On the same website, WHO has bemoaned the lack of good quality suicide registration data, one consequence of this being the paucity of published graphs or tables that show age patterns of suicide in EMR countries.

It is relevant to note that the commonest method of suicide used by females in the Islamic Republic of Iran is self-immolation. Shojaei et al. reported that in 2006–2010, 1814 (39%) of the 4656 females dying by suicide burned themselves to death while 1290 (28%) hanged themselves (15). A majority of people who die by self-immolation in the EMR are reported to be married

females aged 15–30 years, who use this method to show their anger and get revenge on their families (16). Commenting on factors relevant to self-immolation in Kermanshah, Rostami et al. also referred to adjustment disorders, cultural attitudes and Kurdish ethnicity (17).

Having noted the relatively low rate of suicide in the Islamic Republic of Iran it is important to draw attention to a marked variation between rates in the 31 provinces (just as there can be variation in rates between different states in other countries). Kiadalari et al. reported rates per 100 000 in 2006–2010 of 19.53 (Ilam), 13.74 (Kermanshah), 10.64 (Lorestan) and 9.59 (Hamedan), ranging down to 2.21 (Hormozgan), and recognised an inverse association between the social rank of the province and suicide mortality (5). They noted that the 4 western provinces had the highest suicide mortality rates. They are close to, or border on, Iraq. The 4 provinces have the highest unemployment rates, but are also said to have cultural issues such as the tribal structure of communities and extreme fanaticism (5). Rostami et al. drew attention to the heterogeneity of suicide mortality within Kermanshah, and commented on sociocultural transformation in the province, which intensified the conflicts between traditions and modernity (18).

The major potential limitation regarding conclusions from this study is the likelihood that in many countries, some more than others, suicide is under-reported in official national statistics (3). In Western countries it is thought common for “open or misadventure” verdicts to be pronounced by coroners (or their equivalent) trying to protect families from distress in cases of suicide. Deaths given such verdicts were categorised by WHO as “other violent deaths” (OVD) in the 9th revision of the International Classification of Mental and Behavioural Disorders (ICD-9) and due to “other external causes” (OEC) in ICD-10. British suicide researchers commonly combine data on suicide and OVD/OEC cases in epidemiological studies of suicide. The ratio of suicide to OVD cases reported in Britain in 1998–2000 was 1:0.47, but the OVD rates in the Islamic Republic of Iran and other Middle Eastern Islamic countries were much higher: the ratio in Iranian cities was reported as 1 suicide to 7.3 OVDs (3). OVD rates were higher among males in every age-band. Pritchard and Amanullah declared that “the possibility that OVD/OEC might be the depository of culturally unacceptable deaths seems a reasonable assumption to make” (3). This research dates from well over a decade ago and much may have changed since then, but there is good reason to examine recent OEC data and to conduct studies to compare what proportion of such cases (in the Islamic Republic of Iran and elsewhere) might have been suicides.

## Conclusion

Male and female suicide rates in the Islamic Republic of Iran are relatively low, as in most other predominantly Muslim countries. However, higher rates of suicide in youth and in the western provinces give cause for



concern. There is good reason to ponder differences between Western, East Asian and Iranian rates and patterns of suicide in order to identify associated factors that might account for those differences. What protective factors could account for low suicide rates among older Iranians? How have socioeconomic factors affected suicide rates in youth, middle age and the western provinces? How have cultural factors affected choice of suicide method and the age at which the methods are most commonly used?

Researchers in the Islamic Republic of Iran have stated that “social problems and frustration are the causes of most suicides” (19), whereas in Western countries suicidologists have appeared more likely to put emphasis on there being an underlying mental disorder in cases of suicide (20). Goldney commented that “there may be a base rate of suicide predominantly related to psychiatric factors, with the marked variations observed between, and also within, different countries due to diverse psycho-social stressors” (21).

A comparison of factors contributing to, or protective against, self-killing in the Islamic Republic of Iran versus

a Western country such as Australia (and maybe an East Asian jurisdiction) could help identify the varying reasons and circumstances that lead to suicide. A case-control psychological autopsy study (none having been previously conducted in the Islamic Republic of Iran) – comparing data obtained from unselected series of suicide cases and controls in the Islamic Republic of Iran and Australia, using a protocol similar to that used in a large study in China (22) but ensuring compatibility between translations of the schedule of items addressed in the 2 countries – could help answer vital questions about why people kill themselves, and how best to prevent suicide. For example, is there evidence that people in the Islamic Republic of Iran and in Australia who died by suicide were equally likely to have suffered from psychotic and/or melancholic depression at some time? Is there a difference between the percentages of suicides in the Islamic Republic of Iran and Australia that are preceded by life-events or situations that lower self-esteem or cause distress? Are there different percentages of stressful crises in the 2 weeks prior to suicide in the 2 countries?

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**Competing interests:** None declared.

## Comparaison entre les schémas d'âge et les taux de suicide en République islamique d'Iran et en Australie

### Résumé

**Contexte :** Lors de la planification d'interventions visant à prévenir le suicide, il est important de prendre en compte l'incidence des facteurs socio-économiques et culturels sur les taux de ce phénomène. La précision de l'enregistrement des décès par suicide n'est pas partout la même, menant ainsi à des niveaux variables de sous-estimation. Les éléments sociaux, culturels et religieux déterminent si les décès par suicide sont notifiés en tant que tels. De plus, les responsables de la notification d'un décès pourraient éviter de fournir des informations qui suggèrent que le décès est dû au suicide.

**Objectifs :** La présente étude visait à rendre compte des schémas de suicide iraniens entre 2006 et 2010 et entre 2011 et 2015, à les comparer à ceux d'un pays dit « industrialisé » (l'Australie) et à étudier si les différences étaient indicatives de facteurs influençant les taux de suicide.

**Méthodes :** Les données ont été obtenues auprès des bureaux des statistiques nationaux iraniens et australiens.

**Résultats :** Les plus forts taux de suicide chez les hommes iraniens concernaient le jeune âge adulte. Une légère augmentation a été constatée entre les deux périodes quinquennales étudiées. Les taux de suicide masculin en Australie étaient bien plus élevés, avec des pics à des âges moyens et avancés. Le taux de suicide des femmes à partir de 30 ans était deux fois plus élevé en Australie, les graphiques des schémas d'âge étant relativement stables dans les deux pays. Les ratios homme-femme étaient de 2,34 (République islamique d'Iran) et de 3,25 (Australie).

**Conclusions :** Le taux de suicide en République islamique d'Iran est faible, comme dans la plupart des autres pays principalement musulmans. Les taux élevés constatés chez les jeunes sont préoccupants. Une étude cas-témoin selon la méthode de l'autopsie psychologique comparant des cas en République islamique d'Iran et en Australie pourrait aider à répondre aux questions sur les causes du suicide.

## مقارنة بين الأنماط العمرية ومعدلات الانتحار في جمهورية إيران الإسلامية وأستراليا

جان سنودن، سيد صابري، إحسان مؤذن زاده

### الخلاصة

الخلفية: عند تخطيط التدخلات الرامية إلى الوقاية من الانتحار، يكون من المهم أن نضع في الحسبان إمكانية تأثير العوامل الاجتماعية والاقتصادية والثقافية على معدلات الانتحار. ولطالما اتسم تسجيل الوفيات الناجمة عن الانتحار بالتباين، الأمر الذي يؤدي تبعاً إلى تباين مستويات تقييم هذا الأمر على نحو يخالف الحقيقة. وتؤثر العوامل الاجتماعية والثقافية والدينية على ما إذا كان التبليغ بالوفيات الناجمة عن الانتحار منطوقاً على الإفصاح عن سبب الوفاة، وما إذا كان المسؤولون عن التبليغ يتجنبون تقديم معلومات قد توحي بأن الوفاة ناجمة عن الانتحار.

الأهداف: هدفت هذه الدراسة إلى تسجيل أنماط الانتحار في إيران في الفترة من 2006 وحتى 2010 ومن 2011 وحتى 2015، ومقارنتها بمثيلتها في بلد «غربي» (أستراليا)، والكشف عما إذا كانت الاختلافات تشير إلى وجود عوامل مؤثرة على معدلات الانتحار.

طرق البحث: أُخذت البيانات من المكاتب الإحصائية الوطنية الإيرانية والأسترالية.

النتائج: بلغت معدلات الانتحار في إيران ذروتها في وقت مبكر من مرحلة البلوغ. وحدثت زيادة طفيفة في الفترة الفاصلة بين الدراستين الخمسينيتين. في حين كانت معدلات الانتحار في أستراليا أعلى بكثير في صفوف الذكور، وارتفعت بنسبة كبيرة في فترة منتصف العمر والمرحلة المتأخرة للغاية من العمر. وبدءاً من سن الثلاثين، أصبح معدل الإناث أعلى بمرتين في أستراليا، بينما تظهر الرسوم البيانية للأنماط العمرية ثباتاً نسبياً في كلا البلدين. وكانت نسبة الذكور إلى الإناث 2,34 (جمهورية إيران الإسلامية) و 3,25 (أستراليا).

الاستنتاج: إن معدل الانتحار في جمهورية إيران الإسلامية منخفض، كما هو الحال في بقية البلدان ذات الأغلبية المسلمة. غير أن وجود معدلات انتحار أعلى في صفوف الشباب كفيل بإثارة القلق. ومن الممكن أن يساعد إجراء دراسة حالات فردية مقترنة بحالات ضابطة وتحليل نفسي بغرض مقارنة الحالات في كل من جمهورية إيران الإسلامية وأستراليا في الرد على التساؤلات بشأن الأسباب التي تقف وراء الانتحار.

## References

1. Wei KC, Chua HC. Suicide in Asia. *Int Rev Psychiatry*. 2008 Oct;20(5):434–40. doi:10.1080/09540260802397446
2. Chen YY, Wu KC, Yousuf S, Yip PS. Suicide in Asia: opportunities and challenges. *Epidemiol Rev*. 2012;34:129–44. doi:10.1093/epi-rev/mxr025
3. Pritchard C, Amanullah S. An analysis of suicide and undetermined deaths in 17 predominantly Islamic countries contrasted with the UK. *Psychol Med*. 2007;37(3):421–30. doi:10.1017/S0033291706009159
4. Hassanian-Moghaddam H, Zamani N. Suicide in Iran: the facts and the figures from nationwide reports. *Iran J Psychiatry*. 2017;12(1):73–7. PMID:28496505
5. Kiadilari AA, Saadat S, Shahnnavazi H, Haghparsat-Bidgoli H. Overall, gender and social inequalities in suicide mortality in Iran, 2006–2010: a time trend province-level study. *BMJ Open*. 2014 Aug 19;4(8):e005227. doi:10.1136/bmjopen-2014-005227
6. Snowden J. Should the recently reported increase in Australian suicide rates alarm us? *Aust N Z J Psychiatry*. 2017 Aug;51(8):766–9. doi:10.1177/0004867416681855
7. Shojaei A, Moradi S, Alaeddini F, Abdizadeh A, Khademi A. Evaluating the temporal trend of completed suicides referred to the Iranian Forensic Medicine Organization during 2006–2010. *J Forensic Leg Med*. 2016 Apr;39:104–8. doi:10.1016/j.jflm.2015.09.022
8. Snowden J, Chen Y-Y, Zhong B, Yamauchi T. A longitudinal comparison of age patterns and rates of suicide in Hong Kong, Taiwan and Japan and two Western countries. *Asian J Psychiatr*. 2018 Jan;31:15–20. doi:10.1016/j.ajp.2017.11.020
9. Knipe DW, Metcalfe C, Fernando R, Pearson M, Konradsen F, Eddleston M, et al. Suicide in Sri Lanka 1975–2012: age, period and cohort analysis of police and hospital data. *BMC Public Health*. 2014 Aug 13;14:839. doi:10.1186/1471-2458-14-839
10. Hagaman AK, Khadka S, Lohani S, Kohrt B. Suicide in Nepal: a modified psychological autopsy investigation from randomly selected police cases between 2013 and 2015. *Soc Psychiatry Psychiatr Epidemiol*. 2017 Dec;52(12):1483–94. doi:10.1007/s00127-017-1433-6
11. Badiye A, Kapoor N, Ahmed S. An empirical analysis of suicidal death trends in India: a 5 year retrospective study. *J Forensic Leg Med*. 2014 Oct;27:29–34. doi:10.1016/j.jflm.2014.07.007
12. Lester D. Suicide and Islam. *Arch Suicide Res*. 2006;10(1):77–97. doi:10.1080/1381110500318489
13. Rezaeian M. Age and sex suicide rates in the Eastern Mediterranean Region based on global burden of disease estimates for 2000. *East Mediterr Health J*. 2007 Jul–Aug;13(4):953–60. PMID:17955778
14. Abbas MJ, Alhemiary N, Razaq EA, Naosh S, Appleby L. The Iraqi national study of suicide: report on suicide data in Iraq in 2015 and 2016. *J Affect Disord*. 2018 Mar 15;229:56–62. doi:10.1016/j.jad.2017.12.037
15. Shojaei A, Moradi S, Alaeddini F, Khodadoost M, Barzegar A, Khademi A. Association between suicide method, and gender, age, and education level in Iran over 2006–2010. *Asia Pac Psychiatry*. 2014 Mar;6(1):18–22. doi:10.1111/appy.12097

16. Morovatdar N, Moradi-Lakeh, Malakouti SK, Nojomi M. Most common methods of suicide in Eastern Mediterranean Region of WHO: a systematic review and meta-analysis. *Arch Suicide Res.* 2013;17(4):335–44. doi:10.1080/13811118.2013.801811
17. Rostami M, Jalilian A, Rezaei-Zangeneh R, Salari A. Factors associated with the choice of suicide method in Kermanshah Province, Iran. *Ann Saudi Med.* 2016 Jan–Feb;36(1):7–16. doi:10.5144/0256-4947.2016.7
18. Rostami M, Jalilian A, Ghasemi S, Kamali A. Suicide mortality risk in Kermanshah province, Iran: a county-level spatial analysis. *Epidemiol Biostatist Public Health.* 2016;13(3):e11829-1–7. doi:10.2427/11829
19. Najafi F, Hasanzadeh J, Moradinazar M, Faramarzi H, Nematollahi A. An epidemiological survey of the suicide incidence trends in the Southwest Iran: 2004–2009. *Int J Health Policy Manag.* 2013 Sep 9;1(3):219–22. doi:10.15171/ijhpm.2013.40
20. Haw C, Hawton K. Suicide is a complex behaviour in which mental disorder usually plays a central role. *Aust N Z J Psychiatry.* 2015 Jan;49(1):13–5. doi:10.1177/0004867414555419
21. Goldney RD. The importance of mental disorders in suicide. *Aust N Z J Psychiatry.* 2015 Jan;49(1):21–3. doi:10.1177/0004867414549200
22. Phillips MR, Yang G, Zhang Y, Wang L, Ji H, Zhou M. Risk factors for suicide in China: a national case–control psychological autopsy study. *Lancet.* 2002 Nov 30;360(9347):1728–36. doi:10.1016/S0140-6736(02)11681-3

# Guide for implementing the humanitarian–development–peace nexus (HDPNx) for health<sup>1</sup>

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## Introduction

Regional conflicts, often compounded by climate-related shocks, are more frequent and contribute to a cycle of vulnerability for populations in the Eastern Mediterranean Region (1). Therefore, sustainable development and durable solutions to displacement are not possible without peace (1). To reflect this understanding, the concept of a 'humanitarian-development nexus', or a 'humanitarian-development-peace nexus' has been developed. Such nexus focuses on the work needed to coherently address people's vulnerability before, during and after crises (1,2).

As a reflection on this in its relation to public health, a three-day expert consultation to discuss a draft guide for implementing the humanitarian–development–peace nexus (HDPNx) for health was held by the WHO Regional Office for the Eastern Mediterranean during 10–12 February 2020 in Cairo, Egypt (3).

The overall objective of the consultation was to refine the draft guide, based on contributions from participants. This required bringing key actors and stakeholders together to:

- exchange their knowledge and experience of implementing the HDPNx for health, including challenges, lessons learned and pragmatic or creative solutions;
- discuss and review components of the guide, including objectives, guiding principles and elements that are important for the implementation of the HDPNx; and
- discuss how to operationalize the HDPNx approach for health, particularly with regards to: leveraging each actor's comparative advantage and working within a multi-year timeframe; the key steps, activities and best practice recommendations for undertaking joint assessment, deciding on priority actions and collective outcomes; coordinating, financing, implementing, and monitoring and evaluating activities; and the roles and responsibilities of different actors and stakeholders.

The meeting was attended by over 45 regional and international experts, including officials from sister United Nations (UN) agencies, representatives of humanitarian organizations, development partners and donors, academics from Lebanon, Netherlands, Qatar, United Kingdom and United States of America, as well

as senior WHO staff from the Regional Office for the Eastern Mediterranean, Cairo, Egypt, WHO headquarters, Geneva, Switzerland, and country offices in the Region.

## Summary of discussions

The first day of the meeting comprised presentations by WHO representatives and senior WHO staff on the background context, current situation and needs in eight countries experiencing emergencies in the Region, followed by a question and answer session. The second day started with presentations by partner organizations on non-health sectors' HDPNx initiatives from the Region and beyond, and continued with plenary discussions on the different components of the guide, which continued into the third day of the consultation. The last session was dedicated to discussing the way forward and how to support countries in implementing the HDPNx for health. The key points raised during the meeting are summarized below.

## Recommendations

### To WHO

- Ensuring that HDPNx implementation begins with a context analysis, which includes an analysis of the political economy and power dynamics among the different actors and stakeholders.
- Linking the Common Country Analysis and Humanitarian Needs Overview, and ensuring the results are reflected in both the Humanitarian Response Plan and the UN Sustainable Development Framework.
- Contributing to building the capacity of national systems when carrying out nexus activities.
- Linking health assessment, planning and programming to a conflict analysis and addressing root causes.
- Engaging the community to be accountable, including youth engagement.
- Engaging in and promoting multisectoral action to improve the sustainability and effectiveness of interventions.
- Finding ways of bringing non-traditional donors onboard to improve funding for the nexus. This could include the private sector and other novel funding sources.

<sup>1</sup> This report is based on the Summary Report on the Expert meeting on the guide for implementing the humanitarian–development–peace nexus (HDPNx) for health, 10–12 February 2020, Cairo, Egypt (<https://applications.emro.who.int/docs/EMEHSo02E.pdf?ua=1&ua=1>).

**To Member States**

- Developing a framework or tool for a joint country assessment, or one which can be used to consolidate the results of assessments by different actors.
- Developing a planning template that is broad and flexible enough to be used in joint planning or that can aggregate the results of multiple assessments for joint planning.
- Strengthening the section on monitoring and evaluation by developing a monitoring and evaluation implementation plan that separates monitoring from evaluation.
- Addressing the importance of data sensitivity and the politicization of data, and how this can impact on peace, in the section on conflict analysis.
- Developing a plan for disseminating the guide among the different actors and stakeholders.

**References**

1. Oxfam. The humanitarian-development-peace nexus: what does it mean for multi-mandated organizations? Oxfam Discussion Paper June 2019 (<https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620820/dp-humanitarian-development-peace-nexus-260619-en.pdf?sequence=1>).
2. World Health Organization. The new way of working: strengthening the Humanitarian, Development & Peace Nexus. Geneva: World Health Organization; 2019 (<http://origin.who.int/health-cluster/about/structure/HDN-concept.pdf>).
3. World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). Summary Report on the Expert meeting on the guide for implementing the humanitarian–development–peace nexus (HDPNx) for health. Cairo: WHO/EMRO; 2020 (<https://applications.emro.who.int/docs/EMEHS002E.pdf?ua=1&ua=1>).



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## Correspondence

*Editor-in-chief*

Eastern Mediterranean Health Journal  
WHO Regional Office for the Eastern Mediterranean  
P.O. Box 7608  
Nasr City, Cairo 11371  
Egypt  
Tel: (+202) 2276 5000  
Fax: (+202) 2670 2492/(+202) 2670 2494  
Email: emrgoemhj@who.int

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