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From working in emergency to working for peace: leveraging health to build peace in the Eastern Mediterranean Region

Ahmed Al-Mandhari,1 Maha El-Adawy,2 Zahra Ahmed3 and Rana Hajjeh4

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The World Health Organization has noted the important synergies between health and peace since its very inception, both in its foundational document and in its work globally. The WHO Constitution remarks that the “health of all peoples is fundamental to the attainment of peace and security and is dependent on the fullest co-operation of individuals and States.” (1) In addition, peace is noted as being one of the fundamental conditions to promote health in the Ottawa Charter for Health Promotion in 1986 (2). The Eastern Mediterranean Region (EMR) has been contending with the challenges borne of conflict and insecurity for decades. Currently, nine out of the 22 countries and territories in the Eastern Mediterranean Region are represented in the World Bank’s List of Fragile and Conflict Affected States (3) ranging from acute conflict to high institutional fragility.

These conflicts have resulted in large scale migration within and between member states. The Region is home to 66% of the world’s refugees and the number of internally displaced persons (IDPs) has continued to rise in recent years, amounting to 45% of the world’s total in 2020 (4) with the numbers expected to rise. These conflicts not only impact individuals’ health, safety and wellbeing but also weaken health systems as well as other systems that have direct or indirect impact on health and threaten to reverse the recent progress on health indicators and life expectancy in the Region. In April 2019, the Region convened a meeting to explore ways of understanding and addressing the determinants of health. Conflicts and their consequences were identified as major challenges to achieving “health for all by all” which is the goal of the EMR Vision 2023. Peace was identified as a major determinant of health in the Health for Peace (HOPE) initiative, linking SDG 16 and SDG 3. Historically, the notion of “health as a bridge for peace” was part of the work of WHO Pan American Health Organization (PAHO) in conflict affected and post-conflict settings, developing programmes that would provide both health and peace outcomes. In addition to negotiating access to vulnerable populations through ceasefires to provide essential services such as routine immunization, subsequent work expanded to the European region in the 1990s and included advocacy on peace and human rights (5). Previous examples of health for peace work in the EMR included “days of tranquillity” to negotiate access to vaccination campaigns in Afghanistan, Somalia, Sudan and Syria; national health policy reform and trust building in vulnerable communities in Tunisia (5); mental health and psychosocial support provision in Somalia (6).

The Health for Peace Initiative started in 2019 in the Eastern Mediterranean Region in partnership with the Ministry of Health of the Sultanate of Oman and the Government of Switzerland. Since the launch, several activities took place during the past two years aiming to sensitize national and regional stakeholders on the key concepts of the health for peace agenda. Capacity building efforts have focused on providing training on negotiation skills and conflict analysis to guide and inform their work in emergencies and conflicts. An online course to enhance the understanding of health for peace and its aims was developed. Additionally, since 2019, high-level consultations have been convened, both regionally and globally, to discuss the central role of the health sector in peace building, global health security and addressing the impact of the crises including the ongoing COVID-19 pandemic (7).

The regional HOPE initiative has evolved into the Global Health for Peace Initiative (GHPI) in 2021, benefiting from the knowledge, history, and experience of all WHO Regions, aiming at better health and well-being for all and ensuring equity in access to healthcare services, while facing challenges resulting from conflict, insecurity, instability, displacement, and migration. The GHPI was an agenda item in the 150th WHO Executive Board resulting in a decision to begin a consultative process with member states and observers on possibilities for implementation and the development of a road map for the initiative (8). The Initiative “involves WHO building on its technical competencies, legitimacy, relationships and convening power in health to develop innovative ways to address conflict, strengthen resilience to violence and empower people to (re)build peaceful relations with each other” (9).

The GHPI recognizes the importance of fostering and promoting peace across multiple levels: Track 1 – health dialogue and diplomacy through dialogue and engagement with international stakeholders and international bodies both at regional and global level; Track 2 – engaging actors within and beyond the health
sector such as civil society organisations, academia, non-governmental organisations, and activists and; Track 3 – community resilience and health with community-based efforts that build social cohesion and trust and promote intercommunity dialogue (5). Addressing peace building across all tracks contributes to lasting political peace. In conclusion, the work proposed both in the HOPE and the Global Health for Peace Initiatives is one that allows the health sector to address one of the major structural determinants that impact the health and wellbeing of millions of vulnerable people in the Region. It shifts the focus of the health sector from ‘working in emergency’ and merely responding to crisis to ‘working for peace’ and addressing the determinants of conflict where possible. The Initiative plans to conduct this important work by building partnerships with stakeholders, at all levels, while zooming on the role of the communities in its actions. Health should always be presented as an ultimate goal with mutual benefits for all partners and the health sector has an opportunity to position itself as a major stakeholder in building social cohesion, building trust, and promoting lasting peace through conflict-sensitive and peace-responsive programming guided by the core principles of equity, inclusiveness, participation and local ownership at community level.

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Clinical and epidemiological characteristics of the first 150 patients with COVID-19 in Lebanon: a prospective descriptive study

Mahmoud Hassoun, Layal Alaywan, Habib Jaafouri, Rita Feghali, Jida Al-Mulki, Faraj Radi, Mohamad Ramadan and Pierre Hanna

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Abstract

Background: Clinical features of confirmed COVID-19 cases cover a wide spectrum.

Aims: To study the clinical, radiological and virological features of the first 150 patients with COVID-19 in Lebanon.

Methods: Our university hospital was designated as the primary COVID-19 care centre in Lebanon. Between 21 February 2020, the date of the first confirmed case of COVID-19 in Lebanon, and 3 April 2020, our team treated 150 patients diagnosed with COVID-19. In this prospective descriptive study, we present our experience in treating these patients, specifically the diagnostic criteria, outcome, and demographic, clinical, radiological and biological characteristics.

Results: Ninety-five (63.33%) of the patients were male and 55 (36.67%) were female. Most patients (58%) were aged > 50 years, and 8 (5.33%) were healthcare workers. Diagnosis was based on reverse transcription polymerase chain reaction, and patients were classified as mild, moderate or critical. Fifteen (10%) patients had a critical presentation and fever was the most prominent symptom at presentation. One hundred and thirty-eight (92%) patients underwent radiological evaluation. The most common laboratory findings were lymphocytopenia (34.38%), followed by neutropenia (28.13%), but leukocytosis was not prevalent (1.56%). Old age and comorbidity were significant indicators in patient risk stratification. Chest computed tomography was an invaluable method of diagnosis and management. Our radiological findings were consistent with the published literature.

Conclusion: Our study underlines the variable presentation of COVID-19, the difference in severity, and the diverse methods of diagnosis. This suggests the need for a tailored approach, taking into consideration the wide spectrum of presentation.

Keywords: COVID-19, epidemiology, Lebanon, diagnosis, treatment

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Introduction

In December 2019, in Hunan, China, 4 cases that fulfilled the definition of pneumonia of unknown etiology were detected (1). On 31 December 2019, the Chinese Government formally announced the outbreak, and the virus was rapidly isolated and sequenced, and identified as a new type of coronavirus. It was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causing coronavirus disease 2019 (COVID-19) (2,3). Thereafter, person-to-person transmission was officially confirmed (4,5). On 30 January 2020, after spreading to other countries, the World Health Organization (WHO) declared it a Public Health Event of International Concern. The exceptional situation created by COVID-19, which was declared a pandemic by WHO on 11 March 2020 (6), led to the designation of our university hospital as the primary COVID-19 care centre in Lebanon. COVID-19 is an emerging disease that has presented a global challenge which has overwhelmed healthcare institutions worldwide (7,8).

Clinical features of confirmed cases of COVID-19 vary over a wide spectrum, including asymptomatic infection, mild upper respiratory tract illness, lower respiratory tract illness with fever, dry cough, and dyspnoea, neurological symptoms, gastrointestinal symptoms (mainly diarrhoea), and severe viral pneumonia with respiratory failure, multisystem inflammatory syndrome, thromboembolism, and even death (1,5,9).

In this study, we investigated the different characteristics of the first 150 COVID-19 patients in Lebanon, including the diagnostic criteria, outcome, demographics, and clinical, radiological and biological characteristics. Given the novelty and impact of SARS-CoV-2, this study provides an important insight locally, regionally and globally, on the treatment trends of a large university hospital serving as the primary coronavirus response centre in Lebanon.

Methods

Study design

This prospective descriptive study was conducted at Rafik Hariri University Hospital (RHUH), Beirut, Lebanon. We
included the first 150 patients diagnosed with COVID-19 in Lebanon between 21 February and 3 April 2020, as well as a few sporadic cases in other hospitals. Institutional Review Board approval was obtained, and all medical, social and ethical considerations were respected.

During the study period, as the country was not in the community spread phase of the disease, patients with a travel history to endemic regions, contacts of confirmed COVID-19 cases, or symptomatic patients were all screened using reverse transcription polymerase chain reaction (RT-PCR) of nasopharyngeal swab, oropharyngeal swab or sputum specimen. A positive RT-PCR test implied a confirmed diagnosis of COVID-19. A total of 5088 patients were tested for COVID-19 during the period. Criteria for inclusion in the study were based on a positive diagnosis of COVID-19, as per WHO guidelines (10). We excluded patients who had negative RT-PCR test.

All included patients were admitted to RHUH and classified as mild, moderate, severe or critical, according to the severity criteria outlined below. No healthcare, administrative, medical, paramedical, maintenance or environmental service staff at the hospital tested positive for COVID-19 during the of the study.

Severity criteria
Clinical severity was stratified as follows: (i) asymptomatic: no symptoms; (ii) mild: upper respiratory symptoms with no imaging abnormalities; (iii) moderate: symptoms defined by 2 of dyspnoea, cough and temperature > 38°C, with imaging abnormalities; and (iv) severe/critical: O₂ saturation ≤ 93%, respiratory rate ≥ 30 breaths per minute and ratio of arterial oxygen partial pressure to fractional inspired oxygen ≤ 300 mmHg. Patients in the asymptomatic/mild/moderate categories were admitted to the regular isolation wards. Patients with the severe and critical forms were admitted to the COVID-19 intensive care unit (ICU).

Discharge criteria
Based on WHO recommendations, cured status was conditional on 2 consecutive negative RT-PCR tests 24 hours apart, or in patients with total resolution of symptoms and findings. All patients were discharged on the condition of home quarantine until RT-PCR conversion took place.

Data collection
Data was collected prospectively. Several demographic, biological, clinical and radiological characteristics were assessed, as well as the clinical course and outcome. Our data collection took into consideration the WHO/International Severe Acute Respiratory and Emerging Infection (ISARIC) Consortium case record form for severe acute respiratory infections (11). All patients’ names were removed and coded to protect their privacy. All data were checked by 2 physicians and analysed by a statistician and a physician.

Laboratory testing
Upper (nasopharyngeal swabs) and lower (when possible) respiratory tract samples for SARS-CoV-2 diagnostic testing were obtained according to WHO guidelines from all patients at admission and maintained in a viral-transport medium (12). Samples were immediately transported to the laboratory where procedures for RNA extraction and real-time RT-PCR using the Charité protocol were conducted (13). For each patient, samples were obtained upon admission, and subsequently once every 2 or 3 days until they were discharged or died. Viral RNA was extracted manually from 140 μl of nasopharyngeal swab fluid, sputum or both, using the QIAamp Viral RNA Mini kit (Qiagen, Hilden, Germany). Automatic extraction was performed using the MagNA Pure Compact (Roche, Basel, Switzerland) with 200 μl as the primary sample volume. An RT-PCR corresponding to the Charité protocol (published on 17 January 2020) was used for detection of SARS-CoV-2 (13). The assay uses a first-line screening with the E gene and a confirmatory assay with the RdRp gene and a synthetic RNA positive control. A 25-μl reaction was set up containing 5 μl RNA, 12.5 μl 2 reaction buffer provided with the Superscript III One Step RT-PCR system, with Platinum Taq Polymerase (Invitrogen, Carlsbad, CA, USA), 1 μl reverse transcriptase/Taq mixture from the kit, and 0.4 μl 50 mM magnesium sulphate solution.

Thermal cycling was performed at 55°C for 10 minutes for reverse transcription, followed by 95°C for 3 minutes, and then 45 cycles of 95°C for 15 seconds, 58°C for 30 seconds, using an ABI 7500 instrument (Thermo Fisher Scientific, Waltham, MA, USA).

Although the laboratory parameters were assigned, for the first 22 patients who were all categorized as mild or asymptomatic, no blood workup was taken. As the cases became more heterogeneous in presentation, it was decided that all subsequent patients would undergo routine blood examinations. The recorded parameters included a complete blood count with differential, electrolytes, blood urea nitrogen, creatinine and C-reactive protein (CRP). Other types of laboratory workup were taken in specific cases, but not included in the overall design of this study.

Radiology
For the first 24 patients, who were all categorized as asymptomatic or mild, and included paediatric patients, chest X-ray was the radiological procedure of choice, with plain chest computed tomography (CT) reserved for the more severe cases. As the cases became more heterogeneous in presentation, and after including the added benefits of chest CT imaging, it was decided that all subsequent patients would undergo plain chest CT. Chest X-ray and CT findings were interpreted by our team and confirmed by the radiology team. The parameters taken into consideration were ground glass appearance, lobe predominance, and diffuse consolidation.
Statistical analysis
In total, 122 parameters were collected, analysed and classified according to epidemiological factors, demographics, medical history, clinical findings and factors, course of hospitalization, laboratory findings, simple radiography and CT findings, complications, supportive treatment, medications, outcome, and time to conversion. For categorical data, number and valid percentage were calculated. For continuous data, the mean and standard deviation were measured. The statistical calculations were performed using SPSS version 20.

Results

RT-PCR
All patients were diagnosed based on RT-PCR testing of nasopharyngeal and oropharyngeal swabs. RT-PCR using the E Gene assay was used on 146 specimens, while RT-PCR using RdRP assay was used on 104 specimens.

Demographics and epidemiological factors
Most patients were male (95; 63%), of Middle-Eastern origin (143; 95%) and with a mean age of 45 (5–86) years. Around 42% of the patients were aged < 39 years, 17% 40–49 years, 16% 50–59 years, 12% 60–69 years, and 13% ≥ 70 years. Almost 5% of the patients were healthcare providers or were of African, East Asian or South American origin.

Concerning the known mode of exposure, 44 (29.33%) patients had a history of travel to an area with documented cases of SARS-CoV-2 infection; 102 (68.0%) were in close contact with a confirmed or probable symptomatic case of SARS-CoV-2 infection; and 2 (1.33%) patients were present in a healthcare facility where SARS-CoV-2 infections were managed. Two (1.33%) cases had unknown mode of exposure. Of the 44 patients with history of travel, 41 had travelled in the 14 days prior to symptom onset. Fifteen travellers came from the Islamic Republic of Iran, 7 from France or the United Kingdom of Great Britain and Northern Ireland, 4 from the United Arab Emirates, and 1 each from Austria, Egypt, Germany, Italy, Netherlands, Spain and Turkey. One patient was from an unknown country of origin.

Medical history
Table 1 summarizes the prevalence of medical conditions in this population. One hundred and fifteen (76.67%) patients never smoked, 27 (18%) were active smokers, and 8 (5.33%) were former smokers.

Initial presentation
Sixty-eight (45.33%) patients presented with mild symptoms, 67 (44.67%) with moderate symptoms and 15 (10%) with severe symptoms. Fever (89; 59.33%) was the most prominent symptom at presentation, followed by cough (87; 58%), and sore throat (27; 18%) (Table 2). The average temperature at presentation was 37°C (35.6–39.3°C).

Management and clinical course
The overall ICU or high dependency unit admission rate was 10% (15 patients). Nine of these patients required invasive ventilation. The 6 remaining patients required noninvasive positive-pressure ventilation. Eight (5.33%) ICU patients required inotropes or vasopressor support. One patient required prone ventilation and one required renal replacement therapy. Of the 135 patients admitted to the regular non-ICU floor, 3 required oxygen therapy. Most patients (132; 88%) did not receive any form of oxygen treatment. Thirty (20%) patients received antibiotic therapy; 8 (5.33%) received antiviral treatment, specifically Lopinavir/Ritonavir combination; and 12 (8%) received

---

Table 1 Patient comorbidities

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>No. of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>23 (15.33)</td>
</tr>
<tr>
<td>Diabetes without complications</td>
<td>11 (7.33)</td>
</tr>
<tr>
<td>Chronic cardiac disease, including congenital heart disease</td>
<td>5 (3.33)</td>
</tr>
<tr>
<td>Malignant neoplasm</td>
<td>4 (2.67)</td>
</tr>
<tr>
<td>Dyslipidaemia</td>
<td>4 (2.67)</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>3 (2.00)</td>
</tr>
<tr>
<td>Obesity</td>
<td>2 (1.33)</td>
</tr>
<tr>
<td>Chronic neurological disorder</td>
<td>2 (1.33)</td>
</tr>
<tr>
<td>Rheumatological disorder</td>
<td>1 (0.67)</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>1 (0.67)</td>
</tr>
<tr>
<td>Sleeve gastrectomy</td>
<td>1 (0.67)</td>
</tr>
<tr>
<td>History of cholangiocarcinoma and prostate cancer</td>
<td>1 (0.67)</td>
</tr>
<tr>
<td>Kidney stones</td>
<td>1 (0.67)</td>
</tr>
<tr>
<td>Chronic pulmonary disease</td>
<td>1 (0.67)</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>1 (0.67)</td>
</tr>
</tbody>
</table>

Table 2 Patient symptoms at presentation

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No. of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of fever</td>
<td>89 (59.33)</td>
</tr>
<tr>
<td>Cough</td>
<td>87 (58.0)</td>
</tr>
<tr>
<td>Sore throat</td>
<td>27 (18.0)</td>
</tr>
<tr>
<td>Fatigue/malaise</td>
<td>25 (16.67)</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>24 (16.0)</td>
</tr>
<tr>
<td>Rhinorrhea</td>
<td>23 (15.33)</td>
</tr>
<tr>
<td>Productive cough</td>
<td>20 (13.33)</td>
</tr>
<tr>
<td>Myalgia</td>
<td>16 (10.67)</td>
</tr>
<tr>
<td>Headache</td>
<td>14 (9.33)</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>11 (7.33)</td>
</tr>
<tr>
<td>Arthralgia</td>
<td>4 (2.66)</td>
</tr>
<tr>
<td>Vomiting/nausea</td>
<td>4 (2.66)</td>
</tr>
<tr>
<td>Chest wall indrawing</td>
<td>2 (1.33)</td>
</tr>
<tr>
<td>Confusion</td>
<td>2 (1.33)</td>
</tr>
<tr>
<td>Haemoptysis</td>
<td>1 (0.67)</td>
</tr>
</tbody>
</table>
chloroquine. These medications were based on drug availability in the country and were tried randomly, given the lack of clear treatment guidelines and awaiting the relevant WHO trial. None of the patients received convalescent plasma, corticosteroids or antifungal treatment.

Table 3 summarizes the complications during admission in hospital. Patients who developed acute respiratory distress syndrome (ARDS) had a more complicated course in hospital than other patients. They required longer stay and more invasive treatment. Of the 11 patients (7.33%) who developed ARDS, 8 died.

One hundred and thirty-five (90%) patients were discharged from hospital with a favourable outcome; 5 (3.33%) were still hospitalized at the end of the study; and 2 (1.33%) were transferred to another hospital. The overall death rate was 5.33% (8 patients). The average length of stay was 13.9 (1–42) days. Patients were discharged if they tested negative for 2 consecutive RT-PCRs, within 24 hours, as per WHO guidelines. Patients were also discharged if they became fully asymptomatic, with normal laboratory results, on the condition that they remained quarantined at home until RT-PCR conversion took place. One hundred and thirteen (75.33%) patients had a conversion of their RT-PCR test over 2 consecutive days. The average time to conversion was 21.5 (7–64) days.

**Admission date**

Figure 1 shows the number of confirmed positive cases according to admission date.

**Laboratory findings**

One hundred and twenty-eight patients underwent laboratory testing, and on admission, 12 (9.38%) had leucopenia and 2 (1.56%) had leucocytosis, with a mean of 6.38×10^9/l. Forty-four (34.38%) patients had lymphocytopenia and 7 (5.47%) had high lymphocyte count, with a mean of 1.87×10^9/l. Thirty-six (28.13%) patients had neutropenia and 5 (3.91%) had high neutrophil count, with a mean of 3.7×10^9/l. Ninety-five (74.22%) of the 128 tested patients had a haemoglobin level within the normal range, 16 (12.5%) were anaemic, and 17 (13.28%) had high haemoglobin level, with a mean of 13.72 g/dl. Platelets were below the normal range in 16 (12.5%) patients and increased in 5 (3.9%). Of the 123 patients who underwent creatinine level testing, 36 (29.27%) had an elevated level. The most common electrolyte disturbance was hyponatraemia, which was detected in 16 (13.33%) of 120 tested patients. CRP levels were higher than normal values in 71 (58.2%) of 122 tested patients.

**Radiological findings**

Twelve patients underwent chest X-ray, 126 underwent plain CT scan of the chest (Table 4), and 12 asymptomatic cases underwent no imaging.

**Discussion**

This study describes the clinical, epidemiological and radiological features of the first 150 COVID-19 patients in Lebanon. The results show that middle-aged men were more affected than women, with the majority showing mild-to-moderate symptoms. The most prominent

<table>
<thead>
<tr>
<th>Complication</th>
<th>No. of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viral pneumonitis</td>
<td>77 (51.33)</td>
</tr>
<tr>
<td>Bacterial pneumonia</td>
<td>19 (12.67)</td>
</tr>
<tr>
<td>Acute respiratory distress syndrome</td>
<td>13 (8.67)</td>
</tr>
<tr>
<td>Acute renal injury/failure</td>
<td>9 (6.0)</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>7 (4.66)</td>
</tr>
<tr>
<td>Cardiac arrhythmia</td>
<td>5 (3.33)</td>
</tr>
<tr>
<td>Liver dysfunction</td>
<td>3 (2.0)</td>
</tr>
<tr>
<td>Hyperglycaemia</td>
<td>3 (2.0)</td>
</tr>
<tr>
<td>Hypoglycaemia</td>
<td>3 (2.0)</td>
</tr>
<tr>
<td>Pleural effusion</td>
<td>3 (2.0)</td>
</tr>
<tr>
<td>Rhabdomyolysis/myositis</td>
<td>3 (2.0)</td>
</tr>
<tr>
<td>Anaemia</td>
<td>10 (6.67)</td>
</tr>
<tr>
<td>Septic shock</td>
<td>10 (6.67)</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>10 (6.67)</td>
</tr>
<tr>
<td>Bacteraemia</td>
<td>10 (6.67)</td>
</tr>
<tr>
<td>Rib fracture</td>
<td>10 (6.67)</td>
</tr>
<tr>
<td>Septic shock</td>
<td>10 (6.67)</td>
</tr>
</tbody>
</table>
comorbidities were hypertension and diabetes. Fever, cough and sore throat were the most prevalent symptoms. Moreover, lymphocytopenia and neutropenia were predictors of disease severity and chest CT was the gold standard for diagnosis.

In our study, the mean age of the patients was 45 years, which is lower than that reported previously (5,14–17). The latest demographic statistics for Lebanon estimates the median age as 33.7 years, with almost 50% aged 25–54 years (18). The fact that Lebanon has a young population explains the variations in the median ages reported. The present study shows that men were more affected than women, which is consistent with previous studies showing that men are more predisposed to contracting COVID-19 (5,14,16,17). Approximately 5% of the patients were healthcare workers but none were members of the RHUH staff. This proportion is lower than that reported in other similar studies (15) and can be attributed to the meticulous planning and extensive reorganization of departments and divisions before receiving patients, along with the strict precautions observed by the staff.

Around 25% of the patients had previous comorbidities, with hypertension and diabetes mellitus being the most common, which is similar to previous studies (5, 14). Although the underlying pathogenesis of hypertension and diabetes among COVID-19 patients have not been fully elucidated, it is hypothesized that activation of the renin–angiotensin system induces a cytokine storm that causes lung injury (19). Also, decreased innate immunity and vascular dysfunction, along with the prothrombotic state in diabetic patients, worsen the prognosis of COVID-19 patients (20).

The prevalence of smokers in our cohort was 25%, compared with 42% in a larger study of COVID-19 patients conducted in Lebanon (21). This discrepancy in proportions could be attributed to the difference in sample size and the questions about smoking.

Consistent with the findings of several studies, including systematic reviews, the most prominent symptoms at presentation were fever, cough and sore throat (5,19,22). The symptoms, however, were variable and at many times nonspecific, ranging from digestive symptoms to generalized weakness. The most prevalent haematological disorder was lymphocytopenia, followed by neutropenia and elevated creatinine level. Our findings agree with the laboratory abnormalities reported by other studies, which shows that these inflammatory markers are predictors of the clinical severity of COVID-19 (5,14,16).

Regarding the complications, the majority of the patients developed pneumonia (bacterial and viral). ARDS was a major complication associated with poor prognosis and high mortality rate, and 8 of 11 patients who developed ARDS died. The findings of a global literature review substantiate our data, confirming that ARDS is a common complication of COVID-19 and that moderate-to-severe ARDS is associated with a higher risk of mechanical ventilation and death (23).

In accordance with previous studies, the predominant CT finding of COVID-19 was multifocal bilateral air space opacities, characterized by ground glass opacity of the subpleural and peripheral area (5,24). Given that different radiological patterns are observed at different stages of COVID-19, CT remains a crucial diagnostic tool to predict clinical worsening. According to some studies, 50% worsening of CT findings is classified as severe COVID-19, while diffuse consolidation leads to ARDS. Moreover, imaging scores correlate well with mortality risk factors (5,25,26). Although CT remains the gold standard for diagnosis of COVID-19, the radiological findings overlap with those of other pulmonary diseases, thus requiring further attention and precision at the time of diagnosis (27).

The average length of stay in our study was 13.9 days, which is consistent with a systematic review that reported a median length of stay of 14 days in China (28). However, it should be noted that the length of stay in our study could have been overestimated, because at the beginning of the pandemic, all patients with positive RT-PCR results were admitted to the hospital regardless of disease severity, and were only discharged after testing negative for 2 consecutive RT-PCRs as per the initial WHO recommendations (12). Thus, further studies should be carried out to determine an accurate length of stay, taking into consideration the difference between ICU and non-ICU patients.

The novelty of this disease and the rapid and consistent change in the proposed management were a major limitation in this study. We could not provide accurate estimates of the average length of stay among critical and noncritical patients due to the change in recommendations regarding RT-PCR testing. Besides, the descriptive nature of this study and the small sample size impeded us from investigating the correlation between the risk factors and severity of the disease. We could not determine which risk factors were associated with higher mortality. Thus, larger studies should be conducted to identify the underlying factors associated with disease severity and to design interventions to improve outcomes.

**Conclusion**

The management of COVID-19 requires a global approach that takes into consideration the variable presentation of the disease, differences in severity, the diverse methods of diagnosis, and different proposed treatment plans. We
Caractéristiques cliniques et épidémiologiques des 150 premiers patients atteints de COVID-19 au Liban : étude descriptive prospective

Résumé

Contexte : Les caractéristiques cliniques des cas confirmés de COVID-19 couvrent un large éventail.

Objectifs : Étudier les caractéristiques cliniques, radiologiques et virologiques des 150 premiers patients atteints de COVID-19 au Liban.


Résultats : Quatre-vingt-dix patients (63,33 %) étaient des hommes et 55 (36,67 %) étaient des femmes. La plupart des patients (58 %) étaient âgés de plus de 50 ans et 8 (5,33 %) étaient des agents de santé. Le diagnostic était basé sur une réaction en chaîne par polymérase après transcription inverse et les patients étaient classés comme légers, modérés ou critiques. Quinze patients (10 %) étaient atteints d’une forme critique de COVID-19 et la fièvre était le symptôme le plus important lors de la consultation. Cent trente-huit patients (92 %) ont été soumis à une évaluation radiologique. Les résultats de laboratoire les plus fréquents étaient une lymphocytose (34,38 %), suivie d’une neutropénie (28,13 %); par contre, la leucocytose n’était pas prévalente (1,56 %). La vieillesse et les comorbidités étaient des indicateurs significatifs de la stratification du risque chez les patients. La tomodensitométrie du thorax était une méthode de diagnostic et de prise en charge indispensable. Nos résultats radiologiques étaient conformes à la littérature publiée.

Conclusion : Notre étude souligne la variabilité des formes que prend la COVID-19, la différence de gravité de ses symptômes et les diverses méthodes de diagnostic. Ceci suggère la nécessité d’une approche personnalisée, en tenant compte du large éventail des symptômes.
References


Evaluation of antivaccination movement in Turkey: qualitative reports of family physicians

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Abstract

Background: In Turkey, childhood vaccination rates are decreasing in the context of increasingly visible antivaccination movements.

Aims: To evaluate the antivaccination movement based on communication experiences between family physicians and antivaccine parents in Turkey.

Methods: We conducted 39 face-to-face in-depth interviews with family physicians in Sakarya Province who had experiences of communicating with antivaccine parents during October–December 2019. With the permission of the participants, audio recording was obtained in all interviews except one; these were transcribed verbatim and checked. A thematic approach was used to analyse the data.

Results: The most common concern about vaccination was the possible side-effects, followed by the origin of the vaccines, religious concerns and distrust of vaccines. The physicians said they assumed an inquisitive, informative and anxiety-relieving attitude towards antivaccine parents. They said they were able to persuade most parents to vaccinate their children and that highly educated parents or those whose attitudes and behaviours were strongly influenced by their religious leaders were the hardest to convince. Physicians emphasized the importance of trust in increasing vaccine acceptance and noted the need to educate religious leaders and families to introduce mandatory vaccination policies.

Conclusion: Parents had various reasons for refusing childhood vaccinations, however, the family physicians used persuasive methods to convince them to accept the vaccinations. Strengthening the communication and persuasive skills of health care professionals regarding vaccination may help increase acceptance of childhood vaccinations.

Keywords: antivaccination, family physicians, parents, vaccine, Turkey

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Introduction

Vaccination is the most effective, dependable and cost-effective method of protecting human health, preventing infectious diseases and related serious complications. Immunization against diseases through effective and safe vaccination is the right of every child (1).

Immunization studies date back to the 18th century, and there have been as many rejecters as acceptors (2). Although childhood vaccination rates are high in Turkey, the antivaccination movement has been increasing day by day (3).

Turkey is a multicultural, developing country with a well-functioning primary health care system. Childhood vaccinations are provided by family physicians working in primary health care centres (4,5).

The reasons for antivaccination can vary from society to society. It is therefore important to understand these reasons and develop suggestions for solutions. This study aims to evaluate the experiences of family physicians with antivaccine parents and provide fundamental data on antivaccination in Turkey.

Methods

Research design

The phenomenological method explains the meaning of experience about a concept or phenomenon for few individuals. It is aimed at understanding a phenomenon or event and defining the essence of experiences by investigating the meaning of the experiences of individuals about an event. Phenomenology is used for studies that aim to investigate the phenomena that we frequently encounter daily, which are not foreign to us but that we cannot grasp the full meaning of, and, therefore, provide suitable reasons for research (6).

Amedeo Giorgi developed the descriptive phenomenological method with extensive phenomenological analysis in the early 1970s (7). Giorgi’s descriptive
5-step phenomenological method is widely used in the fields of social and human sciences. However, Colaizzi contributed to the development of the method and it is mostly used in the health sciences. In our study, data analysis was performed using Colaizzi’s descriptive phenomenological method; this 7-step analysis process provides a concise and comprehensive description of the phenomenon under study, endorsed by the participants who experienced it (8).

Colaizzi’s phenomenological method was used to qualitatively analyse the communication experiences of family physicians, who are responsible for administering childhood vaccines, with antivaccine parents. The method focuses on the experiences and feelings of participants and finds shared patterns rather than individual characteristics in the research subjects.

**Study subjects**

Using a purposeful sampling method, we selected 39 (20 male, 19 female) family physicians working in Sakarya province between October and December 2019. The inclusion criteria were: having experience of communicating with antivaccine parents and willingness to participate; there were no refusals to participate. We determined the number of required respondents by interviewing family physicians who met the inclusion criteria until the data were saturated and no new topics were generated.

**Interview outline**

After the relevant literature was reviewed, a semi-structured questionnaire was developing using expert opinions, and tested. Details of age, sex, marital status and years of work experience were obtained at the start of the interview.

We posed 4 main interview questions to the participants 1.

- Could you tell us what happened between you and the antivaccine parents 2.
- Could you tell us what happened between you and the antivaccine parents you persuaded 3.
- Which factors do you think play a role in increasing antivaccination campaigns 4.
- What would you recommend that your peers pay attention to while communicating with antivaccine parents?

**Data collection**

The purpose and significance of the research was explained to the participants in advance and a suitable meeting time was planned. The interviews were conducted in private rooms without interruptions. Researchers used techniques such as unconditional acceptance, active listening, and clarification to promote the authenticity of the data and to avoid bias. With the permission of the participants, audio recordings were obtained in all interviews except one. The statements of the participant who did not allow audio recording were documented word for word during the interview. Each interview took 40–50 minutes. The audio recordings were transcribed verbatim by researchers within 48 hours of the interviews and reviewed for accuracy. During data analysis, all researchers agreed with the results and selected the highlighted quotations.

**Data analysis**

Within 48 hours of each interview, the recording was transcribed and analysed using Colaizzi’s phenomenological analysis method. Colaizzi’s analysis is divided into 7 stages (8) 1.

- Every transcript was read several times and significant points were underlined by researchers 2.
- All the significant statements directly associated with the family physicians’ experiences of communicating with antivaccine parents were determined 3.
- Meanings were developed from significant statements 4.
- Meanings were divided into significant statements 4.
- Meanings were divided into groups and classified and then further divided into themes and subthemes 5.
- Themes and subthemes were integrated in a way to comprehensively explain the experiences of family physicians 6.
- The essential structures of the communication experiences of family physicians were described 7.
- The communication experiences of the family physicians and the findings were compared again.

**Ethical approval**

Ethical approval for this research was granted by the ethics committee of Sakarya University Medical Faculty (approval date: 3 May 2019).

**Results**

**Participants and analysis**

We enrolled 20 male and 19 female family physicians, aged 28–59 years, with a mean age of 41.59 (standard deviation (SD) 8.56) years (Table 1). Work experience ranged from 4 to 35 years with a mean of 17.00 (SD 8.66) years. Four participants were unmarried, 3 were married without children and 32 were married with children.

We explored the communication experiences of family physicians with antivaccine parents using phenomenological methods. Five themes emerged from analysis of the interviews. These themes and exemplar quotes are displayed in Table 2.
Theme 1: Reasons parents do not want to vaccinate their children

Family physicians said the primary reason for antivaccination was the possible side-effects of vaccines. They said parents generally had serious concerns about the vaccines causing autism and other disease conditions, including infertility.

There was distrust towards vaccines mainly because the vaccines were imported, sometimes from countries that have poor foreign relations with Turkey. Some parents had concerns because their Islamic religious beliefs, they suspect that imported vaccines may have been made with pig products, which against their religious beliefs.

Theme 2: Family physicians’ attitudes towards parents

Family physicians were careful not to be judgmental towards antivaccine parents. They mostly listen thoroughly and learn about the reasons for not agreeing to vaccinations, then inform the parents about vaccinations and what can occur if their children are not vaccinated. In addition, family physicians with longer professional experience said sharing their professional experience helped persuade some parents.

Theme 3: Factors affecting persuading parents to vaccinate

Family physicians did not force antivaccination parents to vaccinate but they tried to convince them and were highly successful in persuasion. The principal factors in this success were the mutual trust environment established between the doctor and the patient, good communication, and the sharing of scientific data with parents. The most salient characteristics of parents who were unconvinced were having a high level of education, having searched the subject online before the visit and being under the influence of a leader of their religious community.

Theme 4: Factors responsible for increasing anti-vaccine perceptions among parents

Family physicians blamed social media the most for the increase in antivaccination perceptions. The rapid spread of vaccine misinformation through social media, and the lack of correct information, were mentioned as the key factors in the spread of antivaccine beliefs. In addition, the influence of antivaccination religious leaders and medical doctors was substantial.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>41.59</td>
<td>8.56</td>
</tr>
<tr>
<td>Duration of practice (years)</td>
<td>17.00</td>
<td>8.66</td>
</tr>
</tbody>
</table>

Theme 1: Reasons parents do not want to vaccinate their children

Subtheme | Quotations
---|---
Side-effects | “They are afraid of the side-effects of vaccines. Everyone can now learn on the internet the contents and adjuvants used in vaccines and their effects. Unfortunately, the information they obtain on the internet is making parents pessimistic about the possible side-effects of vaccines. As far as I have observed, the most important reason for vaccine rejection is possible side-effects...” (female, 42 years, physician 18 years)
| “Parents strongly believe that vaccines cause infertility. They talk about autism often. There are even those who believe that vaccines make children retarded.” (female, 48 years, physician 23 years)
Insecurity | “… There were parents who said they did not want to give anything artificial to their children. They did not accept vitamin D and iron supplements. They said that they never trust an unnatural product. They argued that God created us this way and that we do not need artificial things.” (female, 33 years, physician 10 years)
| “I think the most common reason is that the vaccines are imported from foreign countries, so their contents are not trusted.” (female, 52 years, physician 28 years)
| “There are those who believe that vaccines are imposed on us from other countries as biological weapons.” (female, 36 years, physician 11 years)
Religious sensibilities | “There were those who did not want to be vaccinated because of their religious beliefs. They refused to be vaccinated on the grounds that there were some products prohibited by God in the vaccines.” (male, 54 years, physician of 30 years)
| “… They said that there are religiously frowned-upon animal ingredients in the content of vaccines.” (female, 36 years, physician 11 years)
| “… They refused, saying it contained things derived from pigs, because of their beliefs.” (female, 43 years, physician 19 years)
### Table 2: Themes identified through interviews with family physicians regarding opposition to vaccination, Sakarya Province, 2019 (concluded)

#### Theme 2: Family physicians’ attitudes towards parents

<table>
<thead>
<tr>
<th>Subtheme</th>
<th>Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquisitive and informative attitude towards the cause</td>
<td>“First, I tried not to judge them. After listening to them and learning their reservations, I explain the risks of not getting vaccinated and what they might face. I try to explain it with scientific data, but I never force it.” (male, 42 years, physician 16 years)</td>
</tr>
<tr>
<td></td>
<td>“I try to make them feel that I respect their decisions, but I also question why they do not want to have it done. Afterwards, I try to explain the data of our Ministry of Health or the World Health Organization as much as possible. I even provide some reliable and up-to-date resources that they can read. I try to make sure they get as much accurate information as possible.” (male, 28 years, physician 14 years)</td>
</tr>
<tr>
<td>Sharing experience to relieve anxiety</td>
<td>“In order to relieve them, I talk about my professional experiences. I state that I have not encountered any negativity in the people I have vaccinated in my professional life. I express that I have been practising medicine for many years and the young people whom I vaccinated as a child, who I still follow as their family physicians, do not have any health problems.” (female, 48 years, physician 23 years)</td>
</tr>
<tr>
<td></td>
<td>“I give examples from my own environment; I state that I have my own children fully immunized. I share my experiences in vaccination.” (female, 43 years, physician of 19 years)</td>
</tr>
</tbody>
</table>

#### Theme 3: Factors affecting persuading parents to vaccinate

<table>
<thead>
<tr>
<th>Subtheme</th>
<th>Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons for persuasion</td>
<td>“Two factors made my job easier. First, I provided antivaccinationist parents with relevant literature and asked them to definitely read it. Second, I have been working in the same place for a long time and I have gained the trust of my patients.” (male, 41 years, physician 18 years)</td>
</tr>
<tr>
<td></td>
<td>“The most prominent issue is sincerity. Good communication with patients. It was also effective when I explained the diseases that can develop in patients who are not vaccinated and sometimes show photo examples. Frankly, I convinced by scaring them.” (male, 59 years, physician 35 years)</td>
</tr>
<tr>
<td></td>
<td>“Sufficient information exchange between the patient and the physician, the establishment of an atmosphere of mutual trust and being able to transfer my experiences made my job easier.” (male, 55 years, physician 30 years)</td>
</tr>
<tr>
<td></td>
<td>“My patients know and trust me for many years, we have a good communication...” (male, 41 years, physician 18 years)</td>
</tr>
<tr>
<td>Reasons for not being convinced</td>
<td>“You can persuade uneducated people much more easily. In the family where I had the hardest time and could not convince, the parents were academics.” (female, 42 years, physician 18 years)</td>
</tr>
<tr>
<td></td>
<td>It is more difficult to convince those with a high level of education and those who ask everything on Google. Most of the time they are not convinced anyway.” (female, 40 years, physician 15 years)</td>
</tr>
<tr>
<td></td>
<td>“The group I find most difficult is the members of a sect. Regardless of their level of education, they do not go beyond what the cult leader said. If he said not to be vaccinated, they would not.” (male, 54 years, physician 31 years)</td>
</tr>
</tbody>
</table>

#### Theme 4: Factors increasing antivaccine views

<table>
<thead>
<tr>
<th>Subtheme</th>
<th>Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social media</td>
<td>“I think the biggest factor is misdirection in social media.” (female, 28 years, physician 3 years)</td>
</tr>
<tr>
<td></td>
<td>“We can say information pollution, and social media, which enables this information to spread very quickly, of course.”</td>
</tr>
<tr>
<td></td>
<td>“Social media is the biggest challenge we have to overcome.” (female, 39 years, physician 13 years)</td>
</tr>
<tr>
<td>Antivaccine religious leaders</td>
<td>“… We hear some sect or congregation leaders say explicitly that they should not be vaccinated.” (male, 55 years, physician 30 years)</td>
</tr>
<tr>
<td></td>
<td>“… It is understood that these people are acting on the words of the cult leaders.” (male, 54 years, physician 31 years)</td>
</tr>
<tr>
<td>Antivaccine physicians</td>
<td>“… There are antivaccine doctors. I think paediatricians who are against vaccination are the most dangerous group...” (female, 48 years, physician 23 years)</td>
</tr>
<tr>
<td></td>
<td>“… There are antivaccine medical professors...” (female, 43 years, physician 19 years)</td>
</tr>
</tbody>
</table>

#### Theme 5: Preventing the increase in vaccine resistance

<table>
<thead>
<tr>
<th>Subtheme</th>
<th>Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>“Education should be at the forefront. It can even be given on TV programmes. Institutions related to religious affairs can provide information about vaccinations. Collective training can be given to parents of children in schools.” (female, 33 years, physician 10 years)</td>
</tr>
<tr>
<td></td>
<td>“Social media is very effective. Educational videos can be shared on social media platforms by the relevant institutions. Religious leaders can be educated.” (female, 53 years, physician 30 years)</td>
</tr>
<tr>
<td></td>
<td>“Everyone who is antivaccine and can influence large masses should be educated about it...” (male, 54 years, physician 31 years)</td>
</tr>
<tr>
<td>Effective use of media</td>
<td>“Since social media is one of the most effective factors in the spread of antivaccination, it is necessary to ensure people can reach the right information on social media.” (female, 36 years, physician 11 years)</td>
</tr>
<tr>
<td></td>
<td>“I think the media will be very effective. Public spots should be prepared in all kinds of media channels...” (male, 48 years, physician 23 years)</td>
</tr>
<tr>
<td>Punishment</td>
<td>“... Anyone who opposes vaccines without scientific basis and misleads people should be punished...” (male, 37 years, physician 13 years)</td>
</tr>
<tr>
<td></td>
<td>“Legal sanctions or obligations should be imposed, both against antivaccinationists and those who encourage them.” (male, 41 years, physician 18 years)</td>
</tr>
</tbody>
</table>
Theme 5: Combating vaccine resistance

Family physicians emphasized that education is at the forefront in combating antivaccination in addition to making accurate information about vaccines available to the public. The majority of them recommended criminal sanctions against people who discourage others from taking vaccines.

Discussion

Antivaccination is a growing problem. Although the reasons given for vaccine hesitance may differ with the characteristics of a particular community, there are common reasons all over the world. In Turkey, family physicians working in primary care are responsible for childhood vaccinations. This study assessed antivaccination in Turkey from different angles based on communication by family physicians with antivaccination parents.

The most important reasons recorded by the study is the concern about vaccine side-effects. Antivaccination respondents said they do not trust the safety of vaccines or think that vaccines are religiously unsuitable. Among the side-effects, fear of autism was predominant. Anxiety created by a fraudulent study on the relationship between the measles, mumps and rubella (MMR) vaccine and autism, which has been revoked, continues to increase worldwide. Family physicians said that infertility, an increasing health concern, was associated with vaccination by the parents. Around 98% of Turkish citizens are Muslim, raising concerns about the possibility of vaccines containing pig-related materials.

In the literature, the prejudiced attitude of physicians has been associated with poor relationships with patients. However, family physicians in our study said their attitude to patients was free of prejudice, enabling healthy communication, which allowed them to persuasively provide necessary medical information about vaccines to patients using appropriate language even when they had negative perceptions. They also shared personal experiences regarding the concerns of the families.

It is important for physicians to not only solve the health problems of patients but also have good personal communication. Good patient-physician communication increases patient satisfaction and trust. The feeling of trust in the physician facilitates the acceptance of medical treatments. Besides this, obtaining complete knowledge about vaccines from a physician is associated with increased vaccine acceptance. Physicians who had established good communication and a trusting relationship with their patients, obtained positive results after explaining medical information using appropriate language. However, it should be noted that patient-physician communication and trust did not change the negative attitudes of some parents who were influenced by religious leaders or who had higher education levels.

It has been observed that the philosophical group or individuals who advocate vaccination opposition actively use mostly social media tools effectively and it has been determined that more than half of adults prefer websites that contain unscientific and unfounded news about vaccines. The most effective and reliable factor in vaccination decisions among individuals is the health professional. Therefore, the existence of antivaccine physicians as noted by our participants constitutes an important obstacle to vaccine acceptance just as social media posts by religious and other independent groups can influence the decision of families towards antivaccination.

Previous research indicates that with the increase in knowledge on vaccination the rate of vaccine acceptance among health care workers increased. As our participants stated, it is thought that the education of the antivaccine group or individuals is an important step towards promoting vaccination, including the use of media tools. It has also been noted that mandatory vaccination policies can be applied in cases where the target cannot be achieved through voluntary processes. However, there are physicians who think that the only solution is obligation and criminal sanctions.

Conclusion

This study provides an insight into antivaccination movements, family physicians' experiences of communication with antivaccine parents and recommendations regarding vaccination in Turkey. Being well-informed and being patient to understand the causes of antivaccine sentiments, as well as building trust, are very important in counseling parents. In the fight against vaccination refusal, everyone should be evaluated individually, and different approaches should be used according to their personal characteristics. While developing strategies for antivaccination policies, it is important to include interventions that will help build the capacity of health care professionals to increase vaccine acceptance among their patients.

Funding: None.

Competing interests: None declared.
Évaluation des mouvements anti-vaccination en Turquie : rapports qualitatifs des médecins de famille

Résumé
Contexte : En Turquie, les taux de vaccination des enfants diminuent dans un contexte de mouvements anti-vaccination de plus en plus visibles.

Objectifs : Évaluer le mouvement anti-vaccination à partir des enseignements tirés par des médecins de famille lors de la communication avec les parents opposés à la vaccination en Turquie.

Méthodes : Nous avons mené 39 entretiens approfondis en face à face avec des médecins de famille de la province de Sakarya qui ont eu des échanges avec des parents opposés à la vaccination d'octobre à décembre 2019. Avec l'autorisation des participants, des enregistrements audio ont été obtenus dans tous les entretiens sauf un ; ceux-ci ont été transcris mot à mot et vérifiés. Une approche thématique a été utilisée pour analyser les données.

Résultats : Les effets secondaires possibles constituaient la préoccupation la plus courante concernant la vaccination, suivis par l'origine des vaccins, les motivations d'ordre religieuses et la méfiance à l'égard des vaccins. Les médecins ont déclaré avoir adopté une attitude empreinte de curiosité, informative et apaisante à l'égard des parents opposés à la vaccination. Ils ont ajouté qu'ils ont pu persuader la plupart des parents de vacciner leurs enfants ; cependant, les parents très instruits ou ceux dont les attitudes et les comportements sont fortement influencés par les chefs religieux étaient les plus difficiles à convaincre. Les médecins ont souligné l'importance de la confiance pour accroître l'acceptation du vaccin, et indiqué le besoin d'éduquer les chefs religieux et les familles pour qu'ils introduisent des politiques de vaccination obligatoire.

Conclusion : Les parents avaient diverses raisons de refuser la vaccination des enfants, mais les médecins de famille utilisaient des moyens de persuasion pour qu'ils acceptent la vaccination. Renforcer la communication et les talents de persuasion des professionnels de santé à l'égard de la vaccination peut contribuer à améliorer l'acceptation de la vaccination des enfants.
References

Research article

Parents’ Education Level and Children’s BMI Explain Caries Distribution Among Kindergarten Students: A Cross-Sectional Study

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Abstract

Background: Dental caries is a common but preventable, multifactorial disease in children. Among several others, it is influenced by child- and parent-related factors.

Aims: To describe knowledge, attitude and practices about oral health among parents of kindergarten children and assess factors influencing caries distribution among the children.

Methods: Parents of 290 kindergarten children in AlMadinah, Saudi Arabia, answered questions concerning their oral health knowledge, attitudes and practices. The children underwent an oral clinical examination. Data were collected between February and April 2018. Comparison between groups was done using the Kruskal-Wallis test.

Results: All parents agreed on the importance of fluoride to strengthen teeth, while 91.7% thought that sweets have a negative impact on teeth. Almost all children ate sweets and candies (99%), while most of them used toothbrushes and fluoride to clean their teeth (98%). Only 66% of parents took their children to the dentist. The 2-step cluster analysis revealed that clusters of children with high body mass index (BMI) and those whose parents had only primary education had the highest caries prevalence compared to clusters of children with lower BMI and parents with higher education (P < 0.05).

Conclusions: Within the study limits, parents demonstrated good oral health knowledge, attitudes and practices. Kindergarten children had high caries, especially those with high BMI and whose parents had lower educational levels.

Keywords: kindergarten children, dental caries, knowledge, attitudes and practices, parents

Citation: Fadel HT; Alamray SF; Alsayed SS; Zolaly GY; Alissi LH; Bahammam SA. Parents’ education level and children’s BMI explain caries distribution among kindergarten students: a cross-sectional study. East Mediterr Health J. 2022;28(3):190-196. https://doi.org/10.26719/emhj.21.074

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Introduction

Oral health is an essential part of the general health of the child as it has a major effect on psychological and physiological well-being (1). Dental caries is considered one of the most common infectious diseases of childhood (2). The prevalence of dental caries among children indicates the need for special attention to resolve this problem. In the United States of America, over 50% of 5–9-year-old children have at least one cavity or restoration (3). Southeast Asia registered a median caries experience of 79% in children aged 5–6 years (4). The Gulf Cooperation Council countries had an overall estimation of 80% prevalence of caries in primary teeth (5); in particular, Saudi Arabia indicated a high proportion of decayed, missing and filled teeth (dmft) among preschool and primary school children in different parts of the country (6).

Dental caries is well established as a multifactorial disease that can be principally prevented by effective oral hygiene and avoiding frequent consumption of sugary food (7). Accordingly, considerable efforts have been directed towards studying attitudes and behaviour towards dental hygiene. In children, the child’s attitude has been connected to several factors such as mother’s education level, parent’s attitude, demographics and the socioeconomic status of the family (8). The key elements that have shown an impact on children’s oral hygiene behaviour and oral health status are parents’ oral health-related attitudes, general knowledge and health status (9). Parental and related factors play a major role in the child’s attitude towards dental health, and their positive reinforcement may ultimately affect the child’s caries experience (10).

To the best of our knowledge, no study has attempted to categorize dental caries distribution among preschool children based on child- and parent-related data in Saudi Arabia. The aims of this study were thus to describe parents’ oral health knowledge, attitudes and practices and their children’s caries experience, and to categorize the children’s caries distribution based on child- and parent-related data in a number of schools in AlMadinah AlMunawwarah.
Research article

Methodology

Study design and sample

We carried out a cross-sectional analytic investigation involving public kindergartens in AlMadinah AlMunawwarah city, Saudi Arabia. AlMadinah AlMunawwarah is one of the largest administrative regions in the country. It is also one of the 2 holy sites and a destination for religious tourists alongside Makkah AlMukarramah. It has a growing, diverse metropolitan population of approximately 1.1 million (ii).

There are 76 public kindergartens in AlMadinah, with more than 7 thousand students. These kindergarten schools are divided over 3 administrative areas according to their geographic location: northern, eastern and western (i2). We selected 6 kindergartens for the study, 2 from each administrative area. The kindergartens were selected through randomized cluster sampling, however, participants were recruited consecutively as a convenience sample based on fulfillment of inclusion criteria.

The sample size was estimated using a sample size calculator (Creative Research Systems, Sebastopol, CA). Considering the total population size (N) for finite population correction (fpc) factor = 7541, with a hypothesized frequency (%) of the outcome variable number of dmft in the population (p) of 50% (+/- 5), and confidence limits as percentage of 100 (absolute +/- %) (d) of 5%, with an anticipated design effect (for cluster surveys-DEFF) for the outcome variable of 1, and by adapting the sample size equation \( n = \left( \frac{\text{DEFF}}{\alpha} \times \frac{N \times (1-p)}{d^2} \right) \), a minimum sample size of 290 students was required to conduct the study.

Study overview

The participants, parents from the selected kindergartens, responded to a questionnaire that measured their knowledge, attitude and practices regarding the oral health of their children. They received an electronic version of the questionnaire on their smart mobile devices via popular application (WhatsApp, California, USA) used for social communication and portable file exchange.

All children from the selected schools completed an oral health promotion programme to educate them about oral disease, risk factors, the importance of their teeth and how they can maintain them in good health. The correct way of tooth brushing was also demonstrated. Then, those children whose parents had filled out the questionnaire and signed the consent form were given a clinical examination. This included measuring the height and weight of the child to calculate body mass index (BMI), and an oral clinical examination. Data collection was carried out between February and April 2018.

Inclusion and exclusion

Children aged 4–6 years attending public kindergartens whose parents had completed the questionnaires and signed the consent forms were included in this study. Other children or those who were enrolled in private kindergartens were excluded.

Study tools

A pre-structured, self-administered Arabic language questionnaire was distributed among the parents. The majority of questions were adopted from a previously validated questionnaire (i3). Questions were added to the original version to cover aspects of practices and attitudes of the children at a young age. The answer format for some questions was changed from a dichotomous (yes/no) format to a 5-point Likert scale format. The modified questionnaire was pilot tested on 23 parents of children in the selected kindergartens, and their responses showed understanding of the questions. No modification to the finalized questionnaire was required after the pilot phase. Thus, responses from the pilot phase were included in the final analysis.

The questionnaire comprised 2 parts. The first covered demographic information of the parents and children such as parent's age, education level and occupation, relation to the child, and child's age and sex. The second part included 33 items designed to evaluate the knowledge, attitudes and practices of the parents and their children regarding their child's oral health. The section on parents’ knowledge included items asking about causes of dental caries and their prevention, the meaning of dental plaque and its effects, and the effects of brushing and using fluoride. Knowledge of the effects of sweets and soft drinks on the teeth was also recorded. Assessment of children’s oral health practices included asking the parents about their child's brushing activities such as brushing aids, frequency, duration and time and their nutritional habits, and negative practices such as nail biting and teeth clenching. Some questions probed the parents' attitudes towards their child's oral health. These included the child's feeding pattern and their influence on their child's oral hygiene such as advice and encouragement to brush, watching their child during brushing and taking their child to the dentist.

The children then had their height and weight measured using a measuring tape and a regular scale. This was followed by a full-mouth, oral clinical examination performed using a disposable mouth mirror and a light source to detect the number of dmft. This was carried out according to the World Health Organization's basic methods for assessing children's oral health (i4). The examination was limited to the primary teeth, as the first permanent molar was only occasionally present, and when present it was often only partially erupted. Accordingly, the decision was made to exclude the first permanent molar for standardization purposes. The examinations were conducted by 8 final-year senior dental students after being carefully trained by an experienced faculty member.

Ethical considerations

The study was approved by the ethical committee at the Taibah University College of Dentistry, AlMadinah Al-
Research article

Munawwarah (approval NO. TUCDREC/2018015/Alsisi; 30/01/2018). It followed the ethical principles outlined in the Declaration of Helsinki (15). Parent’s approval and informed consent were obtained before recruiting their children into the study. Parents were informed that data would be anonymous and treated with confidentiality. They were assured that there would be no intervention and no harm to them or their children. The participants were informed about the results of their oral examination. Participation was voluntary, and no negative repercussions resulted as a consequence for children who were excluded or who chose not to participate in the study.

Data analysis

Descriptive statistics in terms of measures of central tendency and dispersion, and frequency distribution and percentages were used to illustrate the demographic variables, the parent’s knowledge and attitudes and the child’s practices relating to oral health, and the caries experience. For illustrative purposes, the 5-point answers were combined into 2 during the presentation of the data. Inferential statistics were performed to compare different parent characteristic groups with regard to their children’s caries experience. However, no specific patterns were observed that would answer the study questions (data not shown). Accordingly, a 2-step cluster analysis was performed to categorize the studied sample into clusters based on parent- and child-related variables. This was done to explain the distribution of dental caries among the studied sample within clusters of certain characteristics. Different parent- and child-related variables were tried out in the model until the model cohesion read “good” following the entry of the variables: parent education level, sex of child and BMI of child.

The Kruskal–Wallis test was used to compare the resulting clusters in regard to the mean number of dmft. The significance level was set at 0.05. Data were entered and analysed using SPSS, version 20.0 (IBM, Armonk, New York, USA).

Results

Out of the entire school population of 7541 children, a total of 290 children were included from the 6 schools selected in the 3 main administrative areas: 133 from eastern schools, 82 from northern schools and 75 from western schools. The children’s mean age was 5 (standard deviation (SD) 1) years; 51% were females. The mean BMI was 16 (SD 3) kg/m², while the mean number of dmft was 4 (SD 4) (Table 1). No significant differences were observed among children of different sexes or BMI in terms of caries experience (data not shown). Seventy-one percent of the parents or guardians held a higher education level, sex of child and BMI of child.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child-related</td>
<td></td>
</tr>
<tr>
<td>Mean (SD) age (years)</td>
<td>5 (1)</td>
</tr>
<tr>
<td>Sex: no. females/males (%)</td>
<td>149/141 (Sl/49)</td>
</tr>
<tr>
<td>Mean (SD) body mass index (kg/m²)</td>
<td>16 (3)</td>
</tr>
<tr>
<td>Mean (SD) no. decayed teeth</td>
<td>4 (4)</td>
</tr>
<tr>
<td>Mean (SD) no. missed teeth</td>
<td>0.1 (0.5)</td>
</tr>
<tr>
<td>Mean (SD) no. filled teeth</td>
<td>0.2 (0.7)</td>
</tr>
<tr>
<td>Mean (SD) no. decayed, missing and filled teeth</td>
<td>4 (4)</td>
</tr>
<tr>
<td>Parent-related</td>
<td></td>
</tr>
<tr>
<td>Mean (SD) age (years)</td>
<td>36 (7)</td>
</tr>
<tr>
<td>Relation to child – no. mothers/fathers (%)</td>
<td>141/149 (49/51)</td>
</tr>
<tr>
<td>Education, no. (%)</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>15 (5.2)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>70 (24.1)</td>
</tr>
<tr>
<td>Higher</td>
<td>205 (70.7)</td>
</tr>
<tr>
<td>Occupation, no. (%)</td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>7 (2.4)</td>
</tr>
<tr>
<td>Unemployed/student/housewife</td>
<td>94 (32.4)</td>
</tr>
<tr>
<td>Elementary occupations</td>
<td>21 (7.2)</td>
</tr>
<tr>
<td>Service occupations</td>
<td>109 (37.6)</td>
</tr>
<tr>
<td>Administrative/associate professional</td>
<td>27 (9.3)</td>
</tr>
<tr>
<td>Senior official/professional</td>
<td>32 (11.0)</td>
</tr>
</tbody>
</table>

SD = standard deviation.

With regard to child practices, the majority of parents indicated that their children ate sweets and candy (99.7%) but also cleaned their teeth using a toothbrush and toothpaste (96.9%); 18.6% had nail-biting habits (Table 3).

Parents’ attitudes towards their children’s oral health is described in Table 4: 93.8% reported caring about their child brushing their teeth, while 55.9% reported that they had taken their child to the dentist.

Following the 2-step cluster analysis based on parents’ education level, child’s sex and BMI, 4 clusters resulted (Figure 1). Parents in the 3rd and 4th clusters had a higher level of education; clusters 1 and 2 comprised 56% females (Figure 1). The mean number of decayed teeth in the 2nd cluster was 6.3 (SD 4.5), compared with around 3 (SD 3) to 4 (SD 4) in the remaining clusters (P < 0.05) (Table 5). No statistically significant differences in the number of dmft were observed between the clusters (P > 0.05).

Discussion

This study aimed at describing parent’s oral health knowledge, attitudes and practices and their children's caries experience. The findings suggest better parental general oral health knowledge, attitudes and practices when compared with other studies (16,17). This might be...
due to the observed rapid increase in provision of health maintenance information across the media, which presumably reflects on improved oral health awareness among parents (18).

The prevalence of caries among children in AlMadinah was similar to that in some European countries (19). No differences were observed between the 6 kindergartens or the 3 educational areas with regard to caries prevalence (data not shown). Available literature shows that the number of dmft among preschool children has notably been decreasing since 2013 (20). A possible factor could be the growing influence of the health insurance market in the country. One study showed that uninsured children were 2.5 times less likely to receive dental care than insured children (3). Children from families without dental insurance were 3 times more likely to have dental care needs than children with either public or private insurance (3).

When dividing our sample into clusters, caries prevalence was highest in the cluster with less educated parents. This is in line with a study from Italy where increased caries in children was associated with lower education level of parents and lower income level (21). It has been observed that families within the same local community differ in their views regarding prioritizing oral healthcare, where educational background and treatment expenses may be among several contributory factors (22).

A higher caries prevalence was observed in the cluster with more girls. This is in contrast to a study in West Virginia in which girls aged 1–5 years had lower caries levels than boys of the same age (23). It was suggested that differences in caries experience between boys and girls were related to psychological, economic, hormonal and even cultural reasons (24).

Similarly, the cluster with higher BMI demonstrated higher caries experience. Although it is controversial, a systematic review reported that only one-third of the included studies showed a positive relationship between BMI and dental caries in children and adolescents (25). It is plausible to assume that children with obesity have an increased risk of caries since unhealthy dietary habits are a common risk factor for obesity and dental caries (26).

Our investigation adopted a cross-sectional design, and used a convenience sample with unequal recruitment of the sample from the participating kindergartens. This may have limited the generalizability of the study findings and possible causes. Despite this, the suggested associations due to the study limitations may open

<table>
<thead>
<tr>
<th>Question</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular visits to the dentist are important</td>
<td>253</td>
<td>87.2</td>
</tr>
<tr>
<td>Using fluoride strengthens the teeth</td>
<td>265</td>
<td>91.4</td>
</tr>
<tr>
<td>Regular brushing of teeth can protect from caries</td>
<td>256</td>
<td>88.3</td>
</tr>
<tr>
<td>Gum bleeding means inflamed gum</td>
<td>233</td>
<td>80.3</td>
</tr>
<tr>
<td>Dental plaque can lead to gingivitis</td>
<td>206</td>
<td>71.0</td>
</tr>
<tr>
<td>Dental plaque can lead to dental caries</td>
<td>166</td>
<td>57.2</td>
</tr>
<tr>
<td>Dental plaque refers to the soft debris on teeth</td>
<td>183</td>
<td>63.1</td>
</tr>
<tr>
<td>Frequent snacking between meals can cause dental caries</td>
<td>126</td>
<td>43.4</td>
</tr>
<tr>
<td>Soft drinks can affect the teeth adversely</td>
<td>266</td>
<td>91.7</td>
</tr>
<tr>
<td>Consumption of sweets can negatively affect the teeth</td>
<td>266</td>
<td>91.7</td>
</tr>
<tr>
<td>Bacteria can be transferred from parent to the child via sharing utensils</td>
<td>41</td>
<td>14.1</td>
</tr>
<tr>
<td>Bacteria are normally present in saliva and on teeth</td>
<td>162</td>
<td>55.9</td>
</tr>
<tr>
<td>Dental caries are caused by bacteria in the mouth</td>
<td>168</td>
<td>57.9</td>
</tr>
<tr>
<td>Caries affecting primary teeth is permanent</td>
<td>54</td>
<td>18.6</td>
</tr>
<tr>
<td>Primary teeth are important</td>
<td>183</td>
<td>64.8</td>
</tr>
<tr>
<td>Dental caries may affect the child’s psychology</td>
<td>242</td>
<td>83.4</td>
</tr>
<tr>
<td>General health is related to oral health and dental diseases</td>
<td>245</td>
<td>84.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does your child clean his/her teeth with tooth brush and toothpaste?</td>
<td>281</td>
<td>96.9</td>
</tr>
<tr>
<td>Does your child use dental floss?</td>
<td>12</td>
<td>4.1</td>
</tr>
<tr>
<td>Does your child use mouth wash?</td>
<td>24</td>
<td>8.3</td>
</tr>
<tr>
<td>Does your child use toothpicks?</td>
<td>32</td>
<td>11</td>
</tr>
<tr>
<td>Does your child have nail-biting habits?</td>
<td>54</td>
<td>18.6</td>
</tr>
<tr>
<td>Does your child have thumb-sucking habits?</td>
<td>15</td>
<td>5.2</td>
</tr>
<tr>
<td>Does your child have tooth-clenching habits?</td>
<td>27</td>
<td>9.3</td>
</tr>
<tr>
<td>Does your child have other negative teeth habits?</td>
<td>7</td>
<td>2.4</td>
</tr>
<tr>
<td>Does your child eat candy, chocolates or sweets?</td>
<td>289</td>
<td>99.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does your child have a bottle at bedtime?</td>
<td>27</td>
<td>93.3</td>
</tr>
<tr>
<td>Do you care about brushing your child’s teeth?</td>
<td>272</td>
<td>93.8</td>
</tr>
<tr>
<td>Do you encourage your child to brush his/her teeth?</td>
<td>268</td>
<td>92.4</td>
</tr>
<tr>
<td>Do you watch your child during tooth brushing?</td>
<td>268</td>
<td>92.4</td>
</tr>
<tr>
<td>Do you advise your child to brush the teeth without watching him/her?</td>
<td>235</td>
<td>81.0</td>
</tr>
<tr>
<td>Have you ever taken your child to the dentist?</td>
<td>162</td>
<td>55.9</td>
</tr>
</tbody>
</table>
numerous possibilities for future research. Second, the questionnaire we used was mostly new, although based on previous versions in the literature. This may affect the validity of the tool. However, the tool was pilot tested to assure the use of an appropriate measure for the study variables. The clinical examination only measured the number of dmft, which may have limited the possible interpretation of the study findings. Nevertheless, the included variables were decided upon based on previous similar studies to facilitate meaningful comparisons. Moreover, permanent first molar teeth were excluded from the examination, which may have resulted in underestimation of the reported caries prevalence. However, this report from Saudi Arabia on the primary dentition may still have value from an epidemiological perspective. The clinical examination was conducted by 8 examiners, which may have impacted its reliability. Training of the examiners by an experienced clinician may have reduced the negative impact of this detail.

Within the limitations of this study, it can be concluded that parents of kindergarten children demonstrated high levels of oral health knowledge. The children exhibited negative dietary and personal habits, but used appropriate tooth cleaning aids. Parents showed positive attitudes towards maintaining their childrens oral health. A high caries prevalence was observed, especially in children with obesity and whose parents were of low educational levels.

Findings of this study necessitate the conduct of oral health educational programmes for parents and their children, and highlights the influence of parents and lifestyle on the child's oral and general health.

**Acknowledgment**

The authors would like to thank the school administrations for their active participation and facilitation of the study, and Dr. Saba Kassim, Department of Preventive Dental Sciences at Taibah University for her statistical advice.

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**Competing interests:** None declared.
مستوى تعليم الآباء ومؤشر كتلة الجسم لدى الأطفال يوضح توزيع التسوس بين طلاب رياض الأطفال: دراسة مقطوعة

الخلاصة

تُسمى الأسنان مرض شائع ومتعدد العوامل ويمكن الوقاية منه لدى الأطفال. ويتأثر بعوامل متعلقة بالأطفال والآباء، إلى جانب العديد من العوامل الأخرى.

هدفت هذه الدراسة إلى وصف المعلومات والاتجاهات والممارسات المتعلقة بصحة الفم لدى آباء الأطفال في مرحلة رياض الأطفال، وتقييم توزيع تسوس الأسنان لدى الأطفال بحسب العوامل المرتبطة بالأطفال والآباء.

طفلاً في مرحلة رياض الأطفال في المدينة المنورة بالمملكة العربية السعودية على استبيانات تتعلق بمعلوماتهم واتجاهاتهم وممارساتهم المتعلقة بصحة الفم. وخضع الأطفال لفحص سريري للفم. وجُعت البيانات في الفترة ما بين فبراير/ شباط وأبريل/ نيسان 2018. وأُجريت مقارنة بين المجموعات باستخدام اختبار كروسكال واليس.

% من آباء الأطفال أطفالهم لزيارة طبيب الأسنان. وكشف تحليل المجموعات المكوَّن من خطوتين أن مجموعات الأطفال الذين يتمتعون بمؤشر كتلة جسم مرتفع وأولئك الذين لم يحصل آباؤهم إلا على التعليم الابتدائي كان لديهم أعلى معدل للانتشار التسوُّس مقارنةً بمجموعات الأطفال الذين يتمتعون بمؤشر كتلة جسم أقل (p < 0.05).

الاستنتاجات: في حدود هذه الدراسة، أظهر الآباء معلومات واتجاهات ومارسات جيدة بشأن صحة الفم. ويعاني الطلبة في مرحلة رياض الأطفال من نسب تسوس مرتفع خاصة أولئك الذين لديهم مؤشر كتلة جسم مرتفع والذين لم يحصل آباؤهم إلا على التعليم الابتدائي.

Le niveau d'éducation des parents et l'indice de masse corporelle des enfants comme causes de la distribution des caries chez les enfants des crèches : étude transversale

Résumé

Contexte : La carie dentaire constitue une affection multifactorielle courante mais évitable chez les enfants. Comme plusieurs autres affections, elle est influencée par des facteurs liés à l’enfant et aux parents.

Objectifs : Décrire les connaissances, attitudes et pratiques en matière de santé bucco-dentaire chez les parents des enfants de crèches et évaluer leur influence sur la distribution des caries chez les enfants.


Résultats : Tous les parents convenaient de l’importance du fluor pour renforcer les dents, tandis que 91,7 % pensaient que les sucreries ont un impact négatif sur les dents. Presque tous les enfants consommaient des sucreries et des bonbons (99 %), tandis que la plupart utilisaient des brosses à dents et du fluor pour nettoyer leurs dents (98 %). Seuls 6 % des parents emmenaient leurs enfants chez le dentiste. L’analyse par grappes en deux étapes a révélé que les groupes d’enfants ayant un indice de masse corporelle (IMC) élevé et ceux dont les parents n’avaient qu’un niveau d’éducation primaire présentaient également la prévalence de caries la plus élevée par rapport aux grappes d’enfants ayant un IMC plus faible et dont les parents avaient un niveau d’éducation supérieur (p < 0.05).

Conclusions : Dans les limites de l’étude, les parents ont démontré de bonnes connaissances, attitudes et pratiques en matière de santé bucco-dentaire. Les enfants de crèches ont un grand nombre de caries, notamment ceux avec un IMC élevé et un niveau d’éducation parental inférieur.
References


Barriers to the use of mental health services by Syrian refugees in Jordan: a qualitative study

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Abstract

Background: More than 650 000 Syrian refugees are hosted in Jordan. Refugees are at high risk of mental health problems.

Aims: To explore the perspectives of Syrian refugees and their host communities and community leaders in Jordan on barriers and facilitators to the utilization of mental health services by Syrian refugees.

Methods: A qualitative descriptive design was used to collect data through individual, semistructured interviews conducted between May and December 2019 in Jordan. A purposive sample was recruited from different sites.

Results: Twenty-four individual interviews were conducted: 16 for the clients and 8 for the community leaders. Three themes emerged as barriers to accessing mental health services: (i) lack of awareness of mental illness and available services; (ii) availability, accessibility and affordability of mental health services; and (iii) stigma and social discrimination. Findings show that respondents had low mental health literacy levels.

Conclusion: Policy-makers, care providers and decision-makers should take the findings of this study into consideration by facilitating the use of mental health services through awareness-raising about mental illness and the provision of services at primary health care centres. Making the service available near to the people who require it and incorporating mental health services into a broad-based community environment such as schools, primary health centres, or case management system are recommended as a common strategy that could help address refugee needs.

Keywords: Syrian refugees; mental health, Jordan, barriers, Arab culture

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Introduction

More than 5.6 million Syrians have been displaced to Turkey, Lebanon, Jordan, Iraq and Egypt since the onset of the Syrian conflict. More than 650 000 Syrian refugees are hosted in Jordan and registered with the United Nations High Commissioner for Refugees (1). Many Syrians have witnessed or experienced the death of loved ones, physical harm, and a violent and terrifying situation before fleeing the Syrian Arab Republic, and during their journey to Jordan. The Syrian crisis has affected Jordan’s resources and healthcare system and thus Jordanians’ health. Due to their experience of trauma, forced migration, and stresses associated with migration, refugees are classified as a high risk for mental health problems. However, the utilization of mental health services has remained low after settlement (2–6). According to a national Australian study, only 13% of young men aged 16–24 years who had clinically significant symptoms sought professional help compared with one third of young women (7). Help-seeking behaviour has been investigated extensively and research has highlighted its complexity and various factors and barriers may affect it (4,5,8). However, qualitative methodology has not been used to study help-seeking behaviour for mental health services among Syrian refugees in Jordan.

In Jordan, only physicians are allowed to prescribe psychotropic medications. Public sector primary healthcare physicians are allowed to prescribe psychotropic medications but under certain conditions; they may prescribe follow-up treatment, for example, but cannot initiate treatment. The number of psychiatrists in Jordan does not exceed 2 per 100 000 residents and the number of nurses is 0.04 per 100 000 (9).

It is important to look systematically at barriers and facilitators to accessing and providing mental health services to Syrian refugees in Jordan. Barriers to seeking services and factors influencing the effectiveness of services are not well understood. In the absence of such studies, policy-makers, programme managers and mental health professionals may lack the ability to improve access and utilization rate for mental health services to refugees.

The purpose of this study was to explore the perspectives of Syrian refugees and their host communities and community leaders in Jordan on barriers and facilitators to the use of mental health services by Syrian refugees.
Methods

Study design

A qualitative descriptive design was used to collect data through individual, semistructured interviews conducted between May and December 2019. A purposive sample was recruited from different sites in 6 main cities from different parts of Jordan. Twenty-four individual interviews were conducted among Syrian refugees. Sixteen individual interviews were conducted in clinics. The clinics provide psychosocial and mental health services and are run by international nongovernmental organizations. Eight interviews were conducted at the workplaces of the community leaders. Community leaders with knowledge of Mental Health and Psychosocial Support (MHPSS) services were identified by the heads of the clinics. Individuals who were considered knowledgeable of MHPSS service delivery, utilization and barriers to access were included in the interviews. Key informants were purposively selected because of their perceived levels of expertise and efforts were made to sample key informants across the geographic locations of interest; however, the level of expertise was prioritized. Two experts in qualitative research conducted the interviews.

Participants were asked to provide anonymous case descriptions for discussion based on their experience. Interviews were semistructured and a mixture of questioning strategies was used around 2 main issues. Providers were asked to express their views and experiences related to barriers and facilitators for the refugees to access mental health services. Questions included: What is your experience with psychological disorders? What are the positive and negative aspects of your visit to the psychologist? What are the possible reasons for patients not asking for help? The interview lasted 15–60 minutes and data collection continued until saturation was achieved.

Interviews were recorded and transcribed. The field notes taken during the discussion were used for data analysis. Field notes were reviewed before the next interviews to allow exploration of emerging concepts. Qualitative data analysis was completed through data coding, identifying categories, clustering and extracting the themes by the first author, and then reviewed for validity by an independent rater.

Ethical considerations

The study was approved initially by the Institutional Review Board at Jordan University of Science and Technology. The study participants were assured of anonymity and confidentiality. The name of the participants and the health centre were not mentioned. All participants verbally consented to participate and were sent a summary of conclusions, which they approved before analysis began. No previous or existing relationships between participants and researchers were found.

Results

Twenty-four individual interviews were conducted. Sixteen (10 men and 6 women) were conducted with clients and 8 (5 men and 3 women) with community leaders. The participants were aged 18–65 years. Five of the community leaders were Jordanians. Three themes evolved in relation to barriers and facilitators of accessing mental health services: (1) lack of awareness of mental illness and available services; (2) availability, accessibility and affordability of mental health services; and (3) stigma and social discrimination.

Lack of awareness of mental illness and available services

Most participants did not understand or accept that they had a treatable health condition. The patients and their family members often dismissed their depression as “feeling down and lazy” and anxiety as simply “being over-worried”.

I did not think I had a psychological problem ... I did not eat or sleep, I stayed in the room all the time, I did not accept to go out or sit with my family or people in general. I was very tired and if anyone spoke to me, I started crying .... My brothers were saying to me that you are young and at the beginning of your life you need to go outside and see people, I felt that their words were meaningless ... but neither I nor they knew that I had depression and my case required treatment. (male 21 years)

When we asked the participants how they dealt with psychosocial problems, most either did not believe that they had a problem requiring treatment; thought that they could handle the problem themselves; or thought that their problem would get better without any help.

I am not a sick person who is having a problem. My eldest daughter always creates problems at home. She does not accept sitting with her father and brothers and runs away from home at night .... ... I did not imagine that she was a psychotic patient. I said she is at the age of adolescence and I need to understand her, with time, she will calm down and come back to her senses prudently and diligently. (female, 33 years)

There is a lack of understanding of the symptoms of mental health conditions and the benefits that could be provided through treatment.

I am always thinking so much to the point that it is causing me migraine, and from the tension, I had stomach ache .... ... I used to see doctors specialized in internal medicine and digestive diseases, and they were not aware of what I have .... ... one time I went to a general practitioner and he linked my pain to my psychological condition and advised me to see a psychiatrist. I was thinking these are symptoms of physical disease, even specialists did not know from the symptoms that it is a psychological problem. (male 45 years)

Limited knowledge about mental illness can prevent individuals from recognizing it and seeking treatment; poor understanding of mental illness also impairs
families’ abilities to provide adequate care for mentally ill relatives.

The last thing I expected was that my problem was psychological and that it needed treatment. …  ... my family so far is not aware that I have a problem that affects my interaction with them, my level of activity, and my integration with the society. …  ... my father always blames me for not achieving high marks in school like I did before. He thinks that if I take medicine, this would solve the problem, and then they have no responsibility towards me. (female, 22 years)

Some participants with an untreated severe mental illness did not seek care because they believed they did not have a condition that required treatment. One team leader mentioned some clients who did not seek treatment because they wanted to solve the problem on their own and one of the clients confirmed: “I tried to solve my problem on my own, I was occupying myself with house chores.” (female, 39 years)

Another participant said:

I was expressing what I felt to my family, and felt relieved after talking to them …  ... they advised me to pray more and read the Quran; I felt better than before but still had suicidal feelings …  I could not go beyond my problem and stayed a long time believing that I could solve my problem and this made my life worse. (male, 55 years)

These findings suggest that lack of awareness about the nature of psychological disorders and not realizing the need for consistent treatment are significant barriers to care. There is a need to increase awareness about mental health issues with a goal of reducing stigmatization and encouraging those in need of help to access available services. Continued lack of awareness is a barrier to service utilization. “I know several people are in need of this service but they are afraid of what the community will say about them.” (female, community leader, 33 years)

**Availability, accessibility and affordability of mental health services**

Some of the participants said they would like to go to a health centre specializing in mental health, but complained that services were available on 1 or 2 days a week and most of the time the doctors were not available. One mother of a patient said:

I took my son and they said they aren’t treating children in this health centre; I have to take him to Irbid city …  ... If they treated children in this centre it would be easier for us. I stopped my son’s treatment because there were no services for children in the city where we live and the journey was far away. (female, 33 years)

Distance hindered access to mental health services, as stated by the participants: “The centre is far away from us, today we boarded 3 buses until we arrived. Sometimes transportation is available to us and sometimes not, today we suffered a lot until we arrived.” (male, 18 years)

Other barriers related to mental health service affordability included transportation, as stated by 1 participant: “Difficulty of transportation, last time it was rainy and I did not have money for transportation so I did not come, today the weather is good and I walked.” (female, 22 years)

In terms of cost as a barrier, 1 participant stated: “My problem is with car rental, the transport cost is 2 dinars (3 US dollars) and this amount of money is not available to me.” (male, 19 years)

There is a need to increase access to services and embark on outreach activities. The top 3 barriers to seeking support for mental health problems were transportation, costs and lack of awareness. Additionally, there may be a lack of financial resources, even to cover indirect costs of services. One client suggested that they be provided with transportation or the cost of transportation. “I don’t have money to come here every month that is why sometimes I miss my appointment, why don’t they try to bring us here in their cars.” (male, 18 years). Another client suggested mobile clinics: “I am staying far from the health centre, why did they not come to our village to treat us there. They can come once a month, but instead, we come here and pay a lot for transportation.” (female, 33 years)

**Stigma and social discrimination**

Mental illnesses affect people of all ages, cultures and socioeconomic status. Participants stated that mental health is stigmatized in a way that physical health is not. People suffering from mental illnesses are often seen as unpredictable, different, weak, “crazy”, or even dangerous. This negative stereotype has persisted through time and prevents many people with a mental health condition from seeking the treatment they need.

It is possible that they feel ashamed to say that they are consulting a psychiatrist; because of that they haven’t come for treatment. (female, community leader, 22 years)

The community is looking at you as if you are crazy or something is wrong with you – a complex person, and people distance themselves from you. So, to avoid this, you do not go to the psychiatrist. (male, community leader, 32 years)

My husband does not know that I am seeing a psychiatrist and this is an important point because, if he knew, he would disapprove and he would not allow me to come again to be treated. The surroundings, the community, and the attitude of neighbours towards me would change. I always come here secretly. (female, 33 years)

Women were found to be less likely to seek help due to concerns over privacy and stigma. “If my husband knows I have been visiting the mental health clinic he will divorce me.” (female, 22 years) Participants recommended that to address such stigma, MHPSS services should increase engagement with families and communities.

**Discussion**

This qualitative study was conducted to explore the perspectives of Syrian refugees and their host communities and community leaders in Jordan on barriers and facilitators to the use of mental health services by Syrian
refugees. Three themes were identified after analysing interviews. The first theme, lack of awareness of mental illness and available services, focused on the inability of refugees to recognize that the signs and symptoms they were experiencing were related to mental illness and may require treatment. This could be explained by the low mental health literacy levels of participants regarding this issue. Previous studies have highlighted the importance of mental health literacy in improving help-seeking behaviour (2,7,8,10). Individuals who have higher levels of mental health literacy may recognize their mental illness quickly and seek help during the earlier stages, and thus, they are more likely to recover and be cured of their illness (2,7,10–13). Also, individuals who have higher levels of mental health literacy may have more positive attitudes towards mental health services and treatment, and ultimately, they are more likely to have high levels of treatment adherence (2,7,8,10,14,15).

The second theme was availability, accessibility and affordability of mental health services, which described the barriers to access to mental health services. These barriers included the long distance to mental health services, the use of public transportation because of financial inability to own a car, and scarcity of psychiatrists, psychologists and specialized mental health centers in refugee camps or neighbouring cities. These barriers may decrease the rate of mental health service utilization even if individuals have high mental health literacy levels (14,16,17). Previous studies have found that low income, long distances to mental health services, and inability to own a car or free transportation, and scarcity of mental health professionals are considered significant factors in decreasing the rate of mental health services utilization (18–21). Refugees and their families may have the desire to seek help but they lose this desire and do not attend or drop out of treatment when they encounter the barriers mentioned above (17,22). Consequently, patients with mental illness may relapse or their case may exacerbate rapidly leading to life-threatening complications such as suicide attempts, violence directed toward others, homicide, and substance abuse (23). Participants suggested the provision of free transportation to mental health service centres or reimbursement of the cost of transportation. Other suggestions to overcome the issue of transportation were: to build mental health services close to refugees’ residence; hire and help mental health professionals to reach out to refugees who require this type of treatment; and training lay providers/peers to reach out to refugees, engage them in care, and in some cases, provide care. Previous studies have found that these suggestions were effective in improving utilization of mental health services (3,5,14,24).

The third theme was stigma and social discrimination, which is considered one of the most common barriers to mental health treatment. There are several types or aspects of stigma, and most of them were apparent during the interviews. For example, some refugees may have self-stigma toward mental illness, while others highlighted the issue of community stigma. Also, some people have stigma toward mental illness, while others have stigma toward mental health treatment, or both. There are several reasons for stigma among Syrian refugees. First, they are part of the Arabic collectivist culture that shows high levels of stigma toward mental illness and treatment (2,7,10,12,13). Second, low mental health literacy levels can affect attitudes toward illness and treatment negatively, and thus, may increase levels of stigma toward mental illness and treatment (11,13,17,19,23,25–27). Third, the high social pressure and disapproval that patients perceive from their families and significant others increases the likelihood of developing self-stigma toward mental illness and treatment (2,7,10,12,18,19,22). Previous studies have found that high levels of stigma may affect mental health help-seeking behaviour negatively (2,7,10,12). Consequently, the low utilization rate of mental health services caused by stigma may increase the risk of exacerbation and relapse among patients. Also, there is a strong positive relationship between high stigma levels and under-reported cases of mental illness, which make it difficult for healthcare professionals to reach those cases during the early stages of the illness (10,12,18,23). The participants in the present study suggested conducting campaigns to improve the awareness of refugees about mental illness and treatment approaches available. Previous awareness campaigns and mental health educational programmes have been effective in improving mental health literacy levels and access and utilization of mental health services (18,28–30).

This study had some limitations. Its external validity is challenged by the small size of the sample. The Syrian refugees and community leaders answered the questions based on their personal experiences; therefore, generalization of the findings to the wider population should be limited. Also, the recruitment method may have created a sampling bias as the participants were recruited from clinics managed by international organizations, which prevented the researchers from gaining the perspective of the entire Syrian refugee population. Furthermore, since the interviewers stimulated the participants to mention additional barriers by asking them open questions regarding any other barriers, it is possible that the interviewees were encouraged to think and report about barriers that are not critical to the target population. Further research is needed to collect more data and generate more evidence by including a larger number of participants from different sites. Quantitative studies are needed to help data collection from a larger group.

Conclusion

Refugees are at high risk for mental health problems. Many Syrians have witnessed or experienced the death of loved ones, physical harm, and violent and terrifying situations before fleeing Syria, and during their journey to Jordan. This study presents the views of refugees and Jordanians from the host community and community leaders from the host community and the Syrian refugee camps.

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leaders about barriers to seeking help for mental health problems. Three themes emerged from this study regarding barriers to utilization of mental health services: (1) lack of awareness of mental illness and available services; (2) availability, accessibility and affordability of mental health services and (3) stigma and social discrimination. Policy-makers, care providers and decision-makers should take the findings of this study into consideration by facilitating the use of mental health services through awareness-raising about mental illness and the provision of services at primary health care centres. Incorporation of mental health services into a broad-based community environment such as schools, primary intervention, or case management system is recommended as a common strategy that could help address the the needs of refugees.

Funding: None.

Competing interests: None declared.

Obstacles au recours des réfugiés syriens aux services de santé mentale en Jordanie : étude qualitative

Résumé

Contexte : Plus de 650 000 réfugiés syriens sont accueillis en Jordanie. Les réfugiés présentent un risque élevé de problèmes de santé mentale.

Objectifs : Examiner les points de vue des réfugiés syriens, de leurs communautés d’accueil et des dirigeants communautaires en Jordanie sur les obstacles et les facteurs facilitant le recours de ces réfugiés aux services de santé mentale.

Méthodes : Un modèle qualitatif descriptif a été utilisé pour collecter les données par le biais d’entretiens individuels semi-structurés, menés entre mai et décembre 2019 en Jordanie. Un échantillon raisonné a été recruté dans différents sites.

Résultats : Vingt-quatre entretiens individuels ont été réalisés : 16 pour les clients de ces services et huit pour les dirigeants communautaires. Trois thèmes sont apparus comme étant des obstacles à l’accès aux services de santé mentale : 1) le manque de sensibilisation à la maladie mentale et aux services disponibles ; 2) la disponibilité, l’accessibilité et le caractère abordable des services de santé mentale ; et 3) la stigmatisation et la discrimination sociale. Les résultats montrent que les participants avaient de faibles niveaux de littératie en santé mentale.

Conclusion : Les responsables de l’élaboration des politiques, les prestataires de soins et les décideurs devraient tenir compte des résultats de la présente étude en facilitant le recours aux services de santé mentale, grâce à une sensibilisation accrue aux maladies mentales et la prestation de service dans les centres de soins de santé primaires. Il est également recommandé de rendre le service disponible à proximité des personnes qui en ont besoin. Il est nécessaire d’intégrer les services de santé mentale dans un environnement communautaire élargi tel que les écoles, ainsi que dans les centres de soins de santé primaires ou le système de prise en charge des cas, en tant que stratégie commune susceptible de répondre aux besoins des réfugiés.

العوائق التي تحول دون استفادة اللاجئين السوريين من خدمات الصحة النفسية في الأردن: دراسة نوعية

خلاصة

الخلفية: يعاني المزيد من اللاجئين السوريين من عوائق في استغلال خدمات الصحة النفسية، مقارنة باليمنيين. ويواجه اللاجئون مخاطر مرتفعة للإصابة بمشاكل الصحة النفسية.

الأهداف: هدفت هذه الدراسة إلى استكشاف وجهات نظر اللاجئين السوريين وقادة المجتمع بشأن العوائق التي تحول دون استفادة اللاجئين السوريين من خدمات الصحة النفسية والوصول إلى الخدمات. استخدمت الدراسة تصميمً وصفيًّا نوعيًّا لجمع البيانات من خلال مقابلات فردية شبه منظَّمة. وأُجريت الدراسة في الفترة ما بين مايو/ أيار وديسمبر/ كانون الأول 2019 في الأردن. واختيرت عينة مقصودة من разных مراكز.

النتائج: أُجريت أربع وعشرون مقابلة: 16 للاجئين و 8 لقادة المجتمع. وظهرت ثلاث مواضيع: (1) الوعي بالأمراض النفسية، وآخذ الخدمات، (2) توفّر خدمات الصحة النفسية، وإمكانية الحصول عليها، و (3) الفهم وتكميل الممارسة. يمكن أن تتضمن تلك المواضيع مفاهيم متشابهة في الأداء والصحة النفسية.

الاستنتاجات: ينبغي اتخاذ الإجراءات السياسية والميدانية لتعزيز الصحة النفسية، وتحسين خدمات الصحة النفسية، وإصلاح خدمات الصحة النفسية، وإيجاد خدمات الصحة النفسية في خدمات الرعاية الصحية.
References


Direct and indirect effects of health expenditure on economic growth in China

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Abstract

Background: The main social contradictions in China have changed: the core concept is high quality development. Health care investment improves the health of residents and promotes regional economic growth.

Aims: To analyse the direct and indirect economic effects of health expenditure during 2012–2018 and to test whether China’s investment in health care meets the requirements for high quality development.

Method: We selected spatial panel data reflecting the input and output of health resources. We used the knowledge production function and a model of spatial economics to conduct empirical analysis of 31 provinces to show the effects of health expenditure on economic growth.

Results: Economic development (LnGDP) was the dependent variable; explanatory variables included health financial input (LnHI), health personnel input (LnHR), health assets (LnCW) and health insurance expenditure (LnHIE). The regression coefficients for indirect, direct and total effects of LnHI were 0.4346, 0.0623 and 0.4970 respectively (all statistically significant). The direct effect coefficient of LnHR (0.3343) was statistically significant. The regression coefficients for the indirect and total effects were −0.6779 and −0.3436, respectively. The direct, indirect and total effect regression coefficients for LnCW and LnHIE were all statistically significant.

Conclusion: Both LnHI and LnHIE positively promote economic growth within provinces and in neighbouring provinces, i.e. there are direct and indirect positive effects from investing in health care. Increasing the input of health care personnel can promote the economic growth of a province but not that of neighbouring provinces. Overall planning and coordinated development will facilitate high quality development and economic advancement.

Keywords: development; health expenditure; health economics health investment; China

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Introduction

Socialism with Chinese characteristics has entered a new era and the main social contradictions in China have changed (1). The core concept for development in this new era is high quality development, which is required to meet the growing needs of the people for a better life. For example, to mitigate the difficulty and expense incurred in seeing doctors and to satisfy the demand for high quality medical services, the quality and benefits of development must be vigorously improved. In 2018, China’s total health expenditure reached 5.91 trillion yuan, compared to 1.75 trillion yuan in 2009, a 3.37-fold increase. From 2009 to 2018, total health expenditure per capita increased from 314.26 yuan to 437.0 yuan, a 3.22-fold increase (Table 1). Studies in other countries have shown that health care investment not only improves the health of residents but also promotes regional economic growth (2,3). Thus, we examined the economic impact of allocating health care resources in 31 provinces (cities) in China from the perspective of spatial correlation. We empirically analysed whether there is any spillover from the input of public health care resources.

Literature review

Overview

The relevant literature on the relationship between health care spending and economic growth can be classified into 2 competing claims: that health care spending promotes economic growth and that it hinders economic growth.

Public health care expenditure promotes economic growth

Health care spending can stimulate economic growth, according to Mushkin’s hypothesis that health is a determinant of economic growth (4). According to this hypothesis, health is a type of capital. Thus, investment in health care can increase income levels and facilitate economic growth. Since health care is a core component of human capital investment, the accumulation of human capital is the main factor of the endogenous growth model. To accumulate human capital, innovative strategies (innovation) and health care policies are especially important. In this context, it is essential to form appropriate health care policies for both sustainable growth and the overall...
health of the population. Several prominent economists (Kleiman, Newhouse and Pueyo, among others) have offered theoretical and empirical evidence that shows that public health expenditure promotes economic growth (5–7). Wang, Naidu et al., Hatam et al., Aboubacar et al. and Wang et al. have pointed out that public health expenditure plays a certain role in promoting economic growth (8–12). Atilgan et al. estimated that a 1% increase in per-capita health expenditure leads to a 0.434% increase in the per-capita gross domestic product (GDP) (13). Aghion et al. found that investment in health care had a significant and positive impact on economic growth from 1940 to 1980, although they noted that this relationship tended to weaken after 1960 (14).

Health care investment hinders economic growth

In contrast, Barro constructed an endogenous growth model that showed that consumer expenditure hinders economic growth, whereas productive public expenditure plays a role in promoting it (15). According to this view, health care expenditure is only a consumer good and not an investment good. Thus, because of budget limitations, health is a reason for reducing expenditure in the public and private sectors. Many scholars have conducted similar studies. Finkelstein, Hall and Jones, Mehrara et al., Awaworyi et al. and Afawubo et al. used an array of research objects, methods and data and found that increasing investment in health care does not make a significant contribution to economic growth, and indeed may hinder or slow down economic growth in the long-term (16–20).

Summing up

In summary, scholars have not reached a consensus on the relationship between public health expenditure and economic growth. Most research relies exclusively on time-series or cross-sectional data and empirical research, use of spatial panel models is rare. From the perspective of high quality development, on the one hand, we must take into account the characteristics of public goods invested in health care resources and consider the spatial relevance and heterogeneity of these resources. From the perspective of high-quality allocation, on the other hand, we must adopt new methods to study the input of health care resources and then reform the supply side and allocate these resources more efficiently.

In this study, we used an improved knowledge production function to consider health expenditure in 31 provinces in China. We combined this with an advanced spatial panel model to measure and estimate provincial spillover from health expenditure input (i.e. the indirect economic effects on neighbouring provinces) and whether health care investment promotes economic growth.

Model setting and measurement methods

Spatial Durbin model

The spatial Durbin model (SDM) considers the spatial autocorrelation of dependent variables and residuals. The model states that dependent variables have spatial interactions with independent variables:

\[
y = \rho W_1 y + \beta X + W_2 X\lambda + \epsilon
\]

\[\epsilon \sim N(0, \sigma^2 I_n)\]  \hspace{1cm} (1)

where \(Y\) is the dependent variable; \(X\) is the explanatory variable; \(W_1, W_2\) is the spatial weight matrix of \(n \times n\); \(\rho\) and \(\lambda\) are the spatial autoregressive coefficients; \(\beta\) is the regression coefficient; and \(\epsilon\) is the random disturbance term. When \(W_1 = 0\), the SDM model can be simplified to a spatial lag model (SLM), where \(\rho\) indicates whether there is a significant spatial correlation between the units; when \(W_1 = 0\), the SDM model can be simplified to a spatial error model (SEM), where \(\lambda\) represents the error term and whether there is a significant spatial correlation.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total health expenditure (billion yuan)</th>
<th>GDP (billion yuan)</th>
<th>Total health expenditure as a percentage of GDP (%)</th>
<th>Total per capita health expenditure (yuan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>1754</td>
<td>34 562</td>
<td>5.15</td>
<td>1314.26</td>
</tr>
<tr>
<td>2010</td>
<td>1998</td>
<td>40 890</td>
<td>4.98</td>
<td>1490.06</td>
</tr>
<tr>
<td>2011</td>
<td>2426</td>
<td>48 412</td>
<td>5.15</td>
<td>1806.95</td>
</tr>
<tr>
<td>2012</td>
<td>2811</td>
<td>53 412</td>
<td>5.38</td>
<td>2076.67</td>
</tr>
<tr>
<td>2013</td>
<td>3166</td>
<td>58 801</td>
<td>5.57</td>
<td>2327.37</td>
</tr>
<tr>
<td>2014</td>
<td>3531</td>
<td>63 613</td>
<td>5.56</td>
<td>2581.66</td>
</tr>
<tr>
<td>2015</td>
<td>4097</td>
<td>67 670</td>
<td>5.95</td>
<td>2980.80</td>
</tr>
<tr>
<td>2016</td>
<td>4634</td>
<td>74 412</td>
<td>6.23</td>
<td>3351.74</td>
</tr>
<tr>
<td>2017</td>
<td>5259</td>
<td>82 712</td>
<td>6.36</td>
<td>3783.80</td>
</tr>
<tr>
<td>2018</td>
<td>5912</td>
<td>90 086</td>
<td>6.57</td>
<td>4237.00</td>
</tr>
</tbody>
</table>

GDP = gross domestic product.
Modelling ideas and variable description

According to the core idea of the endogenous economic growth model proposed by Lucas, we introduced health-related human capital (mainly determined by the variables of health care input) into the economic growth model.

The ordinary least squares model of health investment and economic growth in this study is as follows:

\[ \text{LnGDP}_t = \beta_1 \text{LnHI}_t + \beta_2 \text{LnHR}_t + \beta_3 \text{LnCR}_t + \beta_4 \text{LnHIE}_t + \epsilon_t \]

(2)

where: \( \text{LnA} \) is the constant term, \( i \) and \( t \) denote the region and time respectively, and the error term \( \epsilon \) represents other factors that were observed to affect economic growth in the 31 provinces and cities. The description of the health variables in this study is shown in Table 2.

We considered the impact of local health care input on economic growth; we also considered the impact of health care input on the economic growth of neighbouring provinces and cities according to the regional economic development level. The following SDM was thus adopted:

\[ \text{LnGDP}_t = \rho \text{LnGDP}_{t-1} + \beta_1 \text{LnHI}_t + \beta_2 \text{LnHR}_t + \beta_3 \text{LnCR}_t + \beta_4 \text{LnHIE}_t + \text{W}(\beta_1 \text{LnHI}_t + \beta_2 \text{LnHR}_t + \beta_3 \text{LnCR}_t + \beta_4 \text{LnHIE}_t) + \epsilon_t \]

(3)

where: \( \nu_t \) represents the regional effect, \( \sigma_t \) represents the effect of time; both the SLM and the SEM in this study use the maximum likelihood (ML). We introduced \( n \times n \) according to the determinant \((1-\rho W)\), such that the lag term is treated as an endogenous variable. The original equations of the 2 models are converted into:

\[ \text{LnGDP}_t = (I - \rho W)\gamma \beta \text{LnHI}_t + (I - \rho W)\text{LnHR}_t + (I - \rho W)\beta \text{LnCR}_t + (I - \rho W)\beta \text{LnHIE}_t + W\gamma \beta \text{LnHI}_t + W\beta \text{LnHR}_t + W\beta \text{LnCR}_t + W\beta \text{LnHIE}_t + \nu_t + \sigma_t + \epsilon_t \]

(4)

For this purpose, we propose a 2-stage test based on Elhorst to judge which model to select, the SEM, the SLM or the SDM (21).

Data sources


Results

Empirical analysis

MATLAB software regression result analysis

First, we used the Matlab space measurement package provided by Elhorst to perform a maximum likelihood estimation (LM) and a robust LM test on the panel data without considering spatial effects (21).

Both the LM test and the robust LM test in models 1–4 were significant at the 1% level (Table 3), rejecting the null hypotheses (i.e. that there was no dependent variable spatial effect and no residual term spatial effect). Only the robust LM tests in models 1 and 4 rejected the null hypothesis that there were no spatial effects of residual terms. Therefore, we inferred that the model should include the spatial lag term, although further tests are needed to determine whether the autocorrelation residual term should be included. In addition, the likelihood ratio test results of the space fixed effect and time fixed effect were 256.3517 \((P < 0.005)\) and 186.5465 \((P < 0.002)\), respectively, and the hypotheses of no space fixed effect and no time fixed effect could be rejected. Therefore, the space effect and time effect must be considered when modelling the space panel.

In the second stage, we used the Wald test and the LR test to verify whether the SDM panel model could be simplified to the SLM panel model or the SEM panel mode, i.e. to test the hypotheses \( H_{\gamma} : \gamma = 0 \) and \( H_{\rho\beta} : \rho\beta = 0 \), respectively.

The test results are shown in Table 4. It can be seen that in the spatial fixed effect models 5–7, the \( P \)-values for the Wald test and LR test of the spatial lag panel and the SEM were less than 10%. Thus, the original hypothesis was rejected. That is, the SDM model could be simplified to the SLM model and SEM model. Therefore, we chose the SDM panel model.

Table 2 Description of health variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indicator description</th>
<th>Take log</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic development</td>
<td>GDP per capita for each province (city)</td>
<td>LnGDP</td>
</tr>
<tr>
<td>Health financial input</td>
<td>Health expenses per capita by province</td>
<td>LnHI</td>
</tr>
<tr>
<td>Health personnel input</td>
<td>No. of health personnel per 1000 people in provinces and cities</td>
<td>LnHR</td>
</tr>
<tr>
<td>Health assets</td>
<td>Number of beds per 1000 people in each province and city</td>
<td>LnCR</td>
</tr>
<tr>
<td>Health insurance expenditure</td>
<td>Basic health insurance fund expenditure per capita of urban and rural residents</td>
<td>LnHIE</td>
</tr>
</tbody>
</table>

GDP = gross domestic product.
Table 3: Maximum likelihood estimation (LM) test and robust LM test of the panel model without spatial effects

<table>
<thead>
<tr>
<th>Test variable</th>
<th>1 General panel mixing</th>
<th>2 Space fixed effect</th>
<th>3 Time fixed effect</th>
<th>4 Time &amp; space fixed effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>LnHI</td>
<td>0.4755***</td>
<td>–0.1129***</td>
<td>–0.1160***</td>
<td>0.6055*</td>
</tr>
<tr>
<td></td>
<td>(4.4405)</td>
<td>(–7.3781)</td>
<td>(–7.7316)</td>
<td>(6.5949)</td>
</tr>
<tr>
<td>LnHR</td>
<td>0.1872**</td>
<td>0.6523***</td>
<td>0.5985***</td>
<td>0.1807**</td>
</tr>
<tr>
<td></td>
<td>(2.3774)</td>
<td>(6.2451)</td>
<td>(5.5879)</td>
<td>(2.3339)</td>
</tr>
<tr>
<td>LnCW</td>
<td>0.0216</td>
<td>–0.7254***</td>
<td>–0.6804***</td>
<td>–0.0015</td>
</tr>
<tr>
<td></td>
<td>(0.2489)</td>
<td>(–8.2593)</td>
<td>(–6.6644)</td>
<td>(–0.0178)</td>
</tr>
<tr>
<td>LnHIE</td>
<td>0.0301</td>
<td>0.5034***</td>
<td>0.5356***</td>
<td>0.0813*</td>
</tr>
<tr>
<td></td>
<td>(0.9573)</td>
<td>(13.9490)</td>
<td>(13.6058)</td>
<td>(1.7117)</td>
</tr>
<tr>
<td>σ²</td>
<td>0.0011</td>
<td>0.0081</td>
<td>0.0077</td>
<td>0.0010</td>
</tr>
<tr>
<td>R²</td>
<td>0.8303</td>
<td>0.7687</td>
<td>0.7433</td>
<td>0.2564</td>
</tr>
<tr>
<td>LogL</td>
<td>247.8525</td>
<td>500.5757</td>
<td>252.9683</td>
<td>508.0461</td>
</tr>
<tr>
<td>LM test no spatial lag</td>
<td>4.5400**</td>
<td>113.2847***</td>
<td>96.5457***</td>
<td>3.6829*</td>
</tr>
<tr>
<td></td>
<td>(P = 0.033)</td>
<td>(P &lt; 0.001)</td>
<td>(P &lt; 0.001)</td>
<td>(P = 0.056)</td>
</tr>
<tr>
<td>Robust LM test no spatial lag</td>
<td>6.9188***</td>
<td>105.4864***</td>
<td>95.6059***</td>
<td>4.7047**</td>
</tr>
<tr>
<td></td>
<td>(P = 0.009)</td>
<td>(P &lt; 0.001)</td>
<td>(P &lt; 0.001)</td>
<td>(P = 0.042)</td>
</tr>
<tr>
<td>LM test no spatial error</td>
<td>3.6371*</td>
<td>33.3758***</td>
<td>18.7168***</td>
<td>3.051*</td>
</tr>
<tr>
<td></td>
<td>(P = 0.062)</td>
<td>(P &lt; 0.001)</td>
<td>(P &lt; 0.001)</td>
<td>(P = 0.081)</td>
</tr>
<tr>
<td>Robust LM test no spatial error</td>
<td>3.0193*</td>
<td>25.5775***</td>
<td>17.7800***</td>
<td>3.0740*</td>
</tr>
<tr>
<td></td>
<td>(P = 0.083)</td>
<td>(P &lt; 0.001)</td>
<td>(P &lt; 0.001)</td>
<td>(P = 0.086)</td>
</tr>
</tbody>
</table>

***, ** and * indicate significance levels 1%, 5% and 10% respectively.

The value of t is in parentheses.

Result analysis
Panel data models

Table 5 lists the empirical data of the 4 specific effects of SDMs 1–4. Elhorst argued that a corrected R² is more reasonable than R² in the panel data model (21). According to the above test results, the corrected R² for SDM 1 and SDM 4 were 0.2877 and 0.2885 respectively, indicating that the model does not fit well. Next, we can see from the spatially fixed SDM panel model 2 that the R² and corrected R² were 0.9251 and 0.8846, respectively, indicating that the model fits well. LnHR, LnHI, LnCW and LnHIE all passed the 10% level test with model 2. We can see from the spatially fixed SDM panel model 3 that the R² and corrected R² were 0.9726 and 0.8443, respectively, indicating that the model fits well. LnHR and LnHI passed the 10% level test with model 3. LnCW and LnHIE. The likelihood function value of model 2 was 513.1888, exceeding the likelihood function value of model 3 (509.1553). Thus, model 2 was more reliable for statistical tests. In summary, the spatial fixed SDM panel model 2 was ultimately selected as the spatial econometric model to study the impact of provincial health care input on regional economies, and the total effect was decomposed.

Analysis of direct and indirect effects

The calculation results for the direct effects and indirect effects of the spatial fixed SDM panel model 2 are shown in Table 6. The indirect effect value of health financial investment (LnLI) was 0.0623. The direct effect regression coefficient value was 0.4346, which was significant at the 1% level, and the total effect regression coefficient was 0.4970. This shows that every 1% increase in health expenditure in a region has a direct effect of 0.4346% on the growth of GDP in that region. Moreover, it has an indirect effect value of 0.0623, the direct effect regression coefficient value being 0.4346, which was significant at the 1% level, and the total effect regression coefficient was 0.4970. This shows that every 1% increase in health expenditure in a region has a direct effect of 0.4346% on the growth of GDP in that region. Moreover, it has an indirect effect value of 0.0623.
The direct effect coefficient of health care personnel investment (LnHR) was significant at 0.3343. The indirect and total effect regression coefficients were −0.6779 and −0.3436, respectively (both negative). This shows that every 1% increase in health-related human capital has a positive direct effect on provincial economic growth of 0.3343%, a negative indirect effect on the economic growth of neighbouring provinces of 0.6779% and a total negative effect of 0.3436% on economic growth. Because the indirect effect is less than the indirect effect, there is a significant negative spillover effect among the 31 provinces. This shows that increased investment in health care personnel in provinces has an obvious effect on provincial economies. This may be because investment in health personnel results in improvements to the health of residents and an economic growth effect. However, there was a significant negative spillover effect among the 31 provinces (cities) in terms of health care personnel, which shows that an increase in health technicians in provinces erodes the economic development of neighbouring provinces. The reason for this may be that increased investment in health care personnel improves the level of medical technology and the capacity of one region, and this attracts human resources from other regions. This can be demonstrated from the population inflow and outflow in the 31 provinces (cities) in 2019. In 2019, Guangzhou, Shenzhen, Changsha, Hangzhou, Chongqing and other economically developed provinces or regions had a net population inflow growth rate of more than 1.5%. In particular, Guangdong’s net population inflow was 1.5 million in 2016. These economically developed provinces or regions offered a more conducive working environment, better medical care and more favourable wages. This attracted a large number of people to the province, resulting in serious population losses in the northeast and western regions. This led to disparity in the regional distribution of health care resources. Therefore, provinces (cities) in China should continue to increase investment in health care assets to effectively promote economic growth in their regions.

Data on health assets per capita are difficult to obtain, so we used the number of hospital beds per 1000 people (LnCW) to express direct effects. LnCW passed the 1% significance test with a regression coefficient of 1.5826%. An increase of 1% economic growth by 1.5826%; the significant value of the indirect effect regression coefficient was 0.2283, indicating that for every 1% increase in per capita health resources in the region the economic growth of the surrounding area increased by 0.2283%. The total effect regression coefficient was 1.8109.
and it was statistically significant. This means that an increase in per capita health assets increased the GDP growth rate of the surrounding area by 1.8109%. This is not difficult to understand. Indeed, the health care industry is a productive industry and, as such, it can promote economic growth in provinces and their neighbouring regions.

The direct, indirect and total effect regression coefficients of health insurance expenditure (LnMIE) were 1.4100, 0.2247 and 1.6348, respectively, statistically significant at the 1% level. This shows that every 1% increase in health insurance expenditure in this region can have a direct effect of 1.4100% on GDP growth in the region, an indirect effect of 0.2247% on GDP growth in neighbouring cities and a total economic growth effect of 1.6348% on GDP. Because of the significant indirect effect, the health insurance expenditure had an obvious spillover effect. This shows that on the one hand, health insurance expenditure promotes the economy of the province by improving the health level of local residents and on the other, it also promotes the health level and economic growth of neighbouring provinces through spillover channels.

The spatial autoregressive coefficient of $W \times \text{dep.var}$ was significant at the 1% level, with a value of 0.4759. This indicates that the spatial lag variable plays a significant role in promoting economic growth. The economic impact of each province and city is significant. In other words, China's economically developed coastal areas and large cities can affect neighbouring provinces (cities) through positive spillover effects. The spillover effect mechanism of health resource investment on economic growth is mainly reflected in 2 aspects. One is the competition effect: when the local financial medical investment promotes the economic development of the region, the improvement in economic strength can attract foreign investment, talent inflow, idea sharing and technology exchange, and produce a spillover effect on the adjacent regions (22). The other aspect is the benchmarking effect: because the promotion of government officials requires improvement in economic performance and an emphasis on people's livelihood, financial expenditure in the performance evaluation of local governments, local officials will imitate the cities which have similar grades in neighbouring areas (23) so as to continuously increase financial investment in medical care and promote economic growth in the same direction. Therefore, provinces (municipalities) in China should continue to invest in health care, to improve the health of the people and to drive mutual prosperity in other regions.

**Conclusions and recommendations**

**Economic interaction**

The above research results show that economic growth in 31 provinces (municipalities) in China not only benefits from local health expenditure input but also from that of neighbouring provinces (cities). Thus, there is significant spatial dependence and obvious economic interaction between the various provinces and cities. To better allocate health resources, full play should be given to the spatial spillover effect of health resources. To facilitate high quality development and economic advancement, we offer the following suggestions.

**Overall planning and coordinated development**

High-quality development is based on the idea that everyone can enjoy the benefits of economic development. We recommend strengthening the cooperation between neighbouring provinces in terms of health expenditure, promoting the free flow of health resources, health human capital and other elements between provinces and cities, allowing the spillover effect between provinces (cities) and the benign interaction of economic development and promoting coordinated development of the economy. We recommend expanding the concept of high quality development by actively establishing a regional health care cooperation system and mechanism. When formulating health policies, focus should be placed on coordinating regional, urban and rural planning, and the overlap and waste of health resources should be avoided. Promoting high-quality economic development is thus a necessity for coordinated development of regional economies.

**Mutual exchange and cooperation**

In accordance with the requirements for high-quality development, by taking advantage of the spillover of inter-provincial health expenditure and inter-regional interdependence, China should encourage exchange and cooperation among regions, and actively encourage the flow of health care technology talent to improve the spillover of knowledge. At present, China's high-quality health resources and high-end health technicians are concentrated in coastal regions and large cities. Instead,
this talent should be diffused from coastal areas toward the central and western regions and remote mountainous areas and exchanged across provinces (cities) to achieve a balanced development of health care in the various regions of China. In underdeveloped areas in the central and western regions, the spillover effect should be exploited to compensate for the shortcomings of medical technology and health care investment in those regions.

**Formulating policies and optimizing the environment**

Policies should be designed according to the requirements for high-quality development, which in turn play a role in promoting health care policies. The policy environment affects the spillover of spatial effects. In hospitals, health centres and clinics, an efficient and modern health care system should be established to develop medical technology and fill the gap in efficiency, and to benefit from the spillover effect of health care investment. Relevant laws and the open market mechanism should be improved, health care management and health supervision systems should be standardized and a soft environment should be encouraged for health care development and the implementation of social policy. In addition, government should establish a scientific and reasonable health insurance system. Against the background of the gradual improvement in China’s social security system, including health insurance, a reasonable health insurance system is to include the key groups and vulnerable groups, not only to ensure fairness but also to consider the efficiency of health insurance and to develop commercial health insurance to meet the personalized needs of residents so as to reduce the waste in health resources. At the same time, this can improve the utilization efficiency of health resources.

**Acknowledgment**

The authors thank all participants who contributed to the study.

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**Competing interests:** None declared.

**Effets directs et indirects des dépenses de santé sur la croissance économique en Chine**

**Résumé**

**Contexte :** Les principales contradictions sociales en Chine ont changé : le concept central est le développement de haute qualité. L’investissement dans les soins de santé améliore la santé des résidents et favorise la croissance économique régionale.

**Objectifs :** Analyser les effets économiques directs et indirects des dépenses de santé au cours de la période comprise entre 2012 et 2018 et tester si l’investissement chinois dans les soins de santé répond aux exigences d’un développement de haute qualité.

**Méthodes :** Nous avons sélectionné des données de panels spatiaux reflétant l’entrée et la sortie des ressources de santé. Nous avons utilisé la fonction de production de connaissances et un modèle d’économie spatiale pour effectuer une analyse empirique de 31 provinces afin de montrer les effets des dépenses de santé sur la croissance économique.

**Résultats :** Le logarithme naturel du développement économique (LnGDP) était la variable dépendante ; les variables explicatives incluaient les logarithmes naturels des apports financiers pour la santé (LnHI), des apports en personnel de santé (LnHR), des actifs de santé (LnCW) et des dépenses d’assurance maladie (LnHIE). Les coefficients de régression des effets directs, indirects et totaux des LnHI étaient respectivement de 0,4346, 0,0623 et 0,4970 (tous statistiquement significatifs). Le coefficient d’effet direct de LnHR (0,3343) était statistiquement significatif. Les coefficients de régression pour les effets indirects et totaux étaient respectivement de –0,6779 et –0,3436. Les coefficients de régression de l’effet direct, indirect et total pour lesLnCW et les LnHIE étaient tous statistiquement significatifs.

**Conclusion :** Les LnHI et les LnHIE favorisent tous deux la croissance économique dans les provinces et dans les provinces voisines, c’est-à-dire que l’investissement dans les soins de santé à des effets positifs directs et indirects. En outre, l’augmentation de l’apport en personnel de santé peut favoriser la croissance économique d’une province mais pas celle des provinces voisines. Une planification globale et un développement coordonné faciliteront un développement de haute qualité et le progrès économique.
The effects of health expenditure on economic growth in the Chinese provinces: a mixed empirical analysis.

Su Binjia, Zhan Taoxing, Li Haibing

The hypothesis: The direct and indirect effects of health expenditure on economic growth in Chinese provinces were analyzed. The study aimed to understand the direct and indirect effects of health expenditure on economic growth.

The results: The coefficients of the direct effects of health expenditure were significant. The coefficients of the indirect effects were also significant. The total effects were also significant.

Conclusion: Health expenditure positively affects economic growth in Chinese provinces. The indirect effects are more significant than the direct effects.


Time for a do-not-resuscitate policy? Outcomes of inpatient cardiopulmonary resuscitation in very old patients in Bahrain

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Abstract

Background: Globally, do-not-resuscitate orders have been used for many years. Due to the lack of a do-not-resuscitate policy, full resuscitative measures including cardiopulmonary resuscitation (CPR) are applied for all patients admitted to our institution regardless of prognosis.

Aims: To observe the outcomes of very old patients who underwent CPR, including mortality rate and length of stay. This will allow discussion of implementing a do-not-resuscitate policy in Bahrain, and its associated challenges.

Methods: This was a retrospective observational study conducted in a 1200-bed tertiary hospital in Bahrain. We included patients aged ≥ 80 years admitted under general medicine who underwent CPR between January and July 2018. Medical records were reviewed for patients’ characteristics and outcomes.

Results: Ninety patients were included in the study with an average age of 87.91 (6.27) years. The inhospital mortality rate was 96.67%, and 5778% of patients died immediately after the first CPR attempt and 38.89% died during subsequent attempts. The survival rate at 1-year follow-up was only 1.11%.

Conclusion: Survival of very old patients after cardiopulmonary arrest is low, and survival at discharge is even lower. The increase in the very old population will lead to a higher demand for critical care resources given the absence of a do-not-resuscitate policy. Our results demonstrate that implementing such a policy at our institution is crucial to reduce the number of futile CPR attempts, minimizing patients’ suffering, and optimizing resource allocation.

Keywords: cardiopulmonary resuscitation, critical care, do not resuscitate, geriatric medicine, inpatient mortality

Citation: Al Saeed M; Al Awainati M; Al Mousawi B; Al Barni M; Abbas F; Sarwani A. Time for a do-not-resuscitate policy? Outcomes of inpatient cardiopulmonary resuscitation in very old patients in Bahrain. East Mediterr Health J. 2022; 28(3):213–220 https://doi.org/10.26719/emhj.22.010

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Introduction

The World’s population is ageing; most notably due to longer life expectancy accompanied by decreased fertility rates (1). According to Bahrain’s national census, people aged ≥ 60 years comprised 3.5% of the population in 2010, whereas it is predicted to increase to 24.9% in 2050 (2). This demographic change will have an impact on resource allocation in the health sector due to an eventual increase in demand on intensive healthcare services. Current estimations indicate that two thirds of all bed-days in intensive care units (ICUs) in the developed world have been allocated to patients aged ≥ 65 years (3). It has been widely accepted in many countries to withhold medical therapy at the end of life based on medical grounds (4–6). On the contrary, it is common practice in our institution to provide full investigative and therapeutic measures to all cases including those deemed futile. This includes cardiopulmonary resuscitation (CPR), intravenous antibiotics, and mechanical ventilation.

Due to the lack of a policy, do-not-resuscitate (DNR) orders are not currently implemented in our institution. Multiple factors oppose the application of such a policy, including local culture and religion. As a result, patients undergo the maximum therapy regardless of prognosis. Wedaei et al. surveyed local physicians about withdrawing mechanical ventilation in cases of brain death and all agreed that such decisions need to be collectively owned by healthcare professionals, patients, families, religious advisors, and society (7).

In this study, we investigated the outcomes of very old patients (≥ 80 years) who were admitted and underwent inhospital CPR at our institute. We also discuss the need to produce and apply a local DNR policy in Bahrain, alongside its framework and expected challenges.

Methods

Study design, population and sample

This retrospective study was carried out in a 1200-bed tertiary hospital in Bahrain. All patients admitted under general medicine at our institution between January and July 2018 were assessed for eligibility. We included patients aged ≥ 80 years who underwent inpatient CPR. Patients with incomplete electronic medical records were excluded. There was a total of 894 patients admitted in that period and 90 met our selection criteria.

Conclusion:

Survival of very old patients after cardiopulmonary arrest is low, and survival at discharge is even lower. The increase in the very old population will lead to a higher demand for critical care resources given the absence of a do-not-resuscitate policy. Our results demonstrate that implementing such a policy at our institution is crucial to reduce the number of futile CPR attempts, minimizing patients’ suffering, and optimizing resource allocation.

Keywords: cardiopulmonary resuscitation, critical care, do not resuscitate, geriatric medicine, inpatient mortality

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Study outcomes and measures

The main outcome examined was inpatient mortality, which was then subdivided based on the number of CPR attempts into early and late mortality. Early mortality was defined as death during the initial CPR attempt and late mortality was defined as death after surviving the initial but not the subsequent CPR attempts. Additionally, 1-year mortality was examined for survivors. Baseline characteristics including age, gender, chronic illnesses, total number of medications, reason for admission, and cause of death were retrieved from the electronic health system. Charlson’s Comorbidity Index (8) was calculated to obtain the estimated 10-year chance of survival. The Katz Index of Independence in Activities of Daily Living (9) was calculated to identify the level of function prior to admission. The Acute Physiology And Chronic Health Evaluation II (APACHE II) (10) scores were recorded to indicate the physiological condition of the patients before CPR.

Ethical considerations

The study was conducted after approval from the Secondary Health Care Research Committee at the Ministry of Health in Bahrain.

Statistical analysis

The baseline characteristics of the patients were described using frequencies with proportions for categorical variables and means with standard deviations for continuous variables. Descriptive comparisons were made using the χ² or Fisher’s exact test for categorical variables and t test or Mann–Whitney U test for continuous variables. P < 0.05 was considered to indicate statistical significance. All statistical analyses were conducted using SPSS version 23 software.

Results

Baseline characteristics of patients

A total of 90 patients were included in this study. The mean age was 87.91 (6.27) years and 48 (53.33%) were male (Table 1). Hypertension (n = 55, 61.11%) and diabetes mellitus (n = 43, 47.78%) were the most prevalent comorbidities, while respiratory tract (n = 41, 45.56%) and urinary tract (n = 35, 38.89%) infections were the most common admission diagnoses. The mean APACHE II score was 28.53 (5.80) among all patients. Mean scores of Charlson’s Comorbidity Index and Katz Index were 14.59 (18.29) and 2.89 (2.28), respectively.

Early and late mortality outcomes

No significant differences in demographics and comorbidities were found between the early and late mortality groups (Table 2). Respiratory tract infections were significantly higher in the late mortality group (P = 0.020), while dehydration and infected pressure ulcers were significantly more common in the early mortality group. APACHE II score was significantly higher in the early mortality group (P < 0.001). No significant differences in Katz Index and Charlson’s Comorbidity Index were found among the early and late mortality groups.

Admission and resuscitation characteristics

The average length of stay was 21.23 (23.62) days and the admission–CPR interval was 12.22 (16.80) days (Table 3). Most patients had nonshockable initial rhythms (n = 85, 94.44%), while only 5 (5.56%) had shockable rhythms. Out of the 90 patients, 87 (96.67%) died in hospital; 52 (57.78%) died immediately after the first CPR (early mortality), and 35 (38.89%) in subsequent CPR attempts (late mortality). Of note, the survival rate at discharge was 3.33% (n = 3), while the 1-year survival rate was only 1.11% (n = 1). Patients in the late mortality group survived for an average of 18.91 (23.53) days after the initial successful CPR attempt. No significant differences were found in admission–CPR interval, initial rhythm during CPR, and duration of CPR between the early and late mortality groups.

<table>
<thead>
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<td><strong>Age groups</strong></td>
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<td>80–89 years</td>
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<tr>
<td>90–99 years</td>
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<tr>
<td>≥ 100 years</td>
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<tr>
<td><strong>Male</strong></td>
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<tr>
<td><strong>Bahraini</strong></td>
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<td><strong>No. of chronic diseases, mean (SD)</strong></td>
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<tr>
<td><strong>No. of regular medications, mean (SD)</strong></td>
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<tr>
<td><strong>Comorbidities</strong></td>
</tr>
<tr>
<td>Hypertension</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
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<tr>
<td>Cerebrovascular accident</td>
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<tr>
<td>Dementia</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
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<tr>
<td>Dyslipidaemia</td>
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<tr>
<td><strong>Admission diagnosis</strong></td>
</tr>
<tr>
<td>Respiratory tract infection</td>
</tr>
<tr>
<td>Urinary tract infection</td>
</tr>
<tr>
<td>Dehydration</td>
</tr>
<tr>
<td>Infected pressure ulcers</td>
</tr>
<tr>
<td>Gastrointestinal bleeding</td>
</tr>
<tr>
<td>Others*</td>
</tr>
<tr>
<td>Katz Index, mean (SD)</td>
</tr>
<tr>
<td>Charlson’s Comorbidity Index, mean (SD)</td>
</tr>
<tr>
<td>APACHE II score, mean (SD)</td>
</tr>
</tbody>
</table>

*Some patients had multiple diagnoses at admission.

**Other diagnoses include hyponatremia, myocardial infarction and acute gastroenteritis.

APACHE II = Acute Physiology And Chronic Health Evaluation II; SD = standard deviation.
Discussion

Islamic doctrine influences laws and policies in Bahrain, including some elements of medical practice. Withholding treatment in terminal illness has always been a source of debate among Muslim scholars (11). Not all Islamic countries have approved the application of DNR orders. Policy-makers in Bahrain are still undecided about the legality of such orders. Since there is no end-of-life policy at our institution, patients are ventilated during or before CPR. This sometimes leads to prolonged mechanical ventilation dependency accompanied by poor outcomes. In our study, patients survived for 18.91 (23.53) days after the first successful CPR attempt (late mortality). It is common practice to intubate dying patients electively as a comfort measure while administering sedatives. A DNR order is documented by a physician so that CPR is not initiated if a patient goes into cardiopulmonary arrest. DNR orders became well established in the United States of America with the advent of CPR training and defibrillators in the 1970s (12). DNR orders are usually initiated when resuscitation would not alter the outcome of a disease, therefore preventing unnecessary suffering and avoiding futile care (12). In countries where DNR orders are practiced, the decision-making process is similar (13). For example, in Sweden, the patient’s primary physician decides on the DNR order after consultation with other certified professionals and preferably with the patient (13). Typically, a DNR order forbids CPR and intubation while permitting treatment for infections and other treatable conditions.

The American Heart Association recommends the widespread use of advance directives for all patients admitted to hospital in addition to frank discussions about prognosis and survival rates after CPR (14). Post-CPR survival is associated with a high chance of neurological and functional impairment leading to poor quality of life (14). The poor outcomes for in-hospital CPR are most likely because cardiopulmonary arrest is usually associated with advanced chronic illness rather than an easily reversible acute cardiopulmonary event such as isolated arrhythmia (14).

In a meta-analysis, Ebell et al. concluded that less than half the patients survived immediately post-CPR and only 13.4% were discharged (15). They noted that survival rates dropped with age (15). In a retrospective study, Murphy et al. concluded that only 6.5% of adults aged ≥ 70 years who underwent in-hospital CPR survived to discharge (16). Our results demonstrated an even lower

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Early mortality, N = 52</th>
<th>Late mortality, N = 35</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr), mean (SD)</td>
<td>87.69 (6.17)</td>
<td>87.37 (5.37)</td>
<td>0.803</td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
<td>0.477</td>
</tr>
<tr>
<td>80–89 years</td>
<td>36 (69.23)</td>
<td>25 (71.43)</td>
<td></td>
</tr>
<tr>
<td>90–99 years</td>
<td>14 (26.92)</td>
<td>9 (25.71)</td>
<td></td>
</tr>
<tr>
<td>≥ 100 years</td>
<td>2 (3.85)</td>
<td>1 (2.86)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>27 (51.92)</td>
<td>20 (57.14)</td>
<td>0.652</td>
</tr>
<tr>
<td>Bahrainian</td>
<td>51 (98.08)</td>
<td>35 (100)</td>
<td>0.598</td>
</tr>
<tr>
<td>No. of chronic diseases, mean (SD)</td>
<td>2.88 (1.83)</td>
<td>2.83 (1.54)</td>
<td>0.882</td>
</tr>
<tr>
<td>No. of regular medications, mean (SD)</td>
<td>4.71 (3.45)</td>
<td>6.11 (3.86)</td>
<td>0.080</td>
</tr>
<tr>
<td>Comorbidities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>31 (59.62)</td>
<td>22 (62.86)</td>
<td>0.761</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>27 (51.92)</td>
<td>15 (42.86)</td>
<td>0.407</td>
</tr>
<tr>
<td>Cerebrovascular accident</td>
<td>13 (25.00)</td>
<td>13 (37.14)</td>
<td>0.225</td>
</tr>
<tr>
<td>Dementia</td>
<td>12 (23.08)</td>
<td>9 (25.71)</td>
<td>0.778</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>11 (21.15)</td>
<td>9 (25.71)</td>
<td>0.620</td>
</tr>
<tr>
<td>Dyslipidaemia</td>
<td>10 (19.23)</td>
<td>7 (20.0)</td>
<td>0.929</td>
</tr>
<tr>
<td>Admission diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory tract infection</td>
<td>18 (34.62)</td>
<td>21 (60)</td>
<td>0.020</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>21 (40.38)</td>
<td>13 (37.14)</td>
<td>0.761</td>
</tr>
<tr>
<td>Dehydration</td>
<td>14 (26.92)</td>
<td>2 (5.71)</td>
<td>0.013</td>
</tr>
<tr>
<td>Infected pressure ulcers</td>
<td>9 (17.31)</td>
<td>0 (0)</td>
<td>0.010</td>
</tr>
<tr>
<td>Gastrointestinal bleeding</td>
<td>4 (4.69)</td>
<td>3 (8.57)</td>
<td>0.591</td>
</tr>
<tr>
<td>Katz Index, mean (SD)</td>
<td>2.90 (2.29)</td>
<td>2.80 (2.32)</td>
<td>0.837</td>
</tr>
<tr>
<td>Charlson’s Comorbidity Index, mean (SD)</td>
<td>15.37 (18.64)</td>
<td>13.11 (17.24)</td>
<td>0.571</td>
</tr>
<tr>
<td>APACHE II score, mean (SD)</td>
<td>30.73 (5.29)</td>
<td>26.34 (4.27)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

APACHE II = Acute Physiology And Chronic Health Evaluation II; SD = standard deviation.
survival rate of 3.33%. This can be attributed to multiple factors. Firstly, with the absence of a DNR policy, there is no decision-making process for who would benefit from CPR. Although futile, CPR is still performed in unfavourable cases such as terminal illness. This was shown by the fact that most patients (57.78%) died after initial CPR. Many of our patients would not have been appropriate candidates for CPR in the first place if DNR orders were allowed. Had they been at a different institution, they would not have been offered CPR. As a result, these additional futile cases could be responsible for lowering our survival rate. Secondly, it could be that our patients were managed in a general ward; therefore, it would have been interesting to look at post-CPR survival in our ICU. Thirdly, our patients generally had multiple comorbidities and were in critical condition as shown by the high APACHE II scores. Fourthly, most of the initial rhythms may have been nonshockable, which carry a lower chance of survival, especially in the older age group (21). Lastly, this low survival rate could have been due to poor technique; therefore, it would have been interesting to compare outcomes with the quality of CPR performed.

Our results showed no significant difference in Katz Index and Carlson’s Comorbidity Index scores between the early and late mortality groups. The APACHE II scores were, however, significantly higher in the early mortality group. This supports the fact that high APACHE II scores indicate severe illness, leading to a high risk of inhospital mortality (10). Regarding discussing DNR with patients and their relatives, our results demonstrate that APACHE II score could be helpful in predicting the chances of achieving return of spontaneous circulation after the initial CPR attempt. Further studies at our institution are needed to identify those predictors that could prove useful when discussing DNR orders with patients and relatives. These studies could include patients admitted under other specialties, in addition to other predictors such as location of CPR and arrest to CPR time.

Some of our patients undergo CPR multiple times since a DNR order cannot be written. These are time consuming and costly, and cause trauma, pain and suffering to patients and relatives. Menon et al. described the chances of survival after multiple CPRs in > 400 000 elderly patients (18). Survival rates at discharge for patients who underwent CPR once and more than once were 17.7% and 8.8%, respectively. The median survival durations after discharge for patients who underwent CPR once and more than once were 20.6 and 10.5 months, respectively (18). This information is helpful when discussing end of life care with patients and relatives who achieve return of spontaneous circulation but remain at risk of further arrest.

In Sharia law, a person is considered dead if the following criteria are met: (1) their heart and breathing have stopped completely and physicians have determined that both cannot be resumed; and (2) all brain function has ceased and expert physicians have determined that this cessation is irreversible (19). While the definition of death is clearly understood, the decision to withdraw or decide not to initiate certain treatments such as CPR has been debated by scholars (20). The consensus on applying DNR orders is still evolving, with Islamic verdicts or fatwas, in some countries, indicating the decision of medical futility is to be decided by competent physicians on the case (21). Therefore, the issue of DNR orders is not fully resolved and is influenced by physicians’ choices and preferences (21). In our opinion, when there is strong clinical evidence supporting the absence of a net permanent benefit from the resuscitation attempt, the evidence must be interpreted in the context of previous institutional experience and data, similar to ours, from the literature supporting this. When discussing CPR from an Islamic perspective, there are 2 major principles that are emphasized in the Qur’an: preservation of life (22) and preservation of resources (23). A decision for DNR is against the principle of preservation of life; however, it it agrees with preservation of resources. Normally,
preservation of life takes precedence over preservation of resources, but when the certainty of life is absent, consideration for preserving resources takes precedence.

Deciding on DNR, particularly early in the hospital stay, can significantly reduce use of resources (24). Early identification of such patients and careful evaluation based on objective and validated criteria could reduce unnecessary patient suffering and medical care costs by limiting the therapeutic options. The same is the case for the criteria of admission to ICU. According to the American Thoracic Society, ICU admission should only be offered to patients who will likely benefit from it (25). Our hospital has a 22-bed ICU. Given the absence of a DNR policy, accommodating all patients in the ICU can prove challenging and impossible at times. As a result of the high demand for ICU beds, critically ill patients are treated in general wards. In principle, instigating a DNR policy would reduce the number of critically ill and ventilated patients and lower the demand on ICU. This conforms with the principle of preservation of natural resources.

Saudi Arabia is a neighboring Islamic country with close cultural, religious, economic, and political ties to Bahrain. In Saudi Arabia, DNR orders are widely used after being clarified by the Presidency of the Administration of Islamic Research and Ifta in their Fatwa number 12086 issued on 30/06/1409(Hijra) [1988 AD]. In summary, this highlights 6 situations where a DNR order is granted: (1) the patient is dead on arrival at a hospital; (2) the condition has been determined by a panel of physicians as untreatable and death is imminent; (3) there are repeated cardiac arrests or the patient suffers from advanced cardiopulmonary disease; (4) the patient is unfit for resuscitation because of their condition; (5) the patient is in a vegetative state; and (6) resuscitation is considered futile (26). Based on this fatwa, many hospitals in Saudi Arabia have implemented a No Code policy (same as a DNR order). The policy states that No Code status is applied after the agreement of 3 physicians; 2 of whom are consultants (4). The family members are informed about the decision but play no role in the decision-making. Collectively, we agree that physicians should make the decision as a team, and keep the family fully informed at all times.

Once a DNR policy is instituted, education and training of healthcare workers in all aspects related to the policy are crucial. A study in Saudi Arabia demonstrated that physicians were not familiar with DNR policies and the fatwa, and had lacked understanding about treating DNR-labelled patients (30). Another concern about initiating a DNR order is the decrease in level of care provided. Al Farhan et al. concluded that placement of DNR orders significantly reduced vital sign measurements, investigations, documentation, and visits by physicians (31). Additionally, some Saudi hospitals lack regulations to guide the use of DNR orders and their effect on quality of care (32). The sensitivity of this matter means that implementing such a policy will not succeed if proper education is not prioritized in addition to support and reinforcement by administrators and policy-makers.

Our study had several limitations. First, this was a retrospective study and erroneous record-keeping could have affected the results. Second, data were not available on CPR performance or quality of CPR performed, including adherence to guidelines and the level of experience of the CPR team members. Third, the patients were selected from those admitted solely under general medicine, which may not represent all other specialty admissions. Therefore, it may not be suitable to generalize our results to other specialties, hospitals or countries. Finally, our sample size was small; however, our study is the first of its kind in Bahrain to focus on the outcomes of critically unwell patients aged ≥ 80 years undergoing CPR.

Conclusion

Inpatient cardiopulmonary arrests usually lead to unfavourable outcomes in very old patients. For instance, our study showed low survival rates post-CPR during admission and follow-up at 1 year. There is currently no attempt to discuss conservative management options.
with patients due to the absence of a DNR policy. When considering outcomes, patient’s wishes, and wise allocation of resources, the development of a DNR policy in Bahrain is of utmost importance. Additionally, regarding treatment of very old patients, especially with multiple comorbidities, it is important to ensure that our priority is not to do harm by futile CPR attempts.

**Funding:** None.

**Competing interests:** None declared.

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**Est-il temps d’adopter une politique de non-réanimaion ? Issu de la réanimation cardiopulmonaire en milieu hospitalier chez des patients très âgés à Bahreïn**

**Résumé**

**Contexte:** Dans le monde entier, les ordres de ne pas réanimer sont utilisés depuis de nombreuses années. En raison de l’absence de politique concernant la non-réaniamation, des mesures de réaniamation complète, y compris la réaniamation cardiopulmonaire, sont appliquées à tous les patients admis dans notre établissement, indifféremment du pronostic.

**Objectifs:** Observer l’issu pour les patients très âgés qui ont subi une réaniamation cardiopulmonaire, y compris le taux de mortalité et la durée du séjour. Cela permettra d’examiner la nécessité de mettre en œuvre une politique de non-réaniamation à Bahreïn et de passer en revue les défis qui y sont associés.

**Méthodes:** Il s’agissait d’une étude observationnelle rétrospective menée dans un hôpital tertiaire de 1200 lits à Bahreïn. Nous avons inclus des patients âgés de 80 ans et plus admis en service de médecine générale et ayant subi une réaniamation cardiopulmonaire entre janvier et juillet 2018. Les dossiers médicaux ont été examinés afin de déterminer les caractéristiques des patients et l’issu de la procédure.

**Résultats:** Quatre-vingt-dix patients ont été inclus dans l’étude avec une moyenne d’âge de 87,91 ans (ET 6,27). Le taux de mortalité en milieu hospitalier était de 96,67 ; 57,78 % des patients sont décédés immédiatement après la première tentative de réaniamation cardiopulmonaire et 38,89 % sont décédés au cours des tentatives ultérieures. Le taux de survie à un an n’était que de 1,11 %.

**Conclusion:** La survie des patients très âgés suite à un arrêt cardiopulmonaire est faible, et la survie à la sortie de l’hôpital est encore plus faible. Compte tenu de l’absence de politique de non-réaniamation, l’augmentation de la population très âgée entraînera une demande accrue de ressources en soins intensifs. Nos résultats montrent que la mise en œuvre d’une telle politique au sein de notre institution est cruciale pour réduire le nombre de tentatives de réaniamation cardiopulmonaire inutiles, minimiser la souffrance des patients et optimiser l’allocation des ressources.
References


COVID-19 infection mortality risk in Iranian patients with type 2 diabetes, hypertension and obesity

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Abstract

Background: Diabetes mellitus and hypertension are highly prevalent among patients with severe COVID-19.

Aims: To study the mortality risk of COVID-19 infection in patients with type 2 diabetes and additive effect of hypertension and obesity in the Iranian population.

Methods: This was a cross-sectional survey of the national COVID-19 registry from the Iranian Ministry of Health. The medical status of 22 002 patients with COVID-19 between 1 March and 30 April 2020 was analysed.

Results: Patients with type 2 diabetes had a higher risk of mortality with an odds ratio (OR) of 1.67 [95% confidence interval (CI): 1.53–1.82, P < 0.001]. The risk of mortality was also high in patients with diabetes and hypertension, with an odds ratio of 1.76 (95% CI: 1.56–1.99, P < 0.001). The odds ratio of the risk of mortality in patients with diabetes, hypertension and obesity was 1.87 (95% CI: 1.35–2.58, P < 0.001).

Conclusion: Type 2 diabetes, hypertension and obesity each predict mortality in Iranian patients with COVID-19, and when they are present together, patients have a greater risk of mortality.

Keywords: COVID-19, diabetes mellitus, hypertension, obesity, mortality, Iran

Citation: Shadnoush M; Rabizadeh S; Esteghamati A; Nakhjavani M; Paridari NB; Khoshabi M; et al. COVID-19 infection mortality risk in Iranian patients with type 2 diabetes and additive effect of hypertension and obesity. East Mediterr Health J. 2022;28(3):221–224 https://doi.org/10.26719/emhj.21.056

Introduction

COVID-19 is a rapidly spreading global pandemic. At the time of writing, there had been > 157 million cases and > 3 274 000 deaths recorded worldwide (1). The Islamic Republic of Iran is known as the hotspot of COVID-19 in the Middle East (2), with around 2 640 000 cases and > 74 000 deaths recorded (1). Diabetes mellitus (DM) is associated with higher mortality risk in hospitalized patients with COVID-19 (3), which was observed in previous coronavirus epidemics, including the Middle East respiratory syndrome (4), and severe acute respiratory syndrome (5). Patients with diabetes have an increased risk of infection. Also, severe COVID-19 might worsen diabetes through direct effects on β-cell function, and could be a precipitating factor for acceleration of acute complications of diabetes (6). Patients with type 2 diabetes mellitus usually suffer from other comorbidities such as obesity and hypertension, which can accentuate the poor prognosis and mortality risk of COVID-19 (7, 8). Furthermore, among patients with severe COVID-19, type 2 DM (T2DM) and hypertension are more prevalent (9).

Although the number of publications about COVID-19 has progressively increased in the Middle East and North Africa (MENA), there is a need for accurate data on the epidemiology of COVID-19 from all MENA countries (10). In this study, we studied the mortality risk in COVID-19 patients in the Islamic Republic of Iran with comorbid T2DM and the additive effects of hypertension and obesity.

Methods

This was a cross-sectional survey from 1 March to 30 April 2020 of the national COVID-19 registry from the Iranian Ministry of Health, including 22 002 patients with COVID-19 from 58 medical universities located across 31 provinces. The following clinical information was recorded daily from all medical centres: demographics, symptoms, signs, and physical examination on admission, medical and medication history, anthropometrics, laboratory test results (including complete blood count and inflammatory markers), imaging findings, therapeutic interventions, and disease outcomes. Suspicions diagnosis of COVID-19 was based on clinical signs and symptoms as well as computed tomography, and definitive diagnosis was based on a positive reverse transcription polymerase chain reaction (RT-PCR) nasopharyngeal swab test (11).

T2DM was defined according to positive medical history, consumption of antidiabetic medication, or glycated haemoglobin ≥ 6.5% and fasting blood
glucose ≥ 126 mg/dL. Hypertension was defined based on medical history of patients or use of antihypertensive medication. Obesity was defined as body mass index (BMI) ≥ 30 kg/m².

Data were analysed using SPSS for Windows version 24 (Chicago, IL, USA). Logistic regression analysis was performed to show the adjusted effect of T2DM, hypertension and obesity on the mortality risk of COVID-19. Hence, sex, age, BMI, smoking, and comorbidities were included in the model.

The study was performed in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Results

There were 22,002 patients with suspicious diagnoses of COVID-19, and 17,476 (79.4%) had definite diagnoses with positive RT-PCR nasopharyngeal swab test results. The mean age was 51.8 (21.1) years and 41.7% were female (Table 1). Among patients with positive RT-PCR tests, 7,713 (44.1%) had T2DM: 3,016 (39.1%) female and 4,697 (60.9%) male (Table 2), and 6,060 (34.7%) had a history of hypertension (Table 1). Among patients with T2DM, 4,167 (54%) had a history of hypertension and 5,570 (69.6%) were overweight or obese (Table 2).

Logistic regression analysis showed that patients with T2DM, hypertension or obesity had a significantly higher risk of mortality (Table 3). The risk of mortality was significantly higher in patients with T2DM and hypertension, or T2DM, hypertension and obesity than in patients with any of the conditions alone.

Discussion

The current study shows that Iranian patients with COVID-19 with diabetes or hypertension or both comorbid conditions had a significantly increased risk of mortality. When obesity was added the mortality risk increased. Our results agree with a previous study in the MENA region by Alguwaihes et al. which showed that patients with DM, specifically T2DM, suffer from other conditions had a significantly higher mortality rate than patients without DM (20.5% vs 12.3%) (12).

Due to the high prevalence of diabetes worldwide, these patients represent a large percentage of the COVID-19 population. Mantovani et al. in a meta-analysis of 83 studies involving 78,874 patients hospitalized with COVID-19 in 2020 showed that the pooled prevalence of diabetes was 14.34%. Hospitalized patients with diabetes had a 2-fold higher risk of having severe COVID-19 and a 3-fold increased risk of mortality (13). In our study, 35% of all patients with COVID-19 had T2DM. DM and hypertension are 2 of the more prevalent comorbidities among patients with COVID-19 (4). Unfortunately, patients with DM, specifically T2DM, suffer from other comorbidities and the additive effect of those diseases results in severe COVID-19. Khan et al. showed that patients with 2 or more comorbidities such as T2DM and hypertension have a 2.5 times greater risk of worse outcome than patients with 1 or no comorbidities (15).

Prevalence of hypertension was high in the general population. Current knowledge about hypertension and COVID-19 is from observational studies that have shown an association between hypertension and critical illness

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**Table 1** Prevalence of T2DM, hypertension and high BMI among 17,476 patients diagnosed with COVID-19

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Sex</th>
<th>Age, mean (SD)</th>
<th>Hypertension</th>
<th>Obesity (BMI &gt; 30 kg/m²)</th>
<th>Overweight (25 &lt; BMI &lt; 30 kg/m²)</th>
<th>Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>7281 (41.7%)</td>
<td>6060 (34.7%)</td>
<td>7713 (44.1%)</td>
<td>1226 (5.6%)</td>
<td>6816 (39.0%)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>10,195 (58.3%)</td>
<td>518 (2.11) years</td>
<td>4167 (54%)</td>
<td>1933 (8.78%)</td>
<td>1933 (8.78%)</td>
</tr>
</tbody>
</table>

Results presented as number (percentage), unless otherwise stated. BMI = body mass index; SD = standard deviation; T2DM = type 2 diabetes mellitus.

---

**Table 2** Characteristics of 7,713 patients with type 2 diabetes and COVID-19

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Sex</th>
<th>Age, mean (SD)</th>
<th>Hypertension</th>
<th>Obesity (BMI &gt; 30 kg/m²)</th>
<th>Overweight (25 &lt; BMI &lt; 30 kg/m²)</th>
<th>Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>3016 (39.1%)</td>
<td>4167 (54%)</td>
<td>442 (5.7%)</td>
<td>4928 (63.9%)</td>
<td>718 (9.3%)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4697 (80.9%)</td>
<td>4928 (63.9%)</td>
<td>7713 (44.1%)</td>
<td>6816 (39.0%)</td>
<td>718 (9.3%)</td>
</tr>
</tbody>
</table>

Results presented as number (percentage), unless otherwise stated. BMI = body mass index; SD = standard deviation.

---

**Table 3** Results of logistic regression analysis for prediction of mortality in patients with COVID-19

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>B</th>
<th>SE</th>
<th>P</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2DM</td>
<td>0.513</td>
<td>0.044</td>
<td>&lt; 0.001</td>
<td>1.67</td>
<td>1.53–1.82</td>
</tr>
<tr>
<td>HTN</td>
<td>0.345</td>
<td>0.044</td>
<td>&lt; 0.001</td>
<td>1.41</td>
<td>1.29–1.54</td>
</tr>
<tr>
<td>Obesity</td>
<td>0.254</td>
<td>0.080</td>
<td>0.001</td>
<td>1.29</td>
<td>1.10–1.51</td>
</tr>
<tr>
<td>T2DM+HTN</td>
<td>0.565</td>
<td>0.063</td>
<td>&lt; 0.001</td>
<td>1.76</td>
<td>1.56–1.99</td>
</tr>
<tr>
<td>T2DM+HTN+obesity</td>
<td>0.627</td>
<td>0.165</td>
<td>&lt; 0.001</td>
<td>1.87</td>
<td>1.35–2.58</td>
</tr>
</tbody>
</table>

CI = confidence interval; HTN = hypertension; OR = odds ratio; SE = standard error; T2DM = type 2 diabetes mellitus.
in COVID-19 but causality has not been established (16, 17). There is evidence that obesity can increase the severity of COVID-19, and when it coexists with other comorbidities such as diabetes, prognosis is even poorer (18). Moreover, there is a current global pandemic of obesity, which could make COVID-19 more severe (19).

Our study had some limitations. There was a lack of investigation of clinical laboratory factors such as glycaemic control, which can have a significant impact on mortality risk of COVID-19. In some cases, diagnosis of T2DM and hypertension was based on self-report, and some patients were newly diagnosed based on measurement of blood glucose and HbA1c. Unfortunately, the exact type of diagnosis was not available, and there was no information in the national registry about patients who were newly diagnosed with diabetes.

In conclusion, the current study shows that diabetes, hypertension and obesity each predicts mortality in patients with COVID-19 in the Iranian population, and when they coexist, patients have a greater mortality risk. Further studies are needed to investigate the effects of comorbidities on other adverse effects of COVID-19.

Acknowledgement
We would like to express our appreciation for the cooperation of all persons who contributed to this study.

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Competing interests: None declared.

Risque de mortalité lié à l’infection par la COVID-19 chez les patients iraniens souffrant de diabète de type 2, d’hypertension et d’obésité

Résumé
Contexte : Le diabète sucré et l’hypertension sont très prévalents chez les patients atteints d’une forme grave de COVID-19.

Objectifs : Étudier le risque de mortalité lié à l’infection par la COVID-19 chez les patients atteints de diabète de type 2 et l’effet additif de l’hypertension et de l’obésité dans la population iranienne.

Méthodes : Il s’agissait d’une enquête transversale du registre national de la COVID-19 du ministère iranien de la Santé et de l’Éducation médicale. L’état de santé de 22 002 patients atteints de COVID-19 entre le 1er mars et le 30 avril 2020 a été analysé.

Résultats : Les patients atteints de diabète de type 2 présentaient un risque de mortalité plus élevé avec un odds ratio (OR) de 1,67 [intervalle de confiance (IC) à 95 % : 1,53-1,82, p < 0,001]. Le risque de mortalité était également plus élevé chez les patients diabétiques et hypertendus, avec un OR de 1,76 (IC à 95 % : 1,56-1,99, p < 0,001). L’odds ratio du risque de mortalité chez les patients diabétiques, hypertendus et obèses était de 1,87 (IC à 95 % : 1,35-2,58, p < 0,001).

Conclusion : Le diabète de type 2, l’hypertension et l’obésité permettent respectivement de prédire la mortalité chez les patients iraniens atteints de COVID-19, et lorsqu’ils sont présents ensemble, les patients ont un risque de mortalité plus élevé.

الخلاصة
الخلفية: ينتشر داء السكري وارتفاع ضغط الدم انتشارًا كبيرًا بين المرضى المصابين بحالة وخيمة من كوفيد-19.

الأهداف: هدفت هذه الدراسة إلى دراسة خطر الوفاة الناجمة عن الإصابة بـ2019-ncov، في المرضى المصابين بالنمط 2 من السكري، وتأثير الارتفاع الضغط الدم والسمنة لدى السكان الإيرانيين.


النتائج: كان المرضى المصابين بالنمط 2 من السكري أكثر عرضة للوفاة بنسبة أرجحية 1.67 [فاحص تفاصل 0.95: 1.53-1.82، القمية الإحصائية 1.67]، وكان خطر الوفاة أيضًا أعلى لدى مرضى السكري وارتفاع ضغط الدم، بنسبة أرجحية 1.76 [فاحص تفاصل 0.95: 1.56-1.99].
References

Development of a World Health Organization mental health in schools programme in the Eastern Mediterranean Region

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Abstract

Background: Schools provide an exceptional opportunity for mental health promotion and intervention.

Aims: To describe the development of a World Health Organization (WHO) mental health in schools programme in the Eastern Mediterranean Region.

Methods: Two tenets guided development of the mental health in schools programme: (i) it used a multitiered system of support framework that includes 3 tiers of interventions (universal, early and targeted); and (ii) interventions that must be feasible for implementation by non-mental health professionals.

Results: The WHO mental health in schools programme manual is organized into a background section, followed by 3 modules: social–emotional childhood development; mental health promoting schools (promotion and prevention); and addressing student mental health problems in your classroom, including specific classroom strategies and case examples.

Conclusion: Developing an appropriate curriculum that is sensitive to the needs of individual countries requires involvement of those familiar with schooling in those countries. It should include mental health priorities and practices that promote mental health, and coalesce school staff, parents and community members in support of their children.

Keywords: Eastern Mediterranean Region, implementation science, school, public health, mental health

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Introduction

There is an urgent need to address mental health issues among children and adolescents. Approximately 1 in 5 children globally (1) and 90% of children living in low- and middle-income countries (LMICs) struggle with a mental illness (2). The World Health Organization (WHO) Eastern Mediterranean Region (EMR), comprising 22 countries, has a large portion of its population under the age of 18 years. Several countries in the EMR have experienced complex humanitarian emergencies including wars, displacement and political unrest. Children exposed to such conflicts have been known to experience higher rates of mental health problems. Investing in the mental health of children should therefore be a national priority with long-term implications for these countries. Despite this reality, the EMR has a striking deficit of mental health resources for young people (3) and regional collaboration among countries on child and adolescent mental health has been challenging (4). Therefore, innovative implementation strategies are necessary to scale-up mental health services in LMICs (5).

In the face of these challenges, the WHO Regional Office for the Eastern Mediterranean (WHO EMRO) has proposed a regional framework to scale-up action on mental health in the Region (6). This framework was adopted by Member States at the 62nd Session of the WHO Regional Committee for the Eastern Mediterranean held in Kuwait, 5–8 October 2015. The framework identified high impact, cost-effective, affordable and feasible strategic actions supported by a set of indicators to monitor implementation. As part of this framework, school mental health services were identified as a priority area for mental health promotion and practice (7).

There is strong evidence to support investment in mental health in schools. School experiences are critical for children’s development and mental health. Emotional health and academic achievement have been strongly associated (8). Schools can enhance academic achievement by addressing issues such as self-esteem and social well-being (9). Children with emotional problems are more prone to poor academic performance and for dropping out of school, making them more vulnerable to a variety of problems including substance abuse, criminal/legal involvement and exploitation (10). Addressing mental health in schools has important implications for teachers as well as students (11).

Comprehensive school mental health systems encourage school and community staff, including educators and health and mental health professionals, to offer multiltiered systems of...
supports (MTSSs), from mental health promotion to treatment in schools (12). We recognize the wide variation in the EMR in terms of resources and capacity for such systems. As a consequence of the dearth of child mental health specialists such as psychiatrists and psychologists, schools in LMICs often task-shift mental health support to educators (13,14). The purpose of this paper is to describe the development of a WHO programme for mental health in schools, catering to the needs of a wide variety of school systems in the EMR, including a review of implementation challenges and opportunities.

Methods

WHO EMRO mental health in schools programme development

Child mental health was highlighted as a priority in the WHO EMRO Framework for Mental Health (6) and mental health in schools was identified as an attractive, feasible, cost-effective option. In response to this directive, WHO EMRO commissioned a systematic review of school mental health interventions to inform the development of a WHO mental health in schools programme. The development process, initially led by a child and adolescent psychiatrist working in partnership with the WHO EMRO, involved a review of literature on school mental health frameworks and interventions, and consultation with international school mental health leaders. The goal was to identify core features of effective and culturally sensitive school mental health and specific interventions that could feasibly be implemented with available resources in EMR schools.

Based on a review of the literature and expert consultation, 2 tenets guided WHO development of the mental health in schools programme: (1) the WHO mental health in schools programme should be implemented using an MTSS framework including 3 tiers of interventions (universal mental health promotion, early intervention, and targeted intervention); and (2) interventions must be easy to implement by non-mental health professionals, including educators, given the limited number of child mental health specialists in the region.

Three-tiered MTSS

The WHO has historically advocated a 3-tier model for school mental health (15). Global evidence from programmes such as positive behavior interventions and supports that use a 3-tiered prevention model has demonstrated success in improving academic achievement and successful management of school culture (16, 17), with strong evidence of a positive impact over time (17). Several evidence-based programmes have been successfully implemented in schools across the 3 tiers of support (16). Universal interventions (Tier 1) for all students, regardless of whether at risk for mental health problems, have been shown to promote positive social, emotional and behavioural skills (18, 19). Social emotional learning (SEL) programming has been widely adopted in schools, with results demonstrating significantly better SEL competencies and academic performance, and fewer conduct problems, and less emotional distress and substance use problems than students not engaged in SEL (20,21). Secondary interventions (Tier 2), or early interventions, are designed to address mental health concerns for students experiencing mild distress or functional impairment or being at risk for a given problem or concern. Tier 2 interventions in schools, including small group therapies and brief individualized counselling (e.g. motivational interview and problem solving), have been shown to increase student resilience, and decrease the likelihood of engaging in conduct problems and risk behaviours like substance abuse (22). Tertiary interventions (Tier 3) in schools have been shown to treat a variety of mental health problems, including anxiety, depression, post-traumatic stress, disruptive behaviour disorders and substance abuse problems (23,24).

Implementation by non-mental health professionals

Mental health providers are in short supply worldwide. The EMR similarly has few mental health resources for young people, including a lack of mental health providers, facilities, training and awareness programmes, and many countries lack adequate mental health policies and laws (25). This underlies the need for integration of mental health across other child service sectors beyond existing health services (26). Schools are among the most feasible and important sites to promote child mental health. While approximately 15% of children experience mental health problems (27), less than half actually receive treatment even in the most-well-resourced countries. Of those children receiving mental health treatment, > 75% receive it at schools, since obtaining mental health treatment outside of schools is often expensive, not available in some areas, and can overwhelm families (28).

Based on these 2 guiding principles, and the review of core school mental health features and MTSS interventions in schools, an initial draft of the WHO mental health in schools programme manual was developed via an international, multisectoral, iterative process. The manual development team included perspectives from regional and international experts as well as expertise from the healthcare and education sectors. Experts involved in the development and review process included the directors of leading international centres on mental health in schools like the National Center for School Mental Health at the University of Maryland School of Medicine (www.schoolmentalhealth.org) and the School Psychiatry Program at Massachusetts General Hospital, as well as school mental health leaders from several EMR countries. There were 6 developers and reviewers from the United States of America (USA), 4 from WHO, 2 each from Oman, Bahrain, Canada and the United Kingdom of Great Britain and Northern Ireland (UK), and 1 each from Egypt, Palestine, Saudi Arabia and Ethiopia. These experts came from multiple...
disciplines: 14 were experts in school mental health, school health, public health and implementation science; 4 WHO staff; 3 experts in education; and 1 person from a nongovernmental organization. The manual was presented to a consultative meeting involving experts at WHO EMRO in December 2014 for review and scale-up plans. Following the first regional WHO mental health in schools programme training conducted in Amman in May 2016, further revisions were made based on participant feedback.

**Results**

**WHO mental health in schools programme**

Review of existing school mental health literature, iterative expert input, and participant feedback from the pilot training of education and behavioural health leaders from EMR countries informed the development of the WHO mental health in schools programme. The resulting document focuses on prevention and promotion, fostering a positive culture in schools, early identification and referral, as well as tiered interventions that can be applied by teachers within a classroom setting. Interventions are grouped under 3 tiers for primary, secondary and tertiary interventions. The programme includes a 103-page reference manual, training materials and handouts, as well as adaptation, implementation, evaluation and monitoring guidance.

WHO mental health in schools programme tiers were defined as follows: Tier 1: focus on mental health promotion or primary prevention and applied to whole populations (e.g. all of the students in a classroom). Tier 2: interventions targeting specific vulnerable populations (e.g. children who have experienced potentially traumatic events). They can also be applied when Tier 1 interventions have not been effective. Tier 2: interventions aimed at supporting children with diagnosed disorders or when Tier 1 interventions have been ineffective. Realizing that mental health is an inseparable part of overall health, topics like nutrition, physical activity in schools, vision, hearing and speech are covered. The programme also addresses contemporary topics like screen time, internet addiction and cyberbullying.

The mental health in schools programme emphasizes evidence-based strategies that can be implemented at low-cost and at scale, incorporating key principles of task-shifting for non-specialists. Included are guidelines for universal and targeted strategies addressing common emotional and behavioural problems, including sadness, anxiety, suicidal thoughts, attention problems and post-traumatic reactions. The manual is designed for use by non-mental health specialists including teachers, administrators, school nurses, social workers, and school counsellors. The manual is intended for a nonclinical audience and avoids using specific diagnostic classifications such as major depressive disorders or post-traumatic stress disorder, and instead uses terms like depression/sadness problems and post-trauma problems. All materials were supplemented with illustrations, to ensure that they reflected the diversity that exists in the EMR.

The WHO mental health in schools programme is organized into a background section conveying the importance of mental health in schools, followed by three modules: social–emotional childhood development, mental health promoting schools (promotion and prevention), and addressing student mental health problems in your classroom (and when to refer for additional help), and a set of appendices with supplemental materials (Table 1). The course includes specific classroom strategies and case examples to reinforce skill application to common classroom scenarios.

**WHO SMHP feasibility and acceptability**

At its launch, 38 master trainers in the mental health in schools programme were trained from Bahrain, Egypt, Islamic Republic of Iran, Jordan, Morocco, Oman, Pakistan, Qatar and Saudi Arabia. Beyond the first cohort of trainees, further cascade training has been conducted in Bahrain, Egypt, Islamic Republic of Iran, Jordan, Pakistan and United Arab Emirates, and has included 2139 master trainers (see Table 2 for further information). Besides being available in English, the programme has been translated into several regional languages including Arabic, Farsi and Urdu.

In 2016, the School Mental Health Implementation Network in the EMR (SHINE) was formed with the aim of scaling up the WHO EMRO mental health in schools programme in the Region by enhancing collaboration among practitioners, researchers and policy-makers (29). The network includes partners from academia, nongovernmental organizations, policy-makers, and implementation scientists from Egypt, Islamic Republic of Iran, Jordan and Pakistan, with support from international universities including Liverpool in the UK and Harvard, Johns Hopkins and the University of Washington in the USA. The SHINE network is funded by the US National Institute of Mental Health (NIMH).

Pilot studies have indicated that the WHO mental health in schools programme is acceptable and feasible. One study in an inner-city school setting in Lahore, Pakistan investigated teachers’ perceptions about students’ mental health. Teachers identified the most common problems they face as learning problems, inattention, disobedience, aggression, lying and disrespect, with few identifying emotional difficulties (30). Another study conducted in Al-Obour City, Egypt provided evidence that delivery of the school-based mental health programme was acceptable to key stakeholders if they were well trained and supported. In another pilot randomized controlled trial, the effectiveness of the mental health in schools programme in improving teachers’ mental health literacy as compared to a waitlist control group (not receiving training during the study period) is being examined (31).

A key focus of SHINE is to address challenges to scale up the mental health in schools programme especially in the lesser-resourced countries. Stakeholders have
identified training and supervision of teachers at scale, maintaining their motivation, and engaging parents as key hurdles. In Pakistan, the WHO mental health in schools programme has been enhanced by developing an interactive online training programme integrated into teachers’ continuing education platforms (32). Teachers’ wellness and parental engagement have been emphasized and operationalized. Teachers use an interactive chat-bot

<p>| Table 1 | Content summary of the mental health in schools programme manual |</p>
<table>
<thead>
<tr>
<th>Background</th>
<th>Topics covered</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 1</strong></td>
<td>Importance of school mental health</td>
</tr>
<tr>
<td>Social–Emotional Childhood Development</td>
<td>Social–Emotional Childhood Development</td>
</tr>
<tr>
<td>1. Developmental tasks of preschoolers</td>
<td>Developmental tasks of preschoolers</td>
</tr>
<tr>
<td>1.2. Developmental tasks of primary-school-age children (6-12 years)</td>
<td>Developmental tasks of primary-school-age children (6-12 years)</td>
</tr>
<tr>
<td>1.3. Developmental tasks of secondary-school-age children (12-18 years)</td>
<td>Developmental tasks of secondary-school-age children (12-18 years)</td>
</tr>
<tr>
<td>1.4. Moral development</td>
<td>Moral development</td>
</tr>
<tr>
<td>1.5. Brain development and schooling</td>
<td>Brain development and schooling</td>
</tr>
<tr>
<td><strong>Module 2</strong></td>
<td>Mental-Health-Promoting Schools (Promotion and Prevention)</td>
</tr>
<tr>
<td>Core values of a mental-health-promoting school</td>
<td>Core values of a mental-health-promoting school</td>
</tr>
<tr>
<td>Behavioral management strategies for schools</td>
<td>Behavioral management strategies for schools</td>
</tr>
<tr>
<td>2.1.1 Role of parents in their child’s education</td>
<td>Role of parents in their child’s education</td>
</tr>
<tr>
<td>2.2. Discipline and management of disruptive behavior</td>
<td>Discipline and management of disruptive behavior</td>
</tr>
<tr>
<td>2.2.2 Counseling</td>
<td>Counseling</td>
</tr>
<tr>
<td>2.2.3 Circle time</td>
<td>Circle time</td>
</tr>
<tr>
<td>2.3. Life skills education</td>
<td>Life skills education</td>
</tr>
<tr>
<td>2.4. Other Health-promoting efforts that impact mental health</td>
<td>Other Health-promoting efforts that impact mental health</td>
</tr>
<tr>
<td>2.4.1 Nutrition</td>
<td>Nutrition</td>
</tr>
<tr>
<td>2.4.2 Vision/hearing/speech</td>
<td>Vision/hearing/speech</td>
</tr>
<tr>
<td>2.4.3 Physical exercise</td>
<td>Physical exercise</td>
</tr>
<tr>
<td>2.5. Media and mental health</td>
<td>Media and mental health</td>
</tr>
<tr>
<td>2.5.1 Screen time</td>
<td>Screen time</td>
</tr>
<tr>
<td>2.5.2 Internet addiction</td>
<td>Internet addiction</td>
</tr>
<tr>
<td>2.5.3 Cyber bullying</td>
<td>Cyber bullying</td>
</tr>
<tr>
<td>2.6. Suicide prevention</td>
<td>Suicide prevention</td>
</tr>
<tr>
<td><strong>Module 3</strong></td>
<td>Addressing Student Mental Health Problems in Your Classroom (and when to refer for additional help)</td>
</tr>
<tr>
<td>When to refer to a specialist for evaluation and treatment?</td>
<td>When to refer to a specialist for evaluation and treatment?</td>
</tr>
<tr>
<td>Roles and responsibilities within the school in regards to mental health</td>
<td>Roles and responsibilities within the school in regards to mental health</td>
</tr>
<tr>
<td>Behavioral manifestations of common mental health problems and strategies to address them</td>
<td>Behavioral manifestations of common mental health problems and strategies to address them</td>
</tr>
<tr>
<td>Anxiety problems</td>
<td>Anxiety problems</td>
</tr>
<tr>
<td>Case study (anxiety)</td>
<td>Case study (anxiety)</td>
</tr>
<tr>
<td>Case study (separation anxiety/school refusal)</td>
<td>Case study (separation anxiety/school refusal)</td>
</tr>
<tr>
<td>Post-trauma problems</td>
<td>Post-trauma problems</td>
</tr>
<tr>
<td>Case study (post-trauma)</td>
<td>Case study (post-trauma)</td>
</tr>
<tr>
<td>Depression or sadness problems - mood stability problems</td>
<td>Depression or sadness problems - mood stability problems</td>
</tr>
<tr>
<td>Case study (depression)</td>
<td>Case study (depression)</td>
</tr>
<tr>
<td>Case study (suicide)</td>
<td>Case study (suicide)</td>
</tr>
<tr>
<td>Hyperactivity, impulsivity and inattention problems</td>
<td>Hyperactivity, impulsivity and inattention problems</td>
</tr>
<tr>
<td>Case study (ADHD/disruptive behaviors)</td>
<td>Case study (ADHD/disruptive behaviors)</td>
</tr>
<tr>
<td>Developmental problems</td>
<td>Developmental problems</td>
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<tr>
<td>Case study (autism)</td>
<td>Case study (autism)</td>
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<tr>
<td>Psychosis</td>
<td>Psychosis</td>
</tr>
<tr>
<td>Case Study (psychosis)</td>
<td>Case Study (psychosis)</td>
</tr>
<tr>
<td>Oppositional problems/conduct problems</td>
<td>Oppositional problems/conduct problems</td>
</tr>
<tr>
<td>Case study (conduct disorders)</td>
<td>Case study (conduct disorders)</td>
</tr>
<tr>
<td>Case study (bullying)</td>
<td>Case study (bullying)</td>
</tr>
<tr>
<td>Substance use problems</td>
<td>Substance use problems</td>
</tr>
<tr>
<td>Case study (substance abuse)</td>
<td>Case study (substance abuse)</td>
</tr>
<tr>
<td>References</td>
<td>References</td>
</tr>
</tbody>
</table>

Appendix

- Appendix I - Teacher Wellness
- Appendix II - Risk and Protective Factors for Mental Illness
- Appendix III - Bullying Prevention and Intervention in Schools
- Appendix IV - Examples of School Intervention Programs from the Eastern Mediterranean Region
- Appendix V - Screening Tools That Can Be Used at Schools
- Appendix VI – Resources
Table 2: Training on the mental health in schools programme in various countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of trainees</th>
<th>Number of schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahrain</td>
<td>32</td>
<td>20</td>
</tr>
<tr>
<td>Egypt</td>
<td>356</td>
<td>68</td>
</tr>
<tr>
<td>Iran</td>
<td>270</td>
<td>18</td>
</tr>
<tr>
<td>Jordan</td>
<td>150</td>
<td>104</td>
</tr>
<tr>
<td>Pakistan</td>
<td>368</td>
<td>90</td>
</tr>
<tr>
<td>UAE</td>
<td>983</td>
<td>353</td>
</tr>
<tr>
<td>Total</td>
<td>2,139</td>
<td>653</td>
</tr>
</tbody>
</table>

*See note.*

Discussion

Schools provide an exceptional opportunity for mental health promotion and interventions. In this study, we described the process of developing a WHO mental health in schools programme in the EMR, including challenges and opportunities.

Several reasons favour mental health promotion being implemented within EMR schools. First, schools provide the best opportunity to address the highest number of children, as most children attend school. Second, the programme focuses on using teachers to provide mental health support to children. Teachers are familiar with child development, and well positioned to promote positive mental health practices. Teachers are well respected and well received by most families, so instruction in health, including mental health, from teachers is often acceptable to families. Third, teachers recognize the importance of mental health in the classroom, and respond to programmes that empower them to recognize and address mental health concerns that affect children’s performance. The provision of mental health literacy for teachers in under-resourced areas increases teachers’ understanding and awareness of students’ mental health, while significantly decreasing stigma associated with mental illness (35). Fourth, teachers are positioned to continuously adapt relevant content to the changing concerns that emerge.

The development of mental health in schools programme revealed several opportunities for creating a viable mental health programme for diverse countries in the same region.

1) While EMR countries share commonalities including cultural heritage and religion, they also all have distinct identities and differences. There are multiple challenges in designing regional programmes to be implemented in settings that have variability in resources and sociodemographic realities. Some EMR countries are among the wealthiest in the world while others are among the poorest (e.g. the 2018 GDP per capita in Qatar was 69,026 compared to $4,98 in Somalia). The WHO mental health in schools programme responded to this challenge by providing a list of interventions over multiple tiers that involve a wide range of resource utilization. In regard to variability in cultural and ethnographic realities, the programme has a framework to allow adaptations for different implementation settings. Engaging representatives from many EMR countries helped clarify common priorities as well as different needs.

2) EMR countries face different challenges (e.g. some experiencing more trauma exposure). Some topics were included that may be higher in priority to specific countries than others, recognizing that individual tailoring is needed during implementation. With limited evidence of school mental health intervention in LMICs (19), developers acknowledged that some of the recommended interventions may not be generalized to all EMR countries or schools.

3) Content development presented unique challenges related to questions about what and how much to include, and how to generalize findings from non-EMR settings. For example, one challenge in developing the programme content was the tension between depth and breadth (i.e. should more topics be covered or should the focus be on having fewer topics covered in greater depth?). Consideration was also given to the balance between including necessary components and not overburdening often overworked, stressed teachers.

4) The WHO mental health in schools programme recognizes the importance of parental support and participation. While the programme primarily targets educators and not students directly, interventions highlighted parent participation, and the WHO EMRO has also developed a life skills programme for students. Programmes directly targeting teachers may be best complemented with those that also target students, such as life skills education and those targeting parents in supporting the emotional needs of children.

5) Continued engagement across EMR countries remains important for revising and enhancing the WHO mental health in schools programme. Mutually beneficial, cooperative agreements between countries to evaluate components of the programme and interventions will accelerate refinements and implementation factors important for the programme’s
success. The establishment of the SHINE network will contribute to evidence from LMICs and provides a foundation and network for groups and countries from the EMR and beyond. SHINE provides a vehicle for countries to identify practices that have the greatest impact and are aligned with available resources within these countries.

6) Building bridges of collaboration between the education and healthcare systems is necessary for the success of the mental health in schools programme. Encouraging co-ownership of school mental health programmes allows both sectors to work collaboratively rather than alone. Adaptation of the programme to local needs will increase the sense of ownership.

7) Scaling up a school-based mental health programme remains an important focus from its inception. Multiple challenges need to be anticipated so that viable solutions can be considered and configured as the programme is expanded. Using simple available technology in digitalizing the program will help in these scale-up efforts.

Conclusions

For the foreseeable future, most countries will lack sufficient resources to address their mental health needs. Mental health in schools programmes provide an immediate opportunity for improving mental health and decreasing the many burdens of poor mental health. Development of an appropriate curriculum sensitive to the needs of individual countries requires involvement of those familiar with schooling, current mental health priorities, and which strategies and practices would be embraced to promote mental health, and bring together school staff, parents and community members in support of their children. Technological innovations are essential in scale-up efforts for training and supervision. Finally, establishing monitoring and evaluation metrics and allowing learning among countries, as in the SHINE network, will help ensure sustainability.

Funding: None.

Competing interests: None declared.

Mise en place d’un Programme de l’Organisation mondiale de la Santé pour la santé mentale en milieu scolaire dans la Région de la Méditerranée orientale

Résumé

Contexte : Les écoles offrent une occasion exceptionnelle de promotion de la santé mentale et d’intervention dans ce domaine.

Objectifs : Décrire la mise en place d’un Programme de l’Organisation mondiale de la Santé (OMS) pour la santé mentale en milieu scolaire dans la Région de la Méditerranée orientale.

Méthodes : Deux principes ont guidé l’élaboration d’un Programme de santé mentale en milieu scolaire : 1) Le programme a utilisé un système de cadre d’appui à plusieurs niveaux comprenant trois niveaux d’interventions (universel, précoce et ciblé) ; et 2) les interventions doivent pouvoir être mises en œuvre par des personnes qui ne sont pas des professionnels de la santé mentale.

Résultats : Le manuel du Programme OMS pour la santé mentale en milieu scolaire est organisé de la manière suivante : il comprend une section de base, suivie de trois modules : développement social et émotionnel de l’enfant ; promotion de la santé mentale dans les écoles (promotion et prévention) ; et résolution des problèmes de santé mentale des élèves dans la classe, y compris des stratégies spécifiques en classe et des exemples de cas.

Conclusion : L’élaboration d’un programme d’études approprié et adapté aux besoins de chaque pays nécessite l’implication de ceux qui connaissent bien la scolarité dans ces pays ; ce processus qui exige la mobilisation du personnel scolaire, des parents et des membres de la communauté au service de leurs enfants, devrait prendre en compte les pratiques qui favorisent la santé mentale et les priorités dans ce domaine.
إن وضع منهج دراسي ملائم يراعي احتياجات البلدان يتطلب إشراك المهتمين بالتعليم في تلك البلدان، وبأولويات الصحة النفسية والعاطفية في مرحلة الطفولة؛ والمدارس التي تُعزِّز الصحة النفسية (التعزيز والوقاية)؛ ومعالجة مشكلات الصحة النفسية للطلاب في الفصل الدراسي، بما في ذلك استراتيجيات محددة في الفصل الدراسي وأمثلة على الحالات.

الاستنتاجات: إن وضع منهج دراسي ملائم يراعي احتياجات البلدان يتطلب إشراك المهتمين بالتعليم في تلك البلدان، وبأولويات الصحة النفسية والعاطفية في مرحلة الطفولة؛ والمدارس التي تُعزِّز الصحة النفسية (التعزيز والوقاية)؛ ومعالجة مشكلات الصحة النفسية للطلاب في الفصل الدراسي، بما في ذلك استراتيجيات محددة في الفصل الدراسي وأمثلة على الحالات.

References


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Global, regional and national incidence and causes of needlestick injuries: a systematic review and meta-analysis

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Abstract

Background: Needlestick injuries (NSIs) are one of the most serious occupational hazards for healthcare workers (HCWs).

Aims: The aim of this study was to evaluate the incidence and causes of NSIs globally.

Methods: A systematic review and meta-analysis of data from January 2000 to May 2020 collected from Scopus, PubMed, Embase, Web of Science, and Google Scholar. The Newcastle–Ottawa Scale was used to assess the quality of the included articles. The data obtained were analysed by R version 3/5/0, and 113 articles were retrieved.

Results: There were 113 studies with a total of 525 798 HCWs. The incidence of NSIs was 43%. Africa had the highest rate of these injuries of 51%, and the World Health Organization (WHO) African Region had the highest incidence among WHO regions of 52%. Women were more frequently affected by NSIs than men. Hepatitis C virus infection was the disease most commonly transmitted via NSIs (21%). The highest rates of NSIs according to causes, devices, hospital locations, occupations and procedures were for recapping of needles, needles, general wards, nurses and waste disposal, respectively.

Conclusion: The incidence of NSIs is gradually decreasing. The findings of this study can contribute to improving the decision-making process for reducing NSIs in HCWs.

Keywords: needle-stick injuries, healthcare providers, healthcare workers, hospitals, occupational hazard

Citation: Hosseinpilang; Z; Golmohammadi Z; Ghashghaei A; Ahmadi N; Hosseinifard H; Mejareh Z; et al. Global, regional and national incidence and causes of needlestick injuries: a systematic review and meta-analysis. East Mediterr Health J. 2022;28(3):233–241 https://doi.org/10.26719/emhj.22.031

Introduction

Physicians, nurses and other members of the healthcare professions are increasingly exposed to a wide range of occupational risks, such as needlestick injuries (NSIs) (i). Globally, NSIs are one of the most serious occupational hazards among healthcare workers (HCWs), with > 2 million occupational exposures occurring among 35 million HCWs annually, according to the World Health Organization (WHO) (2).

NSI refers to a penetrating wound with an instrument potentially contaminated with another person’s body fluid. According to the United States National Institute of Occupational Safety and Health (NIOSH), NSIs are caused by hypodermic needles, blood collection needles, intravenous (IV) stylets, and needles used to connect parts of IV delivery systems (3). HCWs at risk of NSIs, if injured, are at high risk of serious infections by blood-borne pathogens such as HIV/AIDS, hepatitis B virus (HBV) and hepatitis C virus (HCV). According to WHO, NSIs are responsible for the global incidence of HBV (36.7%), HCV (39%) and HIV/AIDS (4.4%) among HCWs for various reasons such as fatigue, carelessness, stress, haste, and sudden movement of patients (4).

The incidence of NSIs varies depending on work conditions, area of specialization and workplace environment. Kebede and Gerensea reported that the incidence of NSIs in Ethiopia was 48.8% among 252 nurses, and most NSIs occurred in the medical and surgical departments (5). Makary et al. estimated that the incidence of NSIs in the United States of America was 83% among 699 surgical residents, with most injuries related to the operating room (6). Despite the high incidence of NSIs among HCWs, evidence suggests that HCWs often do not report their injuries or are not followed up for treatment and testing; possibly due to lack of time, lack of belief in NSI-transmitted infection, and other reasons (7).

Given the importance of NSIs among HCWs, and lack of knowledge, HCWs need to receive accurate and comprehensive information on incidence, control and prevention of NSIs. Although many preliminary studies...
have been conducted on the incidence of NSIs, there is no systematic review of all dimensions and factors (cause, procedure, device and location) related to the global incidence of NSIs. The results of this study provide valuable information for HCWs, hospitals and other medical centres to reduce the incidence of NSIs, as well as provide a safer atmosphere for HCWs to perform clinical tasks, and ultimately improve the quality of services.

**Methods**

The preregistration of this study took place on PROSPERO (International Database of Prospectively Registered Systematic Reviews in Health and Social Care) at the University of York (https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020198842).

**Search strategy**

Two of the authors separately searched Web of Science, PubMed, Scopus and Embase for article published from January 2000 to May 2020, using the following keywords: Injury, Needle-stick OR Needle-stick Injury OR Needle-sticks OR Needle-stick OR Needle-Sticks OR Needle-stick Injury OR Needle-sticks OR Needle-Stick OR Needle-Stick Injury OR Needle-sticks OR Needle-Stick OR Needle-Stick Injuries OR Injuries, Needle-Stick|Title|) OR Injury, Needle-Stick OR NSIs OR Needle-Stick Injury OR Sharps Injuries OR Injuries, Sharps OR Injury, Sharps OR Sharps Injury. The initial search resulted in 4981 relevant articles. In addition, we searched Google Scholar (additional sources) resulting in 41 studies. The duplicates were omitted using EndNote software, and 1624 articles remained for review.

**Study selection process**

The selection process was accomplished in 2 steps. First, the title and abstract of searched articles were checked by 2 individual reviewers to select the relevant studies based on the exclusion and inclusion criteria of this study, which resulted in 348 articles. Subsequently, full-text analysis led to 113 eligible articles (Figure 1).

**Inclusion criteria**

Inclusion criteria were original English-language articles published between January 2000 and May 2020 with full text, having cross-sectional, descriptive, prospective, case study or cohort designs.

**Exclusion criteria**

Exclusion criteria were articles in languages other than English, published after May 2020 or before January 2000, in addition to randomized controlled trials, theses, case–control studies, commentaries, book chapters, books, editorials, expert opinions, letters to the editor, brief reports and reviews, assessments of treatment approaches, follow-up studies, interventional studies, clin-
ial decision-making, studies with invalid tables or figures, or difficulty in calculating quality of life.

Quality assessment of included articles

The Newcastle–Ottawa Scale (NOS) was used to assess the quality of included articles in this systematic review by 2 separate reviewers to mitigate bias, and any disagreements were resolved by a third reviewer. The articles were assessed by NOS in terms of the following domains and related subdomains: (A) selection process (1 – definiton of case; 2 – representativeness of cases; 3 – selection of controls; and 4 – definition of controls); (B) comparability (comparability of cases and controls on the basis of design or analysis); and (C) exposure (1 – ascertainment of exposure; 2 – same method of ascertainment for cases and controls; and 3 – non response rate). Scores were displayed as 0 and 1 points for unreported and referenced items, respectively. The total quality score was calculated through the sum of the points calculated for the reported items, indicating a score of 10 as the best quality and a score of 0 as the lowest quality. Low quality was considered for articles with a score less than the mean score (< 4) (8).

Process of data extraction

The required data were extracted by 3 of the authors in a predesigned form containing name of author, place of research, date of publication, quality of research, WHO region, sample size, number of participating men and women, number of NSIs, number of men and women with NSIs, infection, job status, causes of NSIs, NSI site, instruments and procedures that caused NSIs (Supplementary File 1).

Data analysis by statistical methods

A random-effects model meta-analysis, the conventional DerSimonian–Laird estimator, was used to calculate the means by 4 authors who were experienced in this area. The results were presented in a forest plot at 95% confidence interval (CI). Publication date and sample size were selected as criteria for measuring heterogeneity (P) of included articles and meta-regression analysis. Sensitivity analysis was performed to verify stability of the results. Sample size, place of research, date of publication, sex, procedures and instruments that caused NSIs, NSI site, causes of NSIs and job status were parameters for subgroup analysis. Cumulative meta-analysis was performed on the basis of date of publication and sample size. Publication bias was evaluated by Egger test. R version 3.5.0 was used for data analysis.

Results

The findings of this study were based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement, and using the meta-regression analysis of data from 113 articles published from January 2000 to May 2020. Total incidence of NSIs was 43% (95% CI = 37–49%; n = 226 093) among 525 798 HCWs (Figure 2).

Meta-regression based on WHO regions

Analysis of WHO regions showed that the incidence of NSIs in the African Region was higher than in other regions (51%, 95% CI = 40–61%) (Table 1). The lowest incidence of NSIs (31%, 95% CI = 19–46%) was in the Western Pacific Region.

Meta-regression based on continent

The incidence of NSIs in Africa was higher than in other continents (52%, 95% CI = 41–62%) (Table 1). The lowest incidence of NSIs (21%, 95% CI = 9–41%) was in Oceania.

Meta-regression based on gender

The incidence of NSIs was higher in female than in male HCWs. A total of 93 959 women had a 39% incidence of NSIs (95% CI = 26–54%) compared with 27% (95% CI = 18–38) among 76 504 men.

Meta-regression based on transmitted diseases

The 6 most frequent NSI-transmitted diseases are shown in Table 1, including HCV (21%, 95% CI = 7–38%), HBV (18%, 95% CI = 14–25%) and HIV (17%, 95% CI = 14–32%) in the first to third places, respectively.

Meta-regression based on causes

Recapping of needles was the most frequent cause of NSIs among HCWs (n = 6070, 30.5% of the total) (Figure 3), followed by mental distraction (n = 3566, 17.96%). Carelessness had the lowest rate (n = 170, 0.2%).

Meta-regression based on devices

Needles were the most common cause of NSIs (n = 32 325, 68.46% of the total), followed by scalpels (n = 9189, 19.46%) (Figure 3) while 0.12% of NSIs were related to scissors, which was the lowest rate.

Meta-regression based on hospital wards

Most NSIs occurred in general wards (n = 16 592, 34.67% of the total), followed by operating rooms (n = 11 508, 24.04%) (Figure 3). The radiology ward had the lowest number of NSIs (0.03%).

Meta-regression based on occupation

Nurses had the highest number of NSIs (n = 26 840, 56.28% of the total), followed by physicians (n = 9874, 20.28%), and operating room technicians (n = 45, 0.9%) had the lowest number (Figure 3).

Meta-regression based on type of procedures

Disposing of waste accounted for most NSIs (n = 9405, 37.17% of the total), followed by injections (n = 8583, 33.92%) and suturing (n = 1828, 7.22%) (Figure 3).

Meta-regression based on publication year

The results of meta-regression, based on the year of study, showed that an increase of 1 year of study publication date caused a lower incidence of NSIs by 0.84 units (β = 0.84, 95% CI = 0.837–0.842, P < 0.001) (Figure 4).
Figure 3: Meta-regression of needlestick injuries according to causes, devices, hospital wards, occupations and procedures.
Discussion

The present systematic review and meta-analysis was conducted to estimate the overall prevalence of NSIs among HCWs. Based on the results of our study, the global incidence of NSIs in HCWs was 43%, which is a significant rate in terms of WHO policies. WHO reported in 2002 that about 6.5% of all HCWs had experienced such events. In the systematic review by Bouya et al. (2020) of 87 articles with a total of 50,916 participants, the incidence was 44.5%, which is in line with our study (9). Comparison of the incidence in our study and the 2020 study with that of the WHO report in 2002 shows that the incidence of NSIs has increased, and that presently about half of all HCWs experience these events at least once (10). Considering the annual trend identified in our study, the incidence of NSIs is decreasing based on publication year. This could be an appropriate subject for future studies. We think that increases in the ratio of patient to medical staff numbers and workload could be the main reason for the incremental incidence of NSIs.

Our study showed that Africa and the WHO African Region had the highest incidence of NSIs among other continents and regions. For example, in a study of 72 people in Nigeria in 2009, 86.6% (n = 65) had experienced NSIs (11). In studies conducted in Cameroon, Uganda and Ethiopia, this rate was reported to be > 55%, which is significantly different from other regions, and is in line with our study. We believe that the large workload of medical centres imposes a high risk of experiencing NSIs by the medical staff, and inadequate, unsafe facilities in African countries should be taken into consideration (12).

We found a significant difference in incidence between women and men. Zhang et al. (13) reported that the incidence of NSIs was higher in women, which is consistent with our findings. In contrast, a study by Lee and Hassim found that the incidence of NSIs was higher in men (14). Unfortunately, no specific study has been conducted on this topic, and there is no information on why the incidence of such NSIs is low or high in men and women. However, we believe that one of the main
Incidence et causes des blessures par piqûre d'aiguille aux niveaux mondial, régional et national : revue systématique et méta-analyse

Résumé

Contexte : Les blessures par piqûre d'aiguille constituent l'un des risques professionnels les plus graves pour les agents de santé.

Objectifs : L’objectif de la présente étude était d’évaluer l’incidence et les causes des blessures par piqûre d’aiguille à l’échelle mondiale.


Résultats : Il y avait 113 études incluant un total de 525 798 agents de santé. L’incidence des blessures par piqûre d’aiguille était de 43 %, le continent africain affichait le taux le plus élevé de ces traumatismes, soit 51 %, tandis que la région africaine de l’Organisation mondiale de la Santé (OMS) présentait l’incidence la plus élevée parmi les régions de l’OMS, soit 52 %. Les femmes étaient plus souvent touchées par les blessures par piqûre d’aiguille que les hommes. L’infection par le virus de l’hépatite C était la maladie la plus souvent transmise par les blessures par piqûre d’aiguille (21 %). Les taux les plus élevés de blessures par piqûre d’aiguille selon les causes, les dispositifs, les
Conclusion: L’incidence des blessures par piqûre d’aiguille diminue progressivement. Les résultats de la présente étude peuvent contribuer à améliorer le processus de prise de décision pour la réduction des blessures par piqûre d’aiguille chez les agents de santé.

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Meeting on childhood obesity in the Eastern Mediterranean Region

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Introduction

Overweight and obesity among children and young people is a major public health challenge in the WHO Eastern Mediterranean Region. To address this, a virtual meeting was held during 24–25 May 2021, with the objectives of: encouraging countries of the Region to scale up implementation of policy solutions and good practices to tackle childhood obesity; sharing experience in implementing policies, and action plans; updating Member States on latest WHO guidance and relevant initiatives; and identify country support needs and opportunities for country collaboration.

Almost half adults, over a quarter of adolescents and nearly 6% of children under five in the Region are affected by overweight or obesity. In addition, for people with COVID-19, the presence of overweight and obesity is associated with increased severity and duration of the disease. At the same time, the pandemic may lead to further increases in overweight and obesity as a result of increased exposure to unhealthy diet and physical inactivity. This deadly interplay leaves the Region's populations at risk of further death and disability due to NCDs and potentially vulnerable to future pandemics. Five years after the WHO Commission on Ending Childhood Obesity published a wide range of recommendations (1), decisive action to prevent the development of overweight and obesity, particularly among children, is now more urgent than ever. Many of the Commission's recommendations have since been adopted in the Region, in the Strategy on nutrition for the Eastern Mediterranean Region 2020–2030 (2), endorsed by the Regional Committee in October 2019, and the Regional framework for action on obesity prevention 2019–2023 (3).

Summary of discussions

Factors that influence body weight and promote the development of childhood overweight and obesity include a long-lasting positive energy balance (often as a result of increased consumption of energy dense foods), physical inactivity, sedentary behaviour and food marketing. It is clear that tackling childhood obesity requires a multisectoral approach. No single intervention alone will ever be enough to reduce prevalence of childhood overweight and obesity, and a comprehensive multicomponent approach is needed. Reliable surveillance data are essential to be able to monitor prevalence of childhood overweight and obesity and to track progress. Promotion of breastfeeding is a key element in the prevention of childhood obesity. Unhealthy food environments, including exposure to advertising and other forms of marketing for foods high in fats, sugars and/or salt, are contributing to unhealthy diets and the development of overweight and obesity in childhood and adolescence.

Investment in child and adolescent health has a triple dividend — for childhood, later life and the next generation. The Regional implementation framework on ending preventable newborn, child and adolescent deaths and improving health and development (4), adopted in 2019, proposes key actions in three areas: promoting equitable access to quality newborn, child and adolescent health services in the context of universal health coverage; protecting newborns, children and adolescents from the impact of health emergencies; and strengthening the integration of health programmes and multisectoral coordination and partnerships for the promotion of healthier newborns, children and adolescents. Important areas include scaling up early childhood development interventions, adolescent health and health promoting schools. The framework covers the entire period from birth to 19 years. In addition, a training package for caregivers (which includes several nutrition-related interventions) has been developed, as well as an operational guide for humanitarian settings. At the global level, the Global Accelerated Action for Health of Adolescents (AA-HA!), linked to the Global strategy for women’s, children’s and adolescent’s health (2016–2030) (5), provides guidance to support country implementation.

In discussion, the importance of supporting the development of personal skills in children and adolescents was highlighted. This will enable young people to take better decisions, combat peer pressure, critically appraise marketing messages and make healthy choices. Research mapping of the daily trajectories of children in Tunisia has enabled identification of the food environments to which children are exposed. This approach can be useful in designing programmes and providing evidence to advocate for policy action. It was suggested that it would be useful to share this experience and the methodology applied. The WHO Regional Office for the Eastern Mediterranean has recently published a number of papers outlining progress on nutrition action in the Region and is keen to disseminate case studies of policy implementation, and participants were asked to share their experiences and success stories. In addition,
country profiles are being developed and participants were urged to share all relevant information, including survey data, national guidelines and regulations. It was noted that Kuwait is developing new regulations which can serve as a model for other countries to adapt and adopt. Attention was drawn to the existing monitoring protocols developed by the International Network for Food and Obesity/NCDs Research, Monitoring and Action Support (INFORMAS), in relation to food marketing and school environments. It was suggested that these could be reviewed and adopted for the Region. During the discussion, the country teams agreed on the importance of addressing the identified gaps and ensuring an updated SRH essential medicines list in line with WHO recommendations.

**Recommendations**

A number of areas where Member States require technical support were identified, including: restricting food marketing to children; surveillance of childhood overweight and obesity; school feeding programmes and school nutrition; nutrition education in schools; and nutrition in primary health care.

**References**

La Revue de Santé de la Méditerranée Orientale

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