Original Research

Public knowledge, beliefs, psychological responses, and behavioural changes during the outbreak of COVID-19 in the Middle East

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Abstract

Objective: To evaluate the knowledge, believes, psychological and behavioural impact of COVID-19 on the general population in the Middle East, exploring how it impacted public lives.

Methods: A descriptive cross-sectional online survey was sent to a convenience sample in the Middle East through social media (Facebook and WhatsApp) between 16th of June and 30th of June 2020. The questionnaire was designed to collect the demographic, participant’s source of information regarding COVID-19, knowledge and believes about COVID-19, the psychological consequences of COVID-19, impact of COVID-19 on participant’s behaviour. The final version of the questionnaire was further tested for content validity by experts in the field.

Results: A total of 2,061 participants completed the survey, with the majority being females (n=1394, 67.6%), from urban areas (n=1896, 92%) and the majority were from countries of The Levant (n=1199, 58.1%), followed by the Arabian Peninsula (n=392, 19.1%), Iraq (n=300, 14.6%) and Egypt (n=128, 6.7%). Few participants (3.0%) reported to have been infected and many (n=1847, 89.6%) were committed to quarantine at home. Social media platforms were the most common sources of information (41.2%). Many (63%) believed that COVID-19 is a biological weapon and were afraid of visiting crowded places (85%). The majority avoided public facilities (86.9%) such as prayer places and believed that the news about COVID-19 made them anxious (49.5%).

Keywords

COVID-19; Disease Outbreaks; Quarantine; Health Knowledge, Attitudes, Practice; Attitude to Health; Fear; Problem Behavior; Social Media; Surveys and Questionnaires; Cross-Sectional Studies; Middle East

INTRODUCTION

Coronavirus disease outbreak in 2019 (COVID-19) is an emerging respiratory disease caused by a novel coronavirus.1 COVID-19 was first detected in December 2019 in Wuhan, China.2 On January 30, 2020, the World Health Organization (WHO) declared that COVID-19 is a pandemic disease.3 Till this day, more than 149 million cases were reported globally and more than 3 million confirmed deaths.4

It is known that COVID-19 can spread to humans through an intermediate host such as bats, or from human-to-human, through respiratory droplets and body contacts.1 Contact with contaminated surfaces, hands, and touching of the face, eyes, nose, and mouth are predominant ways to get exposed to the infected droplets.5 The main signs and symptoms of COVID-19 infection include fever, cough, and shortness of breath 6. The incubation period of COVID-19 infection is between 2-14 days after exposure.4 Preliminary data suggest that older adults and persons with underlying health conditions or compromised immune systems might be at greater risk for severe symptoms from this virus.7

In the Middle East region, more than 2.5 million cases were reported until October 4, 2020.8 COVID-19 has appeared in some countries more than others. Iran has reported the greatest number of cases, with more than 470,000 cases, followed by Saudi Arabia (335,000 cases) and Turkey (323,000 cases).8 Jordan witnessed a sudden increase in the number of cases during the past few months (October, 2020), recording more than 15,000 cases.4 Other countries such as Syria and Al Yemen have reported up to 5,000 cases at the time of writing of this manuscript.4 In order to suppress this pandemic, the co-operative work between each government and public is extremely vital to come up with an effective program to protect and prepare against COVID-19. Many studies have shown that practicing preventive measures on an individual level is effective in curbing the spread of infection, i.e. wearing a mask, washing hands, using a hand sanitizer, maintaining social distancing, and staying at home.5 On the other hand, the WHO released some mental health considerations that should be followed during this crisis, such as avoiding watching and listening to news constantly, staying connected with loved ones through digital media, reassuring and supporting each other, along with taking care of one’s own health i.e. exercising, eating healthy, and sleeping well regularly.3

Public adherence to these control measures is associated with a level of emotional modulation among the population, the level of which is affected by their

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knowledge and beliefs about COVID-19.10,11 This in turn can affect the behavioural and psychological responses of the population.12,13 Hence, evaluating of public perceptions toward such outbreaks is essential, especially with the existence of the large amount of misconceptions and false information circulating around on social media regarding the transmission and methods of acquisition of COVID-19.14 Up to this day, there are several research articles globally and in the Middle East examining the psychological and behavioral impact and public perceptions of the pandemic.15-22 Such findings would provide public health officials with the needed data leading to policy updates regarding the management of the COVID-19 pandemic in the Middle East.

This study will evaluate the knowledge, beliefs and behavioral impact of COVID-19 pandemic on the general population in the Middle East, exploring how it impacted public lives.

**METHODS**

**Study design and population**

A descriptive cross-sectional online survey was conducted between the 16th of June and 30th of June 2020 in sixteen countries in the Middle East. The countries included countries of the Levant, The Arabian Peninsula, Iraq, Egypt, Turkey and Iran.

**Questionnaire development and data collection**

Following an extensive literature review on published studies related to the COVID-19 pandemic, a draft questionnaire was designed to cover the areas of interest in this study. The questionnaire was written in two languages, English and Arabic. The translation was validated by the Translation Department at the Applied Science Private University (ASU) and followed the standard ‘forward-backward’ procedure. The final version of the questionnaire was further tested for content validity by experts in the filed who gave their constructive suggestions, and positive feedback for the process. The final version of the questionnaire was organized into five main sections addressing different topics of interest to answer the aim of the study. The first section included items set to collect demographic data about participants’ characteristics. The second section included multiple-choice questions about participant’s source of information regarding COVID-19. The third section was planned to assess participant’s knowledge and beliefs about COVID-19 pandemic. The fourth section was set to assess the psychological consequences of COVID-19 pandemic on the participants. Finally, the fifth section was set to assess the impact of COVID-19 on participant’s behaviour and the safety procedures they followed to avoid getting infected by the COVID-19 virus. Internal reliability was assessed by measuring the Cronbach’s alpha. For participant’s knowledge and beliefs section internal consistency demonstrated high reliability (alpha=0.84), the psychological effect of COVID-19 section had an internal consistency of alpha=0.62, and the internal consistency for the behavioral impact of COVID-19 on participants section was alpha=0.81.

**Sampling strategy and sample size**

A convenience sample of eligible participants was invited to participate in the study from the sixteen countries included in the study through social media (Facebook and WhatsApp). The covering letter stressed anonymity and confidentiality and explained the aim and objectives of the study. Participants did not receive any benefits or payments for filling-out the questionnaire.

Inclusion criteria for the participants in the study included: Residents in Middle East, above 18 years old, and they have the ability to speak and write Arabic language. A consensus sample of subjects was included in the study. Based on the population size in the Middle East (n=411,551,760), sample size calculation was conducted using a margin of error of 5%, confidence level of 95%, giving a minimum sample size of 384 participants. A consensus sample of subjects was included in the study.

**Ethical approval**

This study was approved by the Research Ethics Committee at Faculty of Pharmacy at Applied Science Private University (ASU), Amman, Jordan (Approval No: 2020-PHA-25). The consent to participate was implied by the act of completing and returning the e-survey.

**Statistical analysis**

Data were analyzed by using the SPSS version 24. The internal reliability was assessed by measuring the Cronbach’s alpha for the survey. The descriptive analysis was performed using frequency/percentage for qualitative variables. Age variable was expressed as mean (SD).

| Table 1. Demographic characteristics of the study sample (n=2,061) |
|-------------------|-------------------|
| **Age in years; mean (SD)** | 27.5 (22.4) |
| **Gender, n (%)** | 1394 (67.6) |
| Female | 667 (32.4) |
| Male | |
| **Accommodation place, n (%)** | 1896 (92) |
| City | 165 (8) |
| Countryside | |
| **Country of residency, n (%)** | 1199 (58.1) |
| Countries of the Levant | 392 (19.1) |
| The Arabian Peninsula | 300 (14.6) |
| Iraq | 138 (6.7) |
| Egypt | 22 (1.0) |
| Turkey | 10 (0.5) |
| Iran | |
| **Academic level, n (%)** | 46 (2.2) |
| Uneducated | 389 (18.9) |
| Pre-university study | 1495 (72.5) |
| University study | 131 (6.4) |
| Postgraduate | |
| **Field of study, n (%)** | 784 (38) |
| Medical or health field | 1277 (62) |
| Non-medical or health field | |
| **Field of work, n (%)** | 290 (14) |
| Medical or health field | 1771 (86) |
| Non-medical or health field | |
| **Participants infected previously with COVID-19, n (%)** | 61 (3.0) |
| **Participants who are committed to quarantine in their home, n (%)** | 1847 (89.6) |
RESULTS

Participants’ characteristics are shown in Table 1. The majority of participants were females (n=1394, 67.6%). A large fraction of them was from urban areas (n=1896, 92%). More than half (n=1199, 58.1%) were from countries of The Levant, followed by participants from The Arabian Peninsula (n=392, 19.1%), Iraq (n=300, 14.6%) and Egypt (n=138, 6.7%). About three-quarters of participants were undergraduate students (n=1495, 72.5%). Only 38% of participants (n=784) studied a specialty in the medical and health field and a lower proportion (14%) worked in the health departments. Only 61 participants (3.0%) reported to have been infected by the COVID-19. Most of participants (n=1847, 89.6%) were committed to quarantine at home.

Participants’ sources of information about the COVID-19 pandemic (Table 2) showed that the social media platforms were the most common sources of information (41.2%), followed by visual and audible media (35.2%). Unexpectedly, the world health organization (WHO) reports were the least common source of information (0.3%). About tenth of those included in the study (9.4%) clarified alternative sources for their information.

Participants’ knowledge and beliefs about COVID-19 pandemic revealed interesting results as outlined in Table 3. A majority of participants believed in the existence of COVID-19 pandemic (89.6%), but not in the seriousness of the disease (13.7%). Only a third of participants (37.0%) did not believe that COVID-19 pandemic is a biological weapon. There were 1611 (78.2%) participants who correctly knew that COVID-19 can affect children. About a half of the participants did not know the effect of antihypertensive medications (52.5%) and Hydroxychloroquine (46.5%) on the COVID-19 infection. More than 80% (n=1663) responded that the symptoms of COVID-19 infection might disappear in some cases while 11% (n=227) of participants responded with I do not know. And more than 78% (n=1623) responded that they don’t use a mask for more than once, in contrary to 14.6% (n=301) of participants who reported that they do wear a mask more than one time. Moreover, the majority of participants knew the isolation period (a period of 14 days) of infected patients (89.9%, n=1852), who were the most vulnerable group of people to become infected (85.6%, n=1765), and methods of transmission of the virus (89.5%, n=1844).

The psychological effect of Coronavirus COVID-19 This section depicted the psychological effects of the ongoing pandemic among the participants. The vast majority (85%, n=1751) of participants were afraid of visiting crowded places and 64% (n=1320) reported fear of leaving their homes. Almost all participants (92.2%, n=1901) expressed concerns about safety of their families. And 46% (n=945) of those questioned expressed their fear of getting infected with the virus even without leaving their homes, where 80% (n=1649) reported their concern if a family member walks out. The vast majority 80% (n=1664) agreed that the fake news on social media caused panic among the public and 61.5% (n=1268) reported that they believe the situation is not as bad as portrayed by the media (Table 4). As well as the response of individuals regarding the government’s-imposed safety measures, including curfews,
social distances, and mandatory masks wearing was further investigated through this study. Approximately, the participants were evenly split (50%) between those who trusted the current infection control measures and those who did not (50%).

This section aimed to evaluate the impact of COVID-19 pandemic on participants’ behavior in terms of abiding with the government recommendations about wearing masks, keeping social distancing and personal hygienic habits. The results are demonstrated in Table 5.

The vast majority of participants avoided the use of public facilities (86.9%) such as prayer places, gardens and buses. Approximately 87% of participants changed their social habits to new ones, such as hand shaking habits, limiting the physical contact with others and family reunions. Similarly, more than 75% changed their personal habits such as wearing masks, washing hands repeatedly, quitting smoking and carrying a hand sanitizer due to the COVID-19 pandemic. Notably, half of participants (50.2%) were afraid of running out of food, so they purchased a lot of groceries. Less than half (49.5%) however thought that the news about COVID-19 made them anxious, so they avoided watching, reading and listening to news. More than 40% applied for an annual leave in their workplace.

Participants were asked a multiple-choice question about the safety procedures they depended on to avoid getting infected with COVID-19. Nutritional supplements, vitamin C and vitamin D took the vast proportion of participants’ interest in order to protect themselves against coronavirus, with a percentage of 53.3%. While depending on citrus drinks to strengthen their immune system came next, with a proportion of more than 36% of participants. Less than a third of participants (27%) depended on increasing their vegetables intake, such as onion, garlic, and ginger. Additionally, about a quarter drank a decoction of various medicinal herbs, including one constituent or a combination. More than 20% did not take any special measures to avoid getting infected with COVID-19 (Table 6).

Overall, the participants who worked in a medical field tended to have better knowledge in evaluating drugs for Coronavirus disease, such as Hydroxychloroquine, and the risk of specific antihypertensive drugs during an infection with the Coronavirus compared to those from outside the medical field (Table 7). On the other hand, participants who had worked in a non-medical field were 1.5-2 times more likely to answer ‘I don’t know’ than the participants who had worked in a medical field on method of Corona virus spread and effectiveness of antibiotics (p-value <0.05).

**DISCUSSION**

This is the first study to use an e-survey designed to collect data from the Middle East countries revealing interesting changes taking place in the area regarding the COVID-19 pandemic. These changes touched on the knowledge of people, in addition to their beliefs and behaviour. We identified reasons that could be responsible for such changes. The resources of information participants used to enrich their information about the pandemic and its progress.

The media, and in particular the social platforms, played the major role in the awareness of people regarding the pandemic. Reporting the casualties and death rates from the different areas around the world was a major attracting point of the public’s attention, reflecting the newcomer illness and its seriousness. This was not surprising, as other studies from around the world reported that social platforms, such as the WhatsApp and Facebook, and news media were the most utilized sources for public information gathering regarding the COVID-19 pandemic.23-25 Interestingly, in middle eastern countries, such as Saudi Arabia and Jordan, social platforms were used by the Ministries of Health to communicate and engage the public in the preventative and control measures against COVID-

| Table 5. The proportion of study participants who changed their behavior because of COVID-19 (n=2061) |
|-----------------------------------------------|
| **Behavior** | **Percent** |
| Using public facilities | 86.9 |
| Social habits | 80.8 |
| Personal habits | 76 |
| Purchasing groceries | 50.2 |
| Following news | 49.5 |
| Work permit | 42.5 |

| Table 6. Safety precautions undertaken by participants to avoid getting infected with COVID-19 (n=2061) |
|-----------------------------------------------|
| **Safety precaution** | **Percent** |
| Nutritional supplements and vitamins | 53.3 |
| Citrus | 36.5 |
| Vegetables (onion, garlic and ginger) | 27.3 |
| Medicinal herbs | 23.7 |
| Medicines (antipyretics and decongestants) | 13.6 |
| Do nothing | 21 |
| Other | 1.8 |

| Table 7. Assessment knowledge regarding corona virus pandemic of participants in the medical/ health related field of work compared to participants from outside the medical/ health field (n= 2061) |
|-----------------------------------------------|
| **Correct answer** | **I do not know** | **Correct answer** | **I do not know** |
| Effectiveness of Hydroxychloroquine | 128 (64.1) | 87 (41.7) | 580 (32.7) | 871 (49.2) |
| Effectiveness of saline solution | 92 (31.7) | 81 (27.9) | 496 (28.0) | 661 (37.3) |
| The impact of climate on Corona | 101 (34.8) | 48 (16.6) | 223 (29.3) | 423 (23.9) |
| Method of Corona virus spread | 258 (89.0) | 9 (3.1) | 1547 (87.4) | 118 (6.7) |
| The incubation period of Coronavirus | 223 (76.9) | 25 (8.6) | 1253 (70.8) | 275 (15.5) |
| The risk of antihypertensive | 74 (25.5) | 109 (37.6) | 351 (19.8) | 974 (55.0) |
| Banned period of infected | 253 (87.2) | 11 (3.8) | 1599 (90.3) | 98 (5.5) |
| Strengthening the immune system | 213 (73.4) | 20 (6.9) | 1380 (77.9) | 179 (10.1) |
| Effectiveness of antibiotics | 104 (35.9) | 64 (22.1) | 571 (32.2) | 628 (35.5) |
COVID-19 came bringing with it changes that touched every part of people’s life. People reacted to the pandemic by changing many of their habits, like staying away from gatherings in common places, including transports and holy mosques. The COVID-19 behavioural impact was presented not only in practicing a high level of self-isolation, but also by keeping physical distancing and other initiating safety measures.29 Similar to our study findings, various behaviours were observed among individuals participating in other studies, following the governments recommendations about wearing masks, keeping social distancing, personal hygiene habits and washing hands in order to halt the spread of the disease and to protect themselves.29,30 These measures, to a recent era, were unthinkable to happen. Such changes also impacted jobs, future welfare, and food supply, represented by the ill-practices of stockpiling foods, staying at home to avoid being infected by work colleagues, increasing the anxiety level in the society.31

As for the psychological impact of COVID-19 on individuals, the vast majority of our study reported fear and safety concerns due to the pandemic. Similarly, a research study conducted in the United States, China and United Kingdom, showed an increase in prevalence of panic and anxiety disorders among people due to the increased levels of social and economic tension, unemployment, psychological stress, and fear.32-34 Likewise, among Arab countries, various studies reported an increased level of mental and psychological stresses due to the pandemic.35-38 These results highlight the need of implementing a psychological intervention to those in need, in order to lessen the impact of this pandemic on individuals’ mental and physical health.

It has been well acknowledged that the COVID-19 pandemic posed serious health, social and psychological challenges, affecting the public’s physical and mental health, as well as the individual’s financial economics.29,31,39 Such detrimental consequences could be behind why two-thirds of the people in the Middle East (63%) reported via this study that they believe that the Coronavirus is a biological weapon. Such believe limits precautionary measures to prevent the infection, thus could lead to increasing the number of infected people. On the other hand, a lower percentage (13.7%) of participants did not believe in the seriousness of the disease, which in turn, presents another challenge to policy makers to limit the spread of the virus and increase the awareness of the disease. In contrary to this, findings from studies from other areas around the world including US and Canada reported that the majority of respondents perceived COVID-19 as a very serious problem imposing major changes to their plans and lifestyle.29,40 On the positive side of things, the pandemic played a positive role in increasing interests in good habits in terms of food and exercise practices.41 The study showed that people became more interested in good eating habits and diets of supplementary additives, such as vitamins and medicinal herbs. However, trends toward unfavourable dietary behaviours during the lockdown, such as increased caloric intake, reduced consumption of fruits and vegetables, and weight gain study was reported.42,43 In contrary to our findings, a study in the United Arab Emirates (UAE) reported a shift towards unhealthy dietary patterns among participants during the pandemic.44 In addition to physical exhaustion, emotional exhaustion, irritability, tension and sleeping disturbances have been reported.44

Yet, in light of the spread of false information, people took wrong turns with regards to practices in food intake, health in general and work, which require immediate correction measures by governments. Governments of the region need to provide trust-worthy sources for information that assures clarity and reliability.14 This is not the first study to shed light on this major issue. Misleading information was reported by participants in other studies as well, suggesting that official health authorities and governments should consider mainstream media and social platforms as an essential source to convey accurate information.29,45

People’s insecurity due to the pandemic was not supported by governments’ efforts at the same level. People needed more assurance to stop wrong-practices, which would require more investments in the different health sectors and unemployment compensation.46 This practice will help ease the fear of the unknown future, which would otherwise preserve the increased anxiety and mental illness problems.9

Thus, there is a critical need for the implementation of governmental strategies to control the outbreak of the virus by continuous providing the needed physical and psychological help for the individuals. While many hospitals and ICUs treating COVID-19 patients are slowly reaching capacity, the governments should raise the preparedness of health sectors of available laboratories, technical and working staff and, train and seek assistance to provide the needed health care services during this pandemic.47 For example, in Jordan additional measures have been reintroduced including Friday lockdowns and extended curfew hours. As well as the government is moving forward to accelerate the vaccination programme against COVID-19.48 Indeed, the role of pharmacists is highly crucial and should be incorporated into the pandemic’s plans as frontline healthcare professionals. Pharmacist guideline was released by the International Pharmaceutical Federation (FIP) to clarify the required coronavirus information for pharmacists and the pharmacy workforce including educating the public on infection control and preventive measures to reduce transmission which was adapted by governments in middle east.49-51

The development and approval of several COVID-19 vaccines could also help in resolving the pre-mentioned issues.52-54 The healthcare policy makers can call for an optimization of evidence-based vaccine delivery strategies, aligning with public’s perceptions, and safety concerns (e.g. adverse effects and cost) to influence vaccination acceptance among people, halting the spreading of the
virus.\textsuperscript{35} It has been reported that many individuals are doubtful and skeptical of receiving the new COVID-19 vaccine.\textsuperscript{36} Thus, a reliable relationship between governments and individuals is crucial to enhance their willingness to receive the COVID-19 vaccine and to overcome the burden of spreading this disease.

Limitations

Although the questionnaire underwent face and internal validity, the internal validity for the psychological effect of COVID-19 section had a low internal consistency of Cronbach’s alpha=0.62, future studies can look to improve the content validity of this section by updating some of the questions in this section.

CONFLICT OF INTEREST

The authors declare that no financial or other potential conflicts of interest exist.

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