Public and healthcare providers awareness of Coronavirus (COVID-19) in Qassim Region, Saudi Arabia

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Abstract
Background: The rapid and extensive spread of the COVID-19 pandemic has become a major cause of concern for both general public and healthcare profession.
Objective: The aim of this study is to analyze and evaluate the awareness of both the general public and healthcare providers in Qassim region in Saudi Arabia.
Method: A cross-sectional study was conducted randomly in different shopping malls in Qassim region from 10th of February to 10th of March 2020. All participants have answered the designed questionnaire. The structured questionnaire recorded demographics and awareness of both public participants as well as health care providers.
Result: A total of 130 participants have answered the designed questionnaire, out of which 67 participants were males (58.5%) and 54 were females (41.5%). Overall, 129 (99%) out of the 130 participants are aware of COVID-19, and 116 (90%) have recognize it as a respiratory disease and 100% of the participants have recognized it as a contagious disease. Around 94% of the participants were able to recognize the correct incubation period of the virus. Participants of the age group 20–40 showed higher awareness level than other age groups (P value = 0.005). In addition, government employees showed higher awareness level than other profession groups (P = 0.039). Results showed significant positive correlation between the recognition of high-risk groups, reliable source of information, infection symptoms, disease prevention and available treatments.
Conclusion: General public and health care professionals from Qassim Region showed adequate awareness of COVID-19. However, there is a strong need to implement periodic educational interventions and training programs on infection control practices for COVID-19 across all healthcare professions.

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1. Introduction

COVID-19 is the main causative agent of the newly emerged communicable disease, and it is more commonly referred to as Coronavirus (WHO, 2020a). It has been officially named the Severe Acute Respiratory Syndrome Coronavirus 2, or SARS-CoV-2 (originally, this was called 2019-nCoV) (WHO, 2020a, CDC, 2020). In 2019, there was a spate of cases of respiratory illness that rapidly turned into an epidemic in Wuhan City, Hubei Province of China (Gallegos, 2020). The first report of this was made to the World Health Organization (WHO) on the 31st 2019 (The New york times, 2020). Approximately one month later, on the 30th of January 2020, the WHO announced that the outbreak of COVID-19 was being proclaimed a global health emergency (The New york times, 2020). In addition, since the 21st of January 2020, the WHO has been publishing daily ‘Situation Reports’ on its website (www.who.int) to update disease facts, numbers (cases, deaths, and recoveries, by country), and other related information (The New york times, 2020).

There are three main symptoms of COVID-19, and several others that are less frequently experienced by people (Madjid et al., 2020). The main symptoms are fever, cough, and shortness of breath, while the less common symptoms include muscle pain, anorexia, a general feeling of unwellness, sore throat, nasal congestion, dyspnea, and headache (Madjid et al., 2020). Recently, new symptoms have been raised such as losing taste and smell (Klopfenstein et al, 2020). Once an individual has been exposed to the virus, symptoms can manifest from anywhere between two and fourteen days (Madjid et al., 2020). For the majority of individuals who contract COVID-19, only minor to middling cases of respiratory illness will be experienced, and they will not require any special medical interventions to recover. Conversely, a more severe illness has a high probability of developing if COVID-19 is contracted by the elderly or those with underlying medical conditions (such as cancer, cardiovascular disease, chronic respiratory disease, and diabetes) (Madjid et al., 2020).

The main way in which COVID-19 is transmitted is via saliva or nose discharge droplets that travel when an individual carrying the disease coughs or sneezes (WHO, 2020a). Individuals can acquire the disease also through touching any contaminated surface and touching their eyes, mouth, nose or general face area (WHO, 2020b). Although COVID-19 can be killed by disinfectants, it is believed that it will survive on un cleaned, contaminated surfaces for a couple of hours (WHO, 2020b). It has been suggested that aerosol-generating medical procedures may spread SARS-CoV-2 by means of airborne transmission (WHO, 2020d). Currently, there is no definitive treatment or vaccine for COVID-19. Nevertheless, there are numerous clinical trials being conducted all over the world that are attempting to identify possible treatments for the disease. The WHO will report on clinical findings as and when tangible results become available (WHO, 2020a, ECDC, 2020a). The international community is united in working on finding vaccines against COVID-19 and upwards of ten vaccines are currently being tested through clinical trials - with some studies having already entered Phase II. In addition, a number of wide-ranging clinical trials, conducted at more than one center, are being carried out, using a rigorous methodological model to evaluate prospective methods of treatment which will be effective against COVID-19 (ECDC, 2020c).

In the light of the absence of any effective treatment and with the clearly identified mode of transmission, awareness of essential information of the disease is the most powerful tool that individuals can have against the virus. Being informed about the causes of COVID-19 and the way it spreads is the optimum means of avoiding it and decreasing transmission rates (CDC, 2020). The key advice from the WHO to prevent the spread of COVID-19 is that people should remain at home, ensure social distancing measures are being taken, wash their hands frequently with soap and water, and frequently clean objects and surfaces that are touched on a regular basis (WHO, 2020b); therefore, effective awareness training in workplaces will be essential in the fight to halt the spread of the disease.

The first step to raise people defense against COVID-19 is education (Interactive service, 2020). People should be informed about disease symptoms, actions to take to protect themselves and those around them. It is also important to inform people of what kind of actions should they take in case of getting in contact with someone exposed to the virus (Interactive service, 2020).

The Kingdom of Saudi Arabia introduced preventative measures before any national fatalities from COVID-19 were reported, and prior to the virus being formally declared a global pandemic (Alishammari et al., 2020). The Saudi government thus imposed a strict curfew, reinforced by financial penalties for anyone who ignored the rules (Algaissi et al., 2020). In addition, a new app, the Tawakkalna, was launched by the Ministry of Health and the Ministry of the Interior, to allow people to meet their needs and plan their journeys during the curfew period (SPA, 2020). The app also provided up to date information on highly-contagious and remote areas of the country (SPA, 2020a). The Ministry of Health decided to hold daily meetings, to update the public about the current situation in the country, as well as across the world, to share new information on the virus and to respond to any questions (SPA, 2020b). In addition, the Ministry of Health set up an information helpline (accessible by dialing 937) so that people could ring in for general advice on COVID-19, as well as ask specific questions (MOH, 2020). A COVID-19 website was created, which could ring in for general advice on COVID-19, as well as ask specific questions (SPA, 2020a). The Ministry of Health stated that it would continue to update the public about the current situation as and when new information becomes available (SPA, 2020a).

To the best of our knowledge, there has yet to be a study conducted specifically in this region on peoples' awareness of...
COVID-19. Therefore, in order to fill this research gap, the aim of this paper was to evaluate the knowledge and awareness of both the general public and healthcare providers in Qassim region in Saudi Arabia.

2. Method

This descriptive, cross-sectional, and randomized study was conducted in Qassim region inside shopping malls from 10th of February 2020 to 10th of March 2020. All participants were selected from Qassim province, most of whom were from Buraydah, the province's capital. Qassim is located in the center of Saudi Arabia, and it has around 1.5 million inhabitants.

The following inclusion criteria were applied in this study: first, participants had to be adults (i.e., older than 17 years of age) either Saudi or non-Saudi; second, participants had to reside in Qassim region from general population and health care providers; and third, participants needed to provide voluntary and sign an informed consent prior to participating. Participants who did not meet these criteria were excluded from the study.

Data were obtained in-person using a structured questionnaire after the participants had signed the consent form. A pilot study was undertaken to validate the questionnaire, and a panel of three domain-specific experts was used to test the data collection instrument. The questionnaire was used to gather participants demographic and public participants awareness as well as healthcare providers awareness of the pandemic. Microsoft Excel was used to analyze data from 130 participants, as well as Statistical Package for the Social Sciences (SPSS) version 25. Excel was used for data entry and data representation purposes and SPSS was used for running statistical analyses. Different categorical and quantitative variables were identified, and data were cleansed before running statistical analyses, and missing data and typographical errors were checked. Using SPSS, counts and percentages were examined for the categorical variables, and descriptive statistics were undertaken for the quantitative variables. Inferential statistics were also used to address the study's main research questions. The parametric assumptions associated with all variables were tested. Different comparisons were performed using the Mann-Whitney U test for independent two-group variables, while for more than two groups, the Kruskal-Wallis signed rank test was employed. Throughout this study, data were presented as median and quartiles, and P-values are considered statistically significant at < 0.05.

3. Results

3.1. Demographic characters of the participants

A total of 130 participants have answered the designed questionnaire, out of which 67 participants were males and 54 were female with percentage of 58.5% and 41.5% respectively. Four age groups have been identified among the 130 participants (<20, 20–40, 40–60, >60), with around 75% of the second age group from 20 to 40. Educational level varied from intermediate education to postgraduate studies while the majority (66%) had BA or BSc. Profession showed variation between private, governmental, health and other sectors. Results of the participants demographics is presented in (Table 1 and Fig. 1).

3.2. General knowledge awareness of COVID-19

Results showed that 129 out of the 130 participants are aware of COVID-19, while 4.5% of the participants didn’t know what it is, and 90% have recognize it as a respiratory disease and around 6% have identified it as SARS2 and 100% have recognized it as a contagious disease.

Participants have been asked to response if the COVID-19 is similar to the SARS virus and the responses varied where the participants have been divided into three similar groups with three different answers between yes and no and I don’t know. 94% of the participants were able to recognize the correct incubation period of the virus while only 6% have chosen a wrong answer. Around 84% of the participants have considered the risk of COVID-19 is high while the rest have underestimated the risk of it. Out of the 130 participants, 125 were aware of the situation of the COVID-19 in the Saudi Arabia. Almost half of the participants asked for more information about COVID-19. Results of the COVID-19 basic information awareness (Table 2 and Figs. 2–4).

3.3. Awareness of COVID-19 detailed information

This part of the questionnaire composed of nine checkbox questions and responders should select as much correct choices as possible. Number of correct choices for each participant and number of participants who chose every choice within each question were used to represent the awareness of COVID-19 detailed information (Table 3).

Results showed that the highest awareness rate was recorded in the question of the reliable source of information where 64% of the participants have recognized all reliable sources while only 4% have not recognized any reliable source (Table 3). A total 92% of participant have recognized WHO as the most reliable source of information about COVID-19 while Healthcare professionals came at second with 68%. Other options were selected with<15% of the participants (Fig. 5). Participants showed the second-high awareness towards the recognition of the high-risk groups with 46% of participants have chosen all high-risk groups, while only 5% of the participants have not recognized any group. Elderly people, Patients with chronic conditions, health care workers, was the arrangement of the high-risk groups with around 77%, 69%, 63% of selection respectively (Table 3 and Fig. 6).

Mode of transmission was only recognized through human to human transmission with 96% while on other side no participant has recognized contacting contaminated surfaces as a transmission mode (Table 3 and Fig. 7). Responses varied towards the recognition of disease symptoms were out of the eight known symptoms, only 2% were able to choose all symptoms while 5% where able to recognize seven of them and the highest rate was between 3 and 5 symptoms with around 60% of participants. A total of 87% have

| Table 1 | Demographics characters of participant. |
|---------|----------------------------------------|
| Gender  | Count (%)                             |
| Female  | 54 (41.5)                             |
| Male    | 76 (58.5)                             |
| Age     |                                       |
| <20     | 10 (7.7)                              |
| 20–40   | 96 (73.8)                             |
| 40–60   | 23 (17.8)                             |
| >60     | 1 (0.7)                               |
| Education |                                      |
| Intermediat        | 3 (2.3)                       |
| High school        | 19 (14.6)                      |
| Diploma           | 15 (11.5)                       |
| Bachelor          | 86 (66.2)                       |
| Postgraduate      | 7 (5.4)                         |
| Profession        |                                       |
| Government sector | 36 (27.7)                    |
| Private sector    | 7 (5.4)                         |
| Health sector     | 37 (28.5)                       |
| Other             | 50 (38.4)                       |
Table 2
Awareness of participants about basic information about COVID-19.

| Question                                      | Yes | No | Percentage |
|-----------------------------------------------|-----|----|-------------|
| Are you aware about COVID-19?                 | 129 | 1  | (99.2)      |
| What is COVID-19?                            | 8   | 116| (89.2)      |
| SARS2                                        | 6   |    | (4.6)       |
| Respiratory disease                          | 122 | 4  | (93.8)      |
| Is COVID-19 contagious?                      | 130 | 0  | (100)       |
| Yes                                          | 44  | 38 | (33.8)      |
| No                                           | 38  | 3  | (28.2)      |
| I do not know                                | 48  |    | (36.9)      |
| Is COVID-19 same as SARS virus?              | 122 | 4  | (93.8)      |
| Yes                                          | 4   | 3  | (2.3)       |
| No                                           | 3   |    | (2.3)       |
| Incubation period of COVID-19?                | 108 | 9  | (83.1)      |
| 2–14 Days                                    | 122 | 4  | (93.8)      |
| Three weeks                                  | 4   | 1  | (3.1)       |
| Month                                        | 1   |    | (0.8)       |
| I do not know                                | 3   |    | (2.3)       |
| What is the situation of COVID-19 in KSA?    | 125 | 2  | (96.1)      |
| Some cases were reported                     | 3   |    | (2.3)       |
| No cases were reported                       | 2   |    | (1.5)       |
| I do not know                                | 2   |    | (1.5)       |
| What is the risk of COVID-19?                | 108 | 9  | (83.1)      |
| High                                         | 122 | 4  | (93.8)      |
| Intermediate                                 | 4   | 1  | (3.1)       |
| Low                                          | 1   |    | (0.8)       |
| I do not know                                | 3   |    | (2.3)       |
| Do you need more info about COVID-19?        | 125 | 2  | (96.1)      |
| No                                           | 3   |    | (2.3)       |
| Yes                                          | 2   |    | (1.5)       |

Fig. 1. Demographics characters of participant.

Fig. 2. Percentage of different responses to what is the risk of COVID-19?

Fig. 3. Percentage of different responses to what is the incubation period of COVID-19?
marked fever and shortness of breath to be the most common symptoms followed by cough (75%), sore throat (63%), tiredness (46%), muscle pain (39), the rest symptoms were chosen by <20% (Table 3 and Fig. 8). The lowest awareness rate was towards the long-term complications of the disease where 20% of the participants have recognized none of the long-term complications while 64% were able to recognize only one complication out of the three listed complications. Pneumonia was the highest marked complication by 78%, followed by death with 50%, while kidney failure was recognized by only 15% of the participants (Table 3 and Fig. 9).

Out of six measures to prevent COVID-19 spread, 36% of the participants have denoted the six measures followed by 38% with five measures recognized. The highest recognized measures among the participants were avoid travelling and gathering, sanitizers and cleaning materials usage, washing hands with soap for 20 s with 94%, 79%, 78% respectively (Table 3 and Fig. 10). Preparation to fight the COVID-19 showed a moderate awareness about possible options where over 80% were able to find more than two measures out of the six correct measures. Only 18% were able to identify the six measures correctly followed by 17% with five measures identified. It is noteworthy that this question in line with the spread prevention question showed 0% of participants failed to recognize at least one correct choice. General hygiene rules were the most marked measure with 95% of participants, followed by cover when coughing and sneezing and avoid contact with sick people with 88%, avoid travelling to infected areas with 84%, frequent hand wash 82%. It is worth mentioning that avoid raw animals was marked by 30% of participants, while avoid places handling animals was marked by 46% of participants (Table 3 and Fig. 11).

Responses towards the treatment for COVID-19 showed that 14% were not able recognize the proper handling of the disease while 60% were able to check one measure and 29% were able to find the two correct measures listed in the questionnaire. It is noteworthy to mention that all participants were aware of the fact that there is no vaccination yet for COVID-19 and 80% knew that there is no treatment as well while only 38% were able to recognize supportive treatment as a method to control or improve chances of disease control (Table 3 and Fig. 12).

Preparation of fighting COVID-19 among medical workers showed that 58% were non health workers while among medical workers, results showed that 70% were able to recognize the six important measures for preparation against the virus while around 6% of medical workers were not able to recognize any correct measures. Out of the 54 medical workers who responded to our questionnaire, 85% has recognized check supplies for emergencies as the first priority followed by contact international centers as CDC and WHO followed by evaluation of equipment and ventilators as the highest priority while alternative supplying checking came at last position with 48% (Table 3 and Fig. 13).

Table 3

| Number of correct choices Count (%) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------------------------|---|---|---|---|---|---|---|---|---|
| Who are at high risk for COVID-19? (3) | 7(5.38) | 33(25.3) | 30(23.0) | 60(46.1) | – | – | – | – | – |
| Source of information (reliable source)? (2) | 5(3.84) | 42(32.3) | 83(63.8) | – | – | – | – | – | – |
| What are the symptoms of COVID-19 infection? (8) | 2(1.53) | 9(6.92) | 3(2.30) | 28(21.5) | 31(23.8) | 23(17.6) | 25(19.2) | 6(4.61) | 3(2.30) |
| What is the mode of transmission? (2) | 5(3.84) | 125(96.1) | 0(0) | – | – | – | – | – | – |
| What are long term complications? (3) | 26(20) | 83(63.8) | 20(15.3) | 1(0.76) | – | – | – | – | – |
| How to prevent spread of COVID-19? (6) | 0(0) | 7(5.38) | 3(2.30) | 7(5.38) | 16(12.3) | 50(38.4) | 47(36.1) | – | – |
| Do you know treatment for COVID-19? (2) | 14(10.7) | 78(60) | 38(29.2) | – | – | – | – | – | – |
| What is your preparedness to fight COVID-19? (6) | 0(0) | 14(10.7) | 10(7.69) | 26(20) | 33(25.3) | 23(17.6) | 24(18.4) | – | – |
| How to prepare to fight COVID-19 within medical workers? (6) | 8(6.15) | 3(2.30) | 2(1.53) | 8(6.15) | 9(6.92) | 9(6.92) | 9(6.92) | 91(70) | – |

Fig. 4. Percentage of different responses to what is the recording cases of COVID-19?

Fig. 5. Percentage of different responses to the reliable source of information about COVID-19.

Fig. 6. Percentage of different responses to who are the high-risk groups?
3.4. Awareness level of COVID-19 among different groups

Investigating differences among different groups of the participants was done for sex, age, educational level and profession. Parametric assumptions were tested, and data showed significant violation against assumptions. Differences between different genders were examined using Mann-Whitney Signed rank test while differences among age, education, profession groups were tested using Kruskal-Wallis one way signed rank test. Results showed that there were no significant differences among different groups for all questions except for two questions. Results showed that there were significant differences of awareness levels among different groups of age and profession in response to the identification of the high-risk groups. Participants of the age group 20–40 showed higher awareness than other age groups while government employees showed higher awareness level than other profession groups. Results showed that there were significant differences of awareness levels among different groups of age and sex in response to the identification of COVID-19 treatment. Participants of the age group 20–40 showed higher awareness than other age groups while females showed higher awareness level than males in response to the treatment of COVID-19 (Table 4).

3.5. Correlation among awareness levels of COVID-19 detailed information.

As parametric assumptions have been violated, non-parametric spearman correlation was investigated among awareness levels of COVID-19 specifics. Results showed significant positive correlation between high risk groups recognition, reliable source of informa-
tion, infection symptoms, disease spread prevention and COVID-19 available treatments. While the reliable source of information awareness was positively correlated with all other questions except for the long-term complication's awareness. The lowest correlations were found between the awareness level of the long-term complications and the available COVID-19 treatment in one side and all other questions on the other side. Long term complications awareness level was only correlated to the awareness level of disease symptoms while treatment awareness level was correlated to high risk group, information source and disease spread prevention (Table 5).

4. Discussion:

The purpose of this study was to evaluate the awareness of healthcare professionals and the general public regarding COVID-19 in Qassim region, kingdom Saudi Arabia with focusing on both general awareness and detailed information.

Although the first patient was diagnosed in Qassim region on 22nd March 2020, the COVID-19 dashboard of the Saudi Ministry of Health indicates that Qassim had the lowest coronavirus prevalence across the country (e.g., compared to Dammam, Makkah, and Riyadh) till May 2020 (COVID-19 Dashboard Saudi Arabia, 2020). Currently, Qassim region has recorded 10,028 cases (0.7% of Qassim population) but still is not as high as other regions such Riyadh (0.9%) and it is not as low as Jizan (0.4%) (General Authority for Statistics Kingdom of Saudi Arabia, 2020 and COVID-19 Dashboard Saudi Arabia, 2020).

Results indicate that, regarding the general awareness of COVID-19 in Qassim region, almost every participant, whether a healthcare professional or a member of the general public, knew about the disease and the viral agent that causes it. This is consistent with the fact that many media organizations, due to the pandemic status of the coronavirus, have frequently disseminate information that contributed to grow public awareness globally (WHO, 2020c). For 95% of the study's participants, hygiene practices (e.g. regular handwashing) were considered the main way to prevent the transmission of COVID-19, which reflects the efficacy of the Saudi government's public health education initiatives, many of which have used digital technologies to spread essential information to the country's inhabitants. Furthermore, this awareness is consistent with the World Health Organization's (WHO) emphasis on the importance of regular, thorough, and well-timed handwashing (Modi et al., 2017).

Regarding the participants' awareness of detailed information of COVID-19, only 2% of the participants correctly identified the

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**Fig. 11.** Percentage of different responses to what preparation to fight COVID-19?

| Response                              | Percentage |
|---------------------------------------|------------|
| I don't know                          | 0.76       |
| Avoid sea food and live animals       | 10.7       |
| Use different board and knives for raw meat | 11.5     |
| Avoid products made in China          | 13.8       |
| Avoid raw animal products             | 30         |
| Avoid places handling animals         | 46.1       |
| Wear face mask                        | 59.2       |
| Washing hands more often              | 82.3       |
| Avoid travel to infected areas        | 83.8       |
| Avoid contact with sick people        | 88.4       |
| Cover when coughing or sneezing       | 88.4       |
| General hygiene rules                 | 95.3       |

**Fig. 12.** Percentage of different responses to what preparation against COVID-19 should medical workers consider?

| Response                              | Percentage |
|---------------------------------------|------------|
| I don't know                          | 5.38       |
| Supportive treatment                  | 38.4       |
| Just keep yourself safe               | 42.3       |
| No treatment/ vaccine till date       | 80         |

**Fig. 13.** Percentage of different responses to what treatment is available against COVID-19?
eight known symptoms of the disease, while 5% recognized seven of the eight symptoms. Most participants, approximately 60% identified between three and five symptoms. These varying levels of awareness about the symptoms of COVID-19 may be linked to knowledge deficits, but they could be also explained by the different reports of different symptoms from different countries to be associated with the disease (Pan et al., 2020; ECDC, 2020b). Variation in awareness level of disease symptoms recognition may be also connected to the WHO different reports at the disease early stages (WHO, 2020c; Pan et al., 2020).

The lowest level of awareness was associated with the long-term complications of COVID-19, as well as the disease’s transmission mechanisms. The only mechanism of transmission identified by the participants was human-to-human, which 96% were aware of. However, being in contact with contaminated surfaces was not identified by any of the participants. Of the six measures mentioned in the questionnaire to prevent the transmission of COVID-19, only 36% identified all six, while 38% identified five of the six measures. One way to understand participants’ knowledge deficits regarding the possibility of transmitting COVID-19 being in contact with contaminated surface is to relate it to the fact that this study was conducted at the beginning of COVID-19 crises. As such, it is possible that the participants lacked access to much of the information we have today. As for the lack of awareness about long-term complications, this could stem from the same reason, or it could be due to the fact that not much information has been disseminated about these complications. As such, more information is required for public education about transmission mechanisms and possible complications.

Awareness of COVID-19 management was high in the participants, and although no treatment has yet been proposed for the disease, a range of medications, including antimalarial and antiviral drugs, are being examined in clinical trials (NIH, 2020a, 2020b; SFDA, 2020). For example, evidence indicates that COVID-19 may be amenable to treatment with hydroxychloroquine, an antimalarial, and clinical trials are currently being conducted to see if this existing pharmaceutical can alleviate the symptoms of COVID-19 (e.g., pneumonia) (NIH, 2020a, 2020b; SFDA, 2020).

Subgroup analysis revealed that no significant differences existed between the different groups for every question, except for two questions. Firstly, a significant difference was identified based on age group, and secondly, a significant difference was also identified for profession. Specifically, young individuals who worked in professional positions were associated with a greater awareness of the complications of COVID-19.

To the best of our knowledge, this is the first study that has sought to evaluate COVID-19 awareness in Saudi healthcare professionals and the general public in Qassim region. In healthcare professionals, results indicate that most are aware of the critical details that will aid in the fight in the time of the pandemic. These results are consistent with a Najran-based cross-sectional study of the knowledge and attitudes towards the Middle East Respiratory System coronavirus (MERS-CoV) in healthcare professionals in primary healthcare centers and hospitals (Asaad et al., 2020). Specifically, the study noted that healthcare professionals had a satisfactory level of knowledge about the disease (Asaad et al., 2020). However, other KSA-based studies have been conducted in which it has been found that awareness for emerging infectious diseases is low, which highlights the importance of examining this issue further (Al-Mohaissen, 2017).

Finally, a noteworthy limitation of this study is that the sample group may not have been representative. For example, most of the participants were members of the young generation, meaning that the generalizability of these results to other parts of the KSA is low.

5. Conclusion

The present study found that healthcare professionals and members of the general public in Qassim region have different levels of awareness of both general and technical details of COVID-19. The highest level of awareness was showed in the recognition of the source of information and symptoms of COVID –19. However, there was awareness deficits in the sample group regarding the complications of COVID-19 and the mechanisms of transmission. This may be due to the efforts exerted by the Saudi
government to disseminate the information of COVID-19 regarding how to avoid the disease and how to recognize the symptoms. A less interest was given to disease complications while reporting different mechanisms of transmission on the other side make it unclear for the public to recognize the proper mechanism of transmission.

This study indicates that there is an urgent need to implement regular educational interventions and training initiatives on infection control practices for COVID-19 for healthcare professionals. For example, webinars could be held for members of the healthcare profession, including administrators and hospital managers, and it may be also beneficial to extend these initiatives to the general public.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Algaisi, A.A., Albari, N.K., Hassanain, M., Hashem, A.M., 2020. Preparedness and response to COVID-19 in Saudi Arabia: Building on MERS experience. J. Infect. Publ. Health 13 (6), 834–838. https://doi.org/10.1016/j.jiph.2020.04.016.

Al-Mohaissen, M., 2017. Awareness among a Saudi Arabian university community of Middle East respiratory syndrome coronavirus following an outbreak. East Mediterr. Health J. 23 (5), 351–360.

Alishammari, T.M., Albebanawi, A.F., Alenzi, K.A., 2020. Importance of early precautionary actions in avoiding the spread of COVID-19: Saudi Arabia as an example. Saudi Pharmacist. J. 28 (7), 898–902. https://doi.org/10.1016/j. sjps.2020.05.005.

Asaad, A., El Sokkary, R., Alzamanan, M., El Shafei, M., 2020. Knowledge and attitudes towards Middle East respiratory syndrome coronavirus (MERS-CoV) among health care workers in south-western Saudi Arabia. East Mediterr. Health J. 26 (04), 435–442.

CDC, 2020. How COVID-19 Spreads. https://www.cdc.gov/coronavirus/2019-ncov/about/index.html. (Accessed: January 27, 2020).

COVID 19 Dashboard Saudi Arabia, 2020. https://covid19.moh.gov.sa/. (Accessed: April 25, 2020).

ECDC, 2020a. Vaccines and treatment of COVID-19. https://www.ecdc.europa.eu/en. (Accessed: April 25, 2020).

ECDC, 2020b. Coronavirus disease 2019 (COVID-19) in the EU/EEA and the UK – eighth update. https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-risk-assessment-coronavirus-disease-2019-eighth-update-8-april-2020.pdf. (Accessed: April 25, 2020).

ECDC, 2020c. Vaccines and treatment of COVID-19. https://www.ecdc.europa.eu/en/covid-19/latest-evidence/vaccines-and-treatment. (Accessed: August 1, 2020).

Gallegos, A, 2020 WHO Declares Public Health Emergency for Novel Coronavirus. Medscape Medical News. https://www.medscape.com/viewarticle/924596. (Accessed: March 25, 2020).

General Authority for Statistics Kingdom of Saudi Arabia. 2020. Service guide. https://www.stats.gov.sa/en/825, (Accessed: August 16, 2020).

Interactive service. 2020. Coronavirus (COVID-19) awareness training. https://www.interactiveservices.com/coronavirus-covid-19-awareness-training/. (Accessed: March 25, 2020).

Klopfenstein, Timothée, Zahra, Hajer, Kadiane-Oussou, Ndri Juliette, Lepiller, Quentin, Royer, Pierre-Yves, Toko, Lynda, Gendrin, Vincent, Zayet, Souheil, 2020. New loss of smell and taste: Uncommon symptoms in COVID-19 patients on Nord Franche-Comte cluster, France. Int. J. Infect. Dis. https://doi.org/10.1016/j.ijid.2020.08.012.

Majidj, Mohammad, Safavi-Naeini, Payam, Solomon, Scott D., Vanderven, Orly, 2020. Potential Effects of Coronavirus on the Cardiovascular System: A Review. JAMA Cardiol. 5 (7), 831. https://doi.org/10.1001/jamacardio.2020.1286.

Modi, P.D., Kumar, P., Solanki, R., Modi, J., Chandramani, S., Gill, N., 2017. Hand Hygiene Practices Among Indian Medical Undergraduates: A Questionnaire-Based Survey. Cureus 9, (7). https://doi.org/10.7759/cureus.1463 e1463.

MOH. 2020. MOH: Call (937) Service Center for Inquires about Novel Coronavirus. https://www.moh.gov.sa/en/MediaCenter/News/Pages/News-2020-02-29-002.aspx. (Accessed August 1, 2020).

NIH. 2020a. NIH clinical trial of hydroxychloroquine, a potential therapy for COVID-19, begins. https://www.nih.gov/news-events/news-releases/nih-clinical-trial-hydroxychloroquine-potential-therapy-covid-19-begins. (Accessed: April 5, 2020).

NIH. 2020b. NIH clinical trial of remdesivir to treat COVID-19 begins. https://www.nih.gov/news-events/news-releases/nih-clinical-trial-remdesivir-treat-covid-19-begins. (Accessed: April 5, 2020).

Pan, Lei, Mu, Mi, Yang, Pengcheng, Sun, Yu, Wu, Runsheng, Yan, Junhong, Li, Pibao, Hu, Baoguang, Wang, Jing, Hu, Chao, Jin, Yuan, Niu, Xun, Ping, Rongyu, Du, Yingzhen, Li, Tianzh, Xu, Guogang, Hu, Qinyong, Tu, Lei, 2020. Clinical Characteristics of COVID-19 Patients With Digestive Symptoms in Hubei, China: A Descriptive, Cross-Sectional, Multicenter Study. Am. J. Gastroenterol. 115 (5), 766–773.

SFDA. 2020. SFDA Approved WHO Solidarity clinical trial for COVID-19 to be conducted in Saudi Arabia by the Ministry of Health. https://www.sfda.gov.sa/en/drug/news/Pages/d12-4-2020aa1.aspx (Accessed: May 1, 2020).

SPA. 2020a. SDAIA launches Tawakkalna App to facilitate the issuance of movement permits electronically during the curfew period. https://www.spa.gov.sa/viewfullstory.php?lang=en&newsid=2082059, (Accessed August 1, 2020).

SPA. 2020b. COVID-19 Follow-up Committee Holds Meeting. https://www.spa.gov.sa/viewstory.php?lang=en&newsid=2052401. (Accessed August 1, 2020).

WHO. 2020a. Coronavirus. https://www.who.int/news-room/commentaries/who-who-who-coronavirus/coronavirus-world-health-organization.html. (Accessed May 5, 2020).

WHO. 2020b. Coronavirus. https://www.who.int/health-topics/coronavirus#tab=tab_1 (Accessed: May 5, 2020).

WHO. 2020c. Key Messages and Actions for COVID-19 Prevention and Control in Schools. https://www.who.int/docs/default-source/coronaviruse/key-messages-and-actions-for-covid-19-prevention-and-control-in-schools-june-2020.pdf?sfvrsn=b3f1452_4 (Accessed May 1, 2020).

WHO. 2020d. WHO announces COVID-19 outbreak a pandemic. https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic. (Accessed May 1, 2020).

WHO. 2020e. Transmission of SARS-CoV-2: implications for infection prevention precautions. https://www.who.int/news-room/commentaries/detail/transmission-of-sars-cov-2-implications-for-infection-prevention-precautions. (Accessed August 1, 2020).