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Knowledge, attitude, and practice toward COVID-19 among paramedics in Saudi Arabia: Implications for educational program

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ABSTRACT

Coronavirus disease-2019 (COVID-19) is an ongoing public health issue, which threatens the lives of more than 2.4 million people worldwide. This study's purpose is to establish paramedics' knowledge, attitude, and practices (KAP) towards COVID-19 in Saudi Arabia. An online cross-sectional, descriptive study was conducted among paramedics in four hospitals via WhatsApp Messenger. The study population was composed of paramedics aged 18 years and above. A pre-validated questionnaire was used to evaluate KAP towards COVID-19. Bloom's cut-off of 80% was used to assess sufficient knowledge (≥80%), positive attitude (≥4), and good practice (≥2.4). All analyses were performed using SPSS version 26 of the approaching 300 paramedics, 71 (24%) responded. The majority of participants were male (n=61, n=85.9%), with an average age of 33 (range: 18–57) years. Overall, 4.2% (n=3) had sufficient knowledge, 42% (n=30) had a positive attitude, and 4% (n=4) had good practice regarding to COVID-19. There was a statistically significant difference between paramedics' KAP according to their socio-demographic characteristics. Younger paramedics (≥ 18) have sufficient knowledge and a good practice toward COVID-19 than older paramedics (≥37) (p=0.000, p=0.005), respectively. Older paramedics (≥37) have a positive attitude towards COVID-19 relative to younger paramedics (≥ 18) (p=0.000). A statistically significant difference between the total KAP and the level of education (p=0.000) at which the diploma (p=0.000) had sufficient knowledge of COVID-19 than the bachelors and the postgraduate level. Bachelor's and graduates have a positive attitude (p=0.000) towards COVID-19 than the diploma. Saudi paramedics have poor knowledge of COVID-19. In addition, the results of this study have shown that there are statistically significant differences in KAPs' paramedics according to their demographic characteristics. The author suggests follow-up studies concerning emergency medical services (EMS) settings around the country. Relevance to clinical practice: Ongoing professional education program for Saudi paramedics is encouraged to improve knowledge of paramedics, thus preventing negative attitudes and encouraging constructive preventive and therapeutic practices.

1. Introduction

Coronavirus Disease 2019 (COVID-19) is a rapidly evolving pandemic caused by a novel human coronavirus (SARS-COV-2) known as 2019-nCov (Zhu et al., 2020). COVID-19 was first identified among patients with symptoms of viral pneumonia in Wuhan city, China, in December 2019 (Li et al., 2020; Lu et al., 2020). According to figures from Johns Hopkins University (JHU), more than 2.4 million cases, and 165,000 deaths have been registered worldwide as of 20 April 2020 (JHU, 2020). According to the World Health Organization (WHO), Europe is the most affected, with more than 50% of cases and 60% of deaths in this area (WHO, 2020c). The United States of America has the highest number of cases worldwide (695,350 cases) and the highest number of deaths (32,427 deaths) (WHO, 2020c). According to the Statistical Centre for the Cooperation Council for the Arab Countries of the Gulf ("GCC-Stat"), GCC countries are the least affected with 774,500 cases and 6,476 deaths on 16 July 2020, but the numbers are increasing. In Saudi

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Arabia, the number of confirmed cases rose to 326,258, and the highest number of deaths (4,305 deaths) on 14 September 2020. On 30 January 2020, the WHO conducted an emergency meeting and announced a global outbreak of COVID-19 and a worldwide public health emergency (WHO, 2020c).

COVID-19 is transmitted from person to person by inhalation of an infected individual's aerosols (Li et al., 2020). Old age and patients with co-morbidities such as hypertension, heart disease, lung disease, cancer, or diabetes were identified as possible risk factors for serious illness and mortality (Shi et al., 2020; Tian et al., 2020). To date, COVID-19 has not been approved for antiviral curative treatment or vaccine (Sahin et al., 2020). More detail is being studied about its distribution, transmission, pathophysiology, treatment, and prevention. WHO promotes the prevention of human-to-human transmission by protecting close contacts and health workers from infection and avoiding animal-source infections (WHO, 2020c). Principal prevention strategies include frequent hand washing, social distancing, and respiratory hygiene (coating of mouth and nose while coughing or sneezing) (WHO, 2020b; Wang et al., 2020).

Paramedics are one of the health care workers on the front line of the COVID-19 pandemic response and are exposed to hazards such as pathogen exposure, long working hours, psychological distress, exhaustion, job burnout and stigma, and physical abuse (Fernandez et al., 2020). Lack of understanding of the disease among paramedics can lead to delayed diagnosis and management, leading to a rapid spread of infection. Pandemics is a challenging and difficult period for health care providers with daunting caseloads, constantly changing knowledge, and competing for self-protection priorities while maintaining a high level of patient care (Buick et al., 2020). Therefore, the knowledge of paramedics should be evaluated in order to help their clinical practice during the COVID-19 pandemic. WHO, the CDC, and various governmental agencies in different countries have established recommendations for healthcare professionals and online refresher courses to improve awareness and self-prevention strategies (WHO, 2020a). There is a lack of studies on the KAPs (knowledge, attitudes, and practices) of paramedics toward the COVID-19 pandemic. However, a study with majorly Chinese healthcare workers (HCWs) (89%) revealed that they had sufficient knowledge about COVID-19, and 89.7% followed correct practices toward prevention of COVID-19 transmission. Additionally, doctors showed higher knowledge scores (38.56±3.31) than paramedics (37.85±2.63), nurses (37.85±2.63), and paramedics (36.72±4.82) in this study. In consistence with study, a descriptive study conducted by Saqlain et al. (2020) to assess KAP and perceived barriers among HCWs regarding COVID-19. Findings showed that HCWs have good knowledge (93.2%), a positive attitude (mean 8.43), and good practice (88.7%) regarding COVID-19. Interestingly, analysis of this study revealed that pharmacists (94.7%) had greater knowledge than doctors (93.3%) and paramedics (90.5%), but the difference was not significant (P=0.383). To the researchers' knowledge, no study to assess KAPs among paramedics toward COVID-19 in Saudi Arabia. Therefore, the purpose of this study is to assess the KAPs of paramedics toward COVID-19 in Saudi Arabia.

2. Methods

2.1. Study design, setting, and sample

A descriptive, cross-sectional design using an anonymous online survey carried out in 10 hospitals in Saudi Arabia during the first week of September 2020. A convenience sampling technique based on the recruitment of hospital participants during the outbreak of COVID-19 was used. The total bed capacities of participating hospitals are estimated at 1,900 as of August 2020, with approximately 300–500 paramedics. In order to conduct a power analysis for this study, the G*power software was used to suppose sample size, suppose 0.95 power with an alpha error of 0.05 and a medium effect size of (0.5), the total sample size require 71 participants to have confidence in the findings.

2.2. Data collection

Institutional Review Board (IRB) approval was obtained from the participating hospitals in this study. Due to the suggestion of the Saudi Ministry of Health to avoid the transmission of paper between individuals, the researchers decide to use WhatsApp Messenger for enrolling potential participants. Researchers identify all existing paramedics in the WhatsApp group of four hospitals. An online data collection tool developed and implemented using Google Forms (through docs.google.com/forms). The Google Form link of the questionnaire sent over the specified WhatsApp groups to join participants.

2.3. Study instruments

The online survey package includes three instruments and a demographic sheet (see appendix A). The paramedics' demographic sheet contained questions to disclose information about gender, age, work experience, marital status, the highest level of education, and sources of information on COVID-19, which examined to find their relationship to the paramedics' KAP toward COVID-19. For the purpose of this study, the KAPs toward COVID-19 by Zhong et al. (2020) and Goni et al. (2020) used, consisting of 21-item.

Data regarding Paramedics' knowledge toward COVID-19 collected through the 11-item questionnaire adapted from Zhong et al. (2020) and modified to suit Paramedics, each correct answer weighing one point. The questions were about clinical presentations, transmission, prevention, and

control of COVID-19. Each correct response weight (1) point and (0) for incorrect responses. The higher the points, the more knowledgeable the paramedic is. Paramedics' attitudes toward COVID-19 assessed using 5 Likert-item questions that have been adopted from Goni et al. (2020) and modified appropriately for COVID-19 by the authors. The responses were; strongly disagree, disagree, neutral, agree, and strongly agree, each weighing 1–5 respectively for each positive statement. Some questions were reversed to eliminate biases of giving a single similar. Paramedics' practices toward COVID-19 assessed using five Likert-item questions that have been developed from the WHO, and Saudi Ministry of Health recommended practices for prevention of COVID-19 transmission, i.e., hand washing, avoiding crowded places, keeping a social distance (1 meter apart), avoiding touching of the face, and avoiding handshakes. The responses were; always, occasional, and never each weighing 3, 2, and 1 point respectively for good practice. Bloom's cut-off of 80% was used to determine sufficient knowledge (≥80%), positive attitude (≥4), and good practice (≥2.4) (Kaliyaperumal, 2004).

2.4. Data analysis

The completed questionnaires were retrieved from Google Forms and transferred to Microsoft Excel 2018 for cleaning and coding purposes. The cleaned data exported to Statistical Package for Social Sciences (SPSS) software (IBM SPSS Statistics 26) to describe the study sample characteristics and determine the mean level of paramedics' KAP toward COVID-19. For all statistical tests, levels of statistical significance are established at $\alpha<0.05$. An independent t-test was used to examine the difference in the mean score of paramedics' KAP toward COVID-19 between males and females and between married and unmarried. One-way variance analysis (ANOVA) followed by Scheffe's post-hoc test used to examine differences in the mean score of paramedics' KAP toward COVID-19 between different age groups, different education levels, and different sources of information on COVID-19. Pearson's correlation coefficient was used to examine the relationship between the paramedics' KAP toward COVID-19 and their age in years.

3. Results

3.1. Sociodemographic characteristics of the paramedics

Of the 300 paramedics approached, 71 paramedics responded (response rate=24%). The majority of the participants were male (n=61, 85.9%), with a mean age of 33.6 (SD: 10.2) years, and almost more than half of them were married (69%). Of the 71 participants, 43 (61%) had at least a postgraduate degree, and a minority had a diploma degree 3 (4.2%). The main sources of information about COVID-19 among participants were information from government sites and media, e.g., MoH-KSA (84.5%), and the least source was information from journals and other sources 22 (31%) (Table 1).

Table 1: Sociodemographic characteristics of the participants (n=71)

Variable	Frequency	%
Gender		
Male	61	85.9
Female	10	14.1
Age (Mean, SD) (33.6, 10.2)		
≥18	2	2.8
28-36	47	66.2
≥37	22	31
Marital status		
Married	49	69
Not married	22	31
Level of education		
Diploma	3	4.2
Bachelors	25	35.2
Postgraduate	43	60.6
Source of information on COVID-19		
Government sites and media, e.g., MoH-KSA	60	84.5
International health organization, e.g., WHO, CDC	54	76.1
News media, e.g., TV, radio, newspaper	32	45.1
Social media, e.g., WhatsApp, Facebook	28	39.4
Journals	14	19.7
Others	8	11.3

3.2. Description of the paramedics' KAP

Overall, the total knowledge score was 55.2% (SD: 14.3). The knowledge of paramedics towards COVID-19 was poor. Unfortunately, only three participants scored 80% or more and considered that they had sufficient knowledge. Additionally, twenty-two participants scored below 50% of the total knowledge. The mean attitude score is 3.6 (SD: 0.6). Overall, the attitude of paramedics towards COVID-19 was low. Less than half, 42.3% (n=30) of the participants had a positive attitude towards COVID-19. Only eleven percent (n=8) indicated that the black race was protective against COVID-19, and more than half of 63.4 % (n=45) were confident that they would engage in the management of the COVID-19 patient. When asked about the preparedness of Saudi Arabia, only seven percent (n=5) believed that Saudi Arabia was not in a good position to contain the COVID-19 pandemic (Table 2). The mean practice score is 1.9 (SD: 0.2). Overall, there have been poor practices (mean score ≤2.4, Table 2) among paramedics towards COVID-19. The majority of 85.9% (n=61) of paramedics still wore masks when they came into contact with patients, and up to 90.1% (n=64) washed their hands before and after treating each patient. Unfortunately, 57.7% (n=41) of the participants avoided patients with symptoms close to those of COVID-19 (Table 2).

Table 2: Description of KAP among paramedics (n=71)

Variable	Mean ± SD	Freq (%)
Overall Knowledge/Sufficient knowledge	55.2±014.3	3 (4.2)
Overall Attitude/Positive attitude	3.6±0.7	30 (42.3)
Overall Practices/Good practice	1.9±0.2	4(5.6)

3.3. Relationship between demographic variables and KAP

The findings showed that the relationship between total practice and age in years was found to be statistically significant (r=-0.24, p=0.04). The results revealed a statistically significant difference between total KAP and paramedics' age groups (p=0.000) in which younger paramedics (≥18) have sufficient knowledge and a good practice toward COVID-19 than older paramedics (≥37) (p=0.000, p=0.005) respectively. However, older paramedics (≥37) have a good attitude toward COVID-19 than younger paramedics (≥18) (p=0.000). In addition, there was a statistically significant difference between the total KAP and the level of education (p=0.000) in which the diploma certificate (p=0.000) had more knowledge of COVID-19 than the bachelors and the postgraduate certificate. However, both bachelors and postgraduates have a good attitude (p=0.000) towards COVID-19 than a diploma. There were no statistically significant differences between males and females in their KAP to COVID-19 (p=0.8, 0.3, and 0.9), respectively, in which both males and females had similar KAP to COVID-19. In addition, there were no statistically significant differences between married and single respondents in their KAP towards COVID-19 (p=0.6, 0.8, and 0.9), respectively. Table 3 shows the difference between Groups for Selected Demographics.

Table 3: Difference between groups for selected demographics (N=71)

Variable	Knowledge						Attitude						Practices					
	Mean	SD	F/t ratio	df 1	df 2	*p*	Mean	SD	F/t ratio	df 1	df 2	*p*	Mean	SD	F/t ratio	df 1	df 2	*p*
Gender																		
Male	55.2	14.8	.15		69	.8	3.5	.7	-.97		69	.3	1.91	0.2	-.02		69	.9
Female	54.5	10.4					3.8	.4					1.92	.1				
Marital status																		
Single	55.6	15.8	.41		69	.6	3.6	.7	.23		69	.8	1.9	.2	.003		69	.9
Married	54.1	10.2					3.5	.5					1.9	.2				
Age																		
≥18	1.00	.00	14.2	2	68	.000*	1.00	.00	24.6	2	68	.000*	2.4	.00	5.8	2	68	.005*
28- 36	53.1	11.9					3.7	.08					1.9	.24				
≥37	55.3	12.8					3.5	.09					1.8	.20				
Level of education																		
Diploma	87.8	20.9	11.9	2	68	.000*	1.9	1.6	11.8	2	68	.000*	2.2	.34	2.4	2	68	.09
Bachelors	56.7	9.9					3.7	.50					1.9	.22				
Postgraduate	52.0	13.2					3.6	.51					1.8	.24				

*P<0.05

4. Discussion

COVID-19 is a rapidly changing global health challenge that affects all fields (Kassema, 2020). Paramedics are not just at the forefront of the battle against this extremely contagious infectious disease but are also directly or indirectly impacted by it, and the risk of contracting this disease among paramedics is higher than in the public population (Yang et al., 2020). Thus, it is of utmost importance that paramedics around the globe have sufficient knowledge of all aspects of the disease from clinical presentation, diagnosis, the treatment recommended, and preventive strategies developed. To the best of our knowledge, this is the first study to analyze the KAPs of paramedics against COVID-19 in Saudi Arabia and the Gulf Cooperation Council (GCC). There are also very limited studies worldwide documenting KAPs among paramedics.

A mean knowledge score of 55.2% was obtained from this study on knowledge issues, indicating a low level of knowledge among paramedics in Saudi Arabia. This score is much lower than the overall Chinese population recorded (92%) (Zhou et al., 2020). This may be because the Chinese study evaluated the symptoms of COVID-19 using one direct question rather than asking participants to choose from several choices.

In general, the majority of HCWs had adequate knowledge of COVID-19, which is in contrast to the findings of COVID-19 in Vietnam. It is also consistent with the surveys conducted by Bhagavathula et al. (2020) on COVID-19, a comparative analysis between nurses in Gabon on Ebola (Rehman et al., 2020) and HCWs in Ethiopia on Ebola (Abebe et al., 2016), all of whom reported poor knowledge. From this study, only 4.2% of paramedics had sufficient knowledge of COVID-19, which is lower than the values recorded in the Zhou et al. (2020) study, where 88.4% had sufficient knowledge of COVID-19. In order to improve the knowledge of COVID-19 paramedics in our setting, additional education and training through continuous professional education and journal clubs, particularly on symptoms and transmission, are necessary. Unlike in Vietnam, where age did not differ with knowledge level (Huynh et al., 2020), younger paramedics (about 18 years of age) had knowledge of COVID-19 in this sample. One possible explanation is that younger paramedics would also benefit from a variety of information sources.

Approximately 27% of paramedics claimed that wearing general medical masks did not protect against COVID-19 as compared to Ng et al.'s (2020) results, which showed sufficient protection against COVID-19. Sixty-three percent of the paramedics in this study agreed that they would engage confidently in the management of COVID-19 cases, which means that the paramedics should be provided with sufficient knowledge on COVID-19 case management. However, knowledge didn't determine attitude significantly.

The study finding shows that paramedics have low COVID-19 prevention practices, which vary from Alfahan et al.'s (2016) findings on coronaviruses, Raab et al. (2020) on Ebola Virus Disease in Guinea, and COVID-19 in the general Chinese population (Zhong et al., 2020). Only 5.6% of paramedics follow

the prevention and control activities suggested by the Saudi Ministry of Health and WHO. This involves daily hand washing, social distance, and wearing a facemask while in high-risk circumstances. Seventy-six percent and 82% of paramedics reported wearing a face mask while in touch with patients and washing their hands before/after treatment with patients. These are very critical measures to avoid the transfer of COVID-19 from patients to patients and to the paramedics themselves. However, up to 58% of paramedics reported that they avoided patients with symptoms indicative of COVID-19. This can be due to a lack of personal protective equipment, which has become a global issue (Bauchner et al., 2020; Ranney et al., 2020).

5. Conclusion

Only 4.2% of paramedics have adequate information on the transmission, diagnosis, and prevention of COVID-19 transmission. Knowledge of COVID-19 was significantly higher among younger paramedics≥18–39 years of age. There was no statistically significant difference in COVID-19 knowledge between male and female paramedics in Saudi Arabia. Forty-two of the respondents had a positive attitude towards COVID-19, and about 6% of the paramedics had good practices towards COVID-19, particularly those aged 18 years or older.

6. Implications for paramedics practice

The findings of this study indicate that paramedics in Saudi Arabia need an ongoing professional education program to develop their skills, thereby preventing negative attitudes and encouraging constructive preventive and therapeutic practices. Relevant details on practices for the prevention of COVID-19 transmission, i.e., hand washing, avoiding crowded areas, holding social distances (1 meter apart), avoiding touching the face, and avoiding handshakes. Saudi health providers should also plan the quality of the paramedical education curriculum around these issues. The author suggests follow-up studies concerning emergency medical services (EMS) settings around the country.

7. Limitations of the study

There are some limitations to this study. Firstly, there was no previously established standardized method for evaluating KAPs on COVID-19. However, the researcher has adapted and updated an earlier published KAP assessment method for the prevention of respiratory tract infections; and a method for assessing KAP among Chinese residents (Zhong et al., 2020; Goni et al., 2020). The questions were developed in the WHO and CDC guidance and COVID-19 studies (WHO, 2020b). Second, the study also had a low response rate (24%), which was reported especially among paramedics in web-based surveys (Shih and Fan, 2008), and this limits the generalization of the survey.

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Compliance with ethical standards

Ethical considerations

This study was carried out with the approval of the ethical committee of King Saud University (reference no. E-20-5244). Prior to the start of data collection, the objectives, benefits, and risks of the study were addressed with the participants, and it ensured that participation in the study is voluntary. In addition, all participants were made aware that the information presented in a group format and that anonymity and confidentiality were assured. Participants are allowed to terminate the survey at any time they desire. Participants informed that they may not directly benefit from their participation in the study, but that the findings of the study may be used to develop a professional education program that can help in improving knowledge of paramedics hence averting negative attitudes and promoting positive preventive and therapeutic practices. The risks may associate with participating in this study are considered to be minimal as an inconvenience in studying participants include time and energy spend during data collection.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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