Investigating healthcare practitioners' attitudes towards the COVID-19 outbreak in Saudi Arabia: A general qualitative framework for managing the pandemic

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ABSTRACT

Background: Some previous studies have investigated the attitudes of healthcare professionals towards certain aspects of the COVID-19 outbreak. In addition, some general frameworks have been proposed to manage the pandemic.

Objective: The purpose of this article was to analyze the attitudes of healthcare practitioners in Saudi Arabia towards the treatment of patients with COVID-19, work planning of practitioners, leadership approaches to manage the pandemic, sharing information strategies, medical errors, compliance with procedures, and challenges faced by the practitioners. Furthermore, another objective was to propose a general framework for managing the COVID-19 outbreak in Saudi Arabia.

Methods: To achieve these purposes, a survey was designed based on an online questionnaire that was initially sent via WhatsApp, Twitter, Facebook, and email to 336 healthcare practitioners working in 7 hospitals in Saudi Arabia. The response rate was 30.4%.

Results: The outcomes indicated that healthcare practitioners in Saudi Arabia had positive attitudes towards effective communication and interaction between health professionals and patients, leadership and maintenance of team coordination, work planning, communication and cooperation between team members, training and skills development of healthcare professionals, implementing strict procedures to avoid errors and control the spread of the COVID-19 pandemic, maintaining an adequate supply of medicines and medical equipment, and obtaining the support of the government, the community, and the people.

Conclusion: Based on the findings, it was possible to suggest that the management of health care operations related to the COVID-19 outbreak in Saudi Arabia requires effective collaboration and information sharing among various stakeholders. In this sense, communication, effective leadership, coordination and work planning, adequate treatment for patients, strict compliance with hospital rules and procedures, preventive and regulatory measures, and training and support for health professionals, were parameters considered in the general qualitative framework suggested in this study for managing the COVID-19 pandemic in Saudi Arabia. The propositions presented in this study can help the Saudi Arabian government implement an effective plan to control the spread of the COVID-19 pandemic in this country.

1. Introduction

The COVID-19 pandemic has spread to most of the world, and by mid-November 2020, more than 53, 700, 000 cases of confirmed infected people and more than 1,300,000 deaths had been recognized [1]. The first cases of COVID-19 were reported in late December 2019 in Wuhan, China [2]. Subsequently, the pandemic has spread to almost the entire world and has caused adverse effects on the economic and social activities of most countries [3]. The COVID-19 virus is rapidly spreading, contagious, and continually evolving in humans [2]. Symptoms in patients can include fever, cough, dyspnea, headache, muscle aches, sore throat, nasal congestion, fatigue, among other possible signs [4]. These symptoms can appear 2–14 days after exposure to the virus. The virus is transmitted when an infected person coughs, sneezes, or talks, and drops of saliva or nasal secretions reach the mouth, nose, or eyes of a close person [5]. To minimize the chances of becoming infected with the disease, it is necessary to use a mouth cover or a suitable mask, and wash your hands frequently with soap and water, alcohol or another disinfectant. Also, it is advisable to stay away more than 1 m away from other people.

On the other hand, the attitudes and perceptions of health workers regarding the COVID-19 outbreak have varied in different countries of the world since the beginning of the pandemic [6–14]. In Saudi Arabia, one study showed concern about the severity of the disease, the results of treatments, and government efforts to contain the spread of the infection [6]. Another study in Northwestern Ethiopia found that improving awareness through health education was an important strategy to address the COVID-19 pandemic [7]. Similarly, healthcare providers in Pakistan considered that training programs were necessary to improve the knowledge of health providers about preventing the risks of the COVID-19 outbreak [8]. In Nigeria, research on health providers' attitudes, fears, and knowledge of COVID-19 infection revealed the need to provide health workers with personal protective equipment and training [9]. Likewise, another study conducted in Egypt noted the importance of equipping health workers with personal protective equipment [10]. In South Africa, the lack of leadership has created limitations in the provision of services to combat COVID-19 [11]. As for China, healthcare providers were concerned about the risks and the need to use personal protective equipment [12]. Other general aspects about the attitudes of health professionals towards patients have been pointed out in several previous studies [15–24].

It is important to mention that during pandemics, the attitudes of health professionals can be influenced by the risk of exposure to infection or by increased stress and workload [25]. In this regard, some studies have investigated the impact of pandemics on the attitudes of healthcare professionals and the challenges they face [26–28]. Overall, positive attitudes of healthcare professionals towards patient safety [29], privacy [30], and technology-enabled approaches such as remote monitoring of patients [31] have been observed. In relation to the COVID-19 outbreak, the work environment has varied greatly from a normal healthcare setting to a situation that involves rapid changes in service delivery, procedures and compliance, ethical issues, and treatment preferences related to the support and acceptance of patients, among other factors. In these circumstances, leadership is very important to maintain a positive attitude in the midst of the COVID-19 pandemic [25].

Furthermore, some general frameworks have been proposed to handle the crisis generated by the COVID-19 outbreak [32–39]. However, these frameworks are very broad and do not specify the procedures that must be carried out to manage the COVID-19 pandemic in each country. In general, these frameworks are directed to the institutions, communities and governments of the countries of the world and suggest adapting medical systems to control and prevent the spread of COVID-19; establish policies to mitigate the disease and reduce the transmission of the pandemic; protect communities and detect possible disease transmission scenarios; provide emergency funds and health insurance; establish and extend social protection to the entire population; disseminate accurate information about the pandemic; promote education about the COVID-19 using social media and television; ensure the supply of water, food, energy, medicine, and other medical materials; improve the operation and management of emergency systems; improve leadership and communication between government and communities; evaluate the economic and social impact of the COVID-19 pandemic; ensure that governments and communities coordinate and implement recommended actions, etc.

Related to this research, it is convenient to point out that the human resources departments of hospitals have considered that the attitudes of health personnel are an important area to consider in the process of developing strategies to improve the efficiency of these institutions [17]. Regarding this topic, several studies have investigated, from various perspectives, how the attitudes of health workers towards medicine, work culture and professionalism, robots in service, patients, and other aspects can help to improve the overall quality of health care [15–21].

Based on the aforementioned aspects and considering that in Saudi Arabia only a limited study [6] was found on the attitudes of health professionals towards the COVID-19 outbreak, and no study was observed on the proposal of a framework to face the crisis generated by the pandemic, the objective of this article was to analyze the attitudes of healthcare practitioners in Saudi Arabia towards the treatment of COVID-19 patients, work planning of healthcare providers, leadership approaches for handling the COVID-19 pandemic, information sharing methodologies, medical errors and procedural compliance, and challenges faced by the healthcare practitioners in dealing with the COVID-19 outbreak. Also, taking into account the attitudes of healthcare practitioners, a general framework for managing the COVID-19 pandemic in Saudi Arabia was suggested.

It is pertinent to mention that this study is significant because it analyzes the attitudes of healthcare practitioners towards areas not considered in similar studies, and proposes a practical framework to manage the COVID-19 pandemic in Saudi Arabia where there are no published studies on this subject [[6–24,32–39]]. The importance of this study lies in the fact that it is the first investigation carried out in Saudi Arabia in order to propose a qualitative general framework to manage the COVID-19 pandemic based on the opinions of healthcare practitioners' in this country. Taking into account the proposals presented in this study, the Saudi Arabian government can implement an effective plan in hospitals to control the spread of the COVID-19 pandemic in the Kingdom of Saudi Arabia.

2. Methods

2.1. Study settings

To achieve the objective of this study, an online questionnaire-based survey was designed to collect data on the attitudes of Saudi Arabian healthcare practitioners towards the treatment of COVID-19 patients, work planning of practitioners, leadership strategies for handling the COVID-19 pandemic, information sharing methodologies, medical errors and procedural compliance, and challenges faced by the practitioners in dealing with the COVID-19 outbreak.

The questionnaire was translated into Arabic by two professional translators, and the survey was developed using the QuestionPro application. The survey was distributed to participants through social media and emails. Practitioners were from seven hospitals including Saudi German Hospital, King Abdullah Medical Complex and Abdul Latif Jameel Hospital in Jeddah, King Fahad Hospital in Medina Munawwarah, King Faisal Specialist Hospital, Prince Mohammad Bin Abdulaziz Hospital, and King Fahad Medical City in Riyadh. These hospitals were state-owned and implemented standard protocols and procedures for the treatment of COVID-19 patients during the pandemic. The approval to carry out this study was given by the Imam Abdulrahman Bin Faisal University, Saudi Arabia.
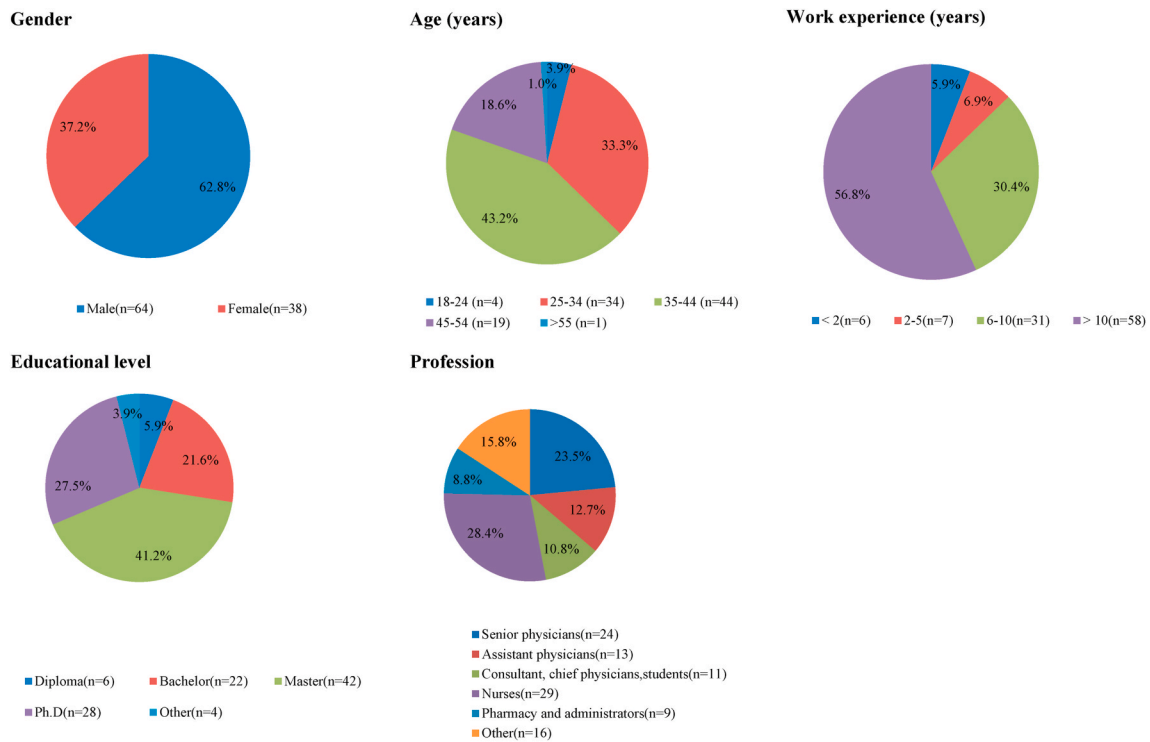
Gender

Age (years)

Work experience (years)

Educational level

Profession

Fig. 1. Demographic information of healthcare practitioners (n = 102).

2.2. Description of the questionnaire

The questionnaire consisted of 7 sections that included closed and multiple choice questions or items. Each item was rated using the 5-point Likert scale: 1. Strongly disagree; 2. Disagree; 3. Neutral; 4. Agree; 5. Strongly agree [40]. The questionnaire is shown in Appendix A.

The first section of the questionnaire consisted of 6 items aimed at obtaining the demographic information of the participants (age, gender, education level, profession, work experience).

The second section had 12 questions focusing on the attitudes of the healthcare practitioners towards the treatment of patients and work activities (Please rate the following items using the Lickert scale: prescribing should take into account patients' expectations of treatment; physicians and patients should agree on a treatment plan that takes into account their views; physicians should try to help patients to make the most informed decision possible about the benefits and risks of alternative treatments; it is sometimes appropriate for the physician to make treatment decisions without the patient's input; it is not always necessary for physicians to take into account patients' priorities; I am happy with my working situation; I am happy to treat old-aged patients; I would be happier in my job if I had to work fewer night shifts; I would like to reduce my average working hours; I would like to work fewer night shifts; I have no objection for working in ICUs allocated for COVID-19; my work life balance is good).

The third section contained 6 items related to leadership management approaches for handling the crisis (Please rate the following statements using the Lickert scale: senior staff should encourage questions from junior medical and nursing staff if appropriate; leadership of the medical team should rest with the medical staff; there are no circumstances where a junior team member should assume control; in critical situations, I rely on my superiors to tell me what to do; I sometimes feel uncomfortable telling team members from other disciplines that they need to take some action).

The fourth section consisted of 7 items related to information sharing (Please rate the following statements using the Lickert scale: a regular debriefing of procedures and decisions after a session or shift is an important part of developing and maintaining effective team coordination; team members in charge should verbalize plans for procedures or actions and should be sure that the information is understood and acknowledged by others; I am encouraged by my leaders and co-workers to report any incidents I may observe; it is better to agree with other medical team members than to voice a different opinion; the physician's responsibilities include coordination between his or her work team and other support teams; medical team members share responsibilities for prioritizing activities in high workload situations; all members of the medical team are qualified to give me feedback).

The fifth section consisted of 6 items related to error/procedural compliance (Please rate the following statements using the Lickert scale: errors are a sign of incompetence; procedures and policies are strictly followed in our department; human error is inevitable; team members frequently disregard rules or guidelines developed for our department such as hand washing, treatment protocols/clinical pathways, and sterile field; I rarely witness an error where one or more team members lack the knowledge to perform the needed action; medical errors are discussed to prevent recurrence).

The sixth section included 12 questions about the existence of several challenges (Please rate the following statements using the Lickert scale: work overload; poor salary; fewer staff; poor organizational culture; poor leadership; limited or no access to technology; lack of training; lack of healthcare resources such as ventilators/accessories, gloves, masks etc.; lack of sufficient financial resources; lack of support from government; lack of support from community/people; poor operational framework for managing pandemic).

Finally, the seventh section comprised 5 statements related to the importance of developing a healthcare framework for the management of the COVID-19 pandemic (Please rate the following statements using the Lickert scale: highly important; important; neutral; not important; not necessary).

Table 1
Frequency distribution of healthcare practitioners' attitudes towards the treatment of patients and working conditions (n = 102).

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Prescribing should take into account patients' expectations of treatment	21.57%	55.88%	13.73%	5.88%	2.94%
Physicians and patients should agree a treatment plan that takes into account their views	35.29%	47.06%	9.80%	5.88%	1.96%
Physicians should try to help patients to make as informed as possible the benefits and risks of alternative treatments	37.25%	47.06%	9.80%	1.96%	3.92%
It is sometimes appropriate for the physician to make treatment decisions without the patient's input	22.55%	37.25%	14.71%	14.71%	10.78%
It is not always necessary for physicians to take into account patients' priorities	24.51%	38.24%	3.92%	21.57%	11.76%
I am happy with my working situation	31.37%	47.06%	12.75%	3.92%	4.90%
I am happy to treat old-aged patients	36.46%	31.24%	6.91%	18.21%	10.18%
I would be happier in my job if I had to work fewer night shifts	27.45%	41.18%	22.55%	3.92%	4.90%
I would like to reduce my average working hours	30.39%	41.18%	20.59%	3.92%	3.92%
I would like to work fewer night shifts	26.47%	38.24%	23.53%	3.92%	7.84%
I have no objection for working in ICUs allocated for COVID	21.57%	46.08%	16.67%	6.86%	8.82%
My work life balance is good	26.47%	46.08%	17.65%	6.86%	2.94%

2.3. Data collection

Considering the objective and characteristics of this study, a purposive sampling method was adopted to collect the data [41]. The survey link was initially sent to 336 healthcare practitioners working in the 7 selected hospitals mentioned above using WhatsApp, Twitter, Facebook, and emails. Only 102 practitioners completed the survey. 80 of them did not start the survey and 154 sent incomplete responses. The response rate was 30.4%. The low response rate may be due to the fact that healthcare practitioners were very busy dealing with the COVID-19 outbreak. The survey was conducted for a period of four weeks, between March 23 and April 12, 2020.

2.4. Validity and reliability of the questionnaire

The questionnaire was validated through a pilot study conducted with nine healthcare practitioners (six nurses, 2 managers and 1 physician). Based on feedback from participants, some changes were made to the questions' formulations, and the grammatical errors in

Arabic were addressed. In addition, the Cronbach's alpha for all items of the questionnaire were estimated to evaluate its reliability; the Cronbach's alpha of all items were greater than 0.83 (>0.70); this revealed good consistency [42].

2.5. Statistical analysis

The relative frequencies and the Cronbach's alpha for each item of the questionnaire was estimated using basic descriptive statistics. Tables and Figures were used to represent the data.

3. Results

The demographic information of the participants is shown in Fig. 1. This table indicates that 62.8% of the participants were female and 37.2% were male. Considering the age groups, most of the participants (95.0%) were between 25 and 54 years old, and the rest of the participants were between 18 and 24 years old, or were older than 54 years. Focusing on the educational level, 41.2% of the participants had a master's degree, 27.5% of them were Ph.D., 21.6% were Bachelor's degree holders, 5.9% were Diploma holders, and 3.9% had other educational qualifications. The professions of the participants were diverse. Of these, 28.4% were nurses, 23.5% senior physicians, 12.7% assistant physicians, 10.8% consultants or chief physicians or medical students, 8.8% pharmacists or administrators, and the rest of the participants had other medical professions. Regarding the experience of the participants, most of them (56.9%) had a work experience of more than ten years, followed by 30.4% who had six to ten years of work experience, and other participants had less than 5 years of experience.

Table 1 presents the frequency distribution of various aspects related to healthcare practitioners' attitudes towards patient treatment and working conditions during the COVID-19 outbreak. This table shows that more than 70% (21.57% strongly agreed and 55.88% agreed) of the participants preferred that the prescription process should take into account the patient's treatment expectations. Likewise, 82.35% (35.29% strongly agreed and 47.06% agreed) of the respondents considered that the treatment should take into account the opinions of both doctors and patients. One of the important aspects in treating COVID-19 includes the risks associated with it. In this context, the majority of the participants stated that patients should be informed about the benefits and risks of treatment. Next, 59.8% of the participants strongly agreed or agreed that it was appropriate to take treatment decisions without informing patients. However, there were a considerable number of participants (25.49%) who opposed the approach (disagreed or strongly disagreed), and 14.71% were neutral. Similar results were observed with regard to considerations of patients' priorities. Furthermore, Table 1 reveals that most of the participants were happy with their working conditions; however, they preferred to reduce their working hours, particularly the night shifts. Similarly, most of them have no objection on working in ICUs, where severely affected COVID-19 patients were treated; nevertheless, a significant number of participants (15.68%) stated they had objections, while 16.67% of them took neutral position.

In relation to various management approaches for handling the COVID-19 crisis in hospitals, Fig. 2 shows a summary of some key approaches and the participants' opinions about these methods. Most of the participants thought (38.24% strongly agreed and 45.10% agreed) that senior staff should encourage questions from junior staff, as the COVID-19 is a new infection, and the details of symptoms and treatment procedures are different from other viral diseases. Also, the majority of them stated that they relied on their superiors' advice in critical situations. In relation to juniors assuming control of treatment and care, more than half of the respondents (22.55% strongly agreed and 32.35% agreed) opposed the idea of juniors taking control, while a considerable number of participants (18.63% disagreed and 6.86% strongly disagreed) considered that juniors may assume control. In addition, the majority of the participants preferred that leadership be in medical staff
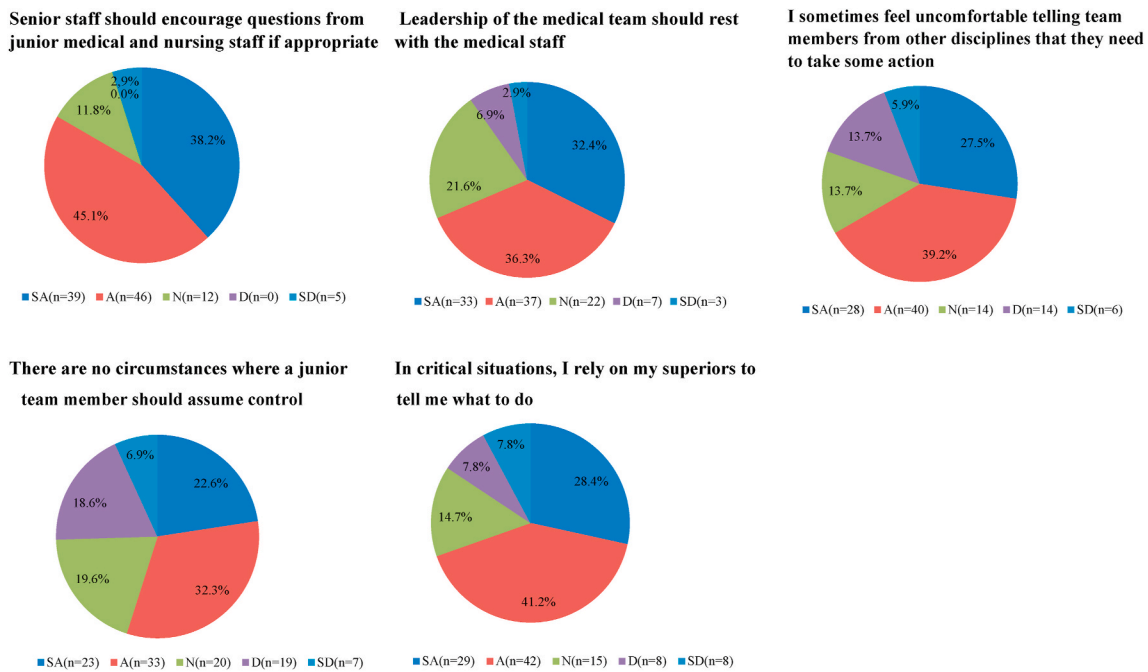
Fig. 2. Frequency distribution of healthcare practitioners' leaderships approaches for handling the crisis (n = 102).

members. However, 66, 67% of the participants (agreed and strongly agreed) stated that they feel uncomfortable in telling team members from other disciplines to take some action.

Table 2 displays the results of the participants' opinions regarding information sharing approaches. Most participants suggested that methodologies such as regular debriefing, verbalizing plans and actions related to treatment and procedures, regular reporting of incidents, and team member coordination were important information approaches. However, the majority of participants pointed out that it is better to agree with other team members than to express a different opinion. Moreover, the respondents observed that the need for support and collaboration among team members were important approaches for prioritizing activities in high workload situations.

The perceptions of participants regarding errors and procedural compliance are presented in Fig. 3. The results indicated that most of participants pointed out that errors were a sign of incompetence, and that human errors were inevitable. However, these risks can be effectively addressed by adopting strict policies and regulations in the workplace. In this context, more than 70% of the respondents (20.59% strongly agreed and 55.88% agreed) denoted that they strictly followed all procedures and policies in their respective departments. It was interesting to note that more than 60% (13.73% strongly agreed and 54.90% agreed) perceived that the team members did not lack the knowledge to carry out the necessary actions. However, more than 60% (21.57% strongly agreed and 40.20% agreed) observed that team members frequently disregarded rules or guidelines (hand washing, treatment protocols/clinical pathways, sterile field, etc.), which can be one of the most serious concerns when dealing with COVID-19. Also, most of the participants stated that they discuss medical errors to prevent the recurrence of COVID-19.

Table 3 outlines the major challenges that healthcare practitioners faced during the COVID-19 pandemic. Some of the key challenges included work overload, lack of training, insufficient staff, poor operational framework for managing the pandemic, poor leadership, poor organizational culture, lack of healthcare resources, and lack of support from government, community, and people.

On the other hand, Fig. 4 shows the opinion of the participants on the importance of a healthcare operational framework for managing the COVID-19 outbreak in Saudi Arabia. The findings revealed that 92.15%

of the respondents believed that the development of an integrated framework was important (80.39% highly important and 11.76% important).

Similarly, Fig. 5 illustrates the characteristics of a general qualitative framework for managing the COVID-19 outbreak in Saudi Arabia.

4. Discussion

This research explored the attitudes of Saudi Arabian healthcare practitioners towards the treatment of COVID-19 patients, work planning of practitioners, leadership strategies for handling the COVID-19 pandemic, information sharing methodologies, medical errors and procedural compliance, and challenges faced by the practitioners in dealing with the COVID-19 infection. Furthermore, based on the attitudes of the healthcare practitioners, a general framework for the management of the COVID-19 pandemic in Saudi Arabia was proposed in this study.

The findings indicated that physicians should consider the expectations and views of patients regarding the treatment offered for the COVID-19 pandemic. As COVID-19 is caused by a novel coronavirus, and a vaccine has not yet been discovered [43], it may not be possible to consider patients' opinions and expectations about their treatment. However, patients must be fully informed about the benefits and risks of the available treatment and off-label medications, which are prescribed by the World Health Organization (WHO) [43]. In this context, the majority of participants have stated that it is sometimes appropriate to make treatment decisions without patients' opinions, considering the safety of patients and others, and the fact that patients may transmit the disease to others without knowing that they are infected [44]. The large number of elderly patients who were affected with COVID-19 may be a cause for concern, as few healthcare participants reflected negative attitudes towards them [45]. However, most of the participants had no objection to working in the ICUs, where seriously ill COVID-19 patients are treated. In any case, communication and interaction between healthcare professionals and patients must be effective and sincere and must be considered as a central aspect in the elaboration of any general framework for the management of the COVID-19 outbreak in Saudi Arabia. For this reason, this aspect was included in the characteristics of the general framework proposed in this study.

Concerning work planning, the majority of the participants preferred

Table 2
Frequency distribution of healthcare practitioners' information sharing approaches (n = 102).

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
A regular debriefing of procedures and decisions after a session or shift is an important part of developing and maintaining effective team coordination	39.22%	40.20%	13.73%	2.94%	3.92%
Team members in charge should verbalize plans for procedures or actions and should be sure that the information is understood and acknowledged by others	44.12%	38.24%	9.80%	6.86%	0.98%
I am encouraged by my leaders and co-workers to report any incidents I may observe	35.29%	49.02%	8.82%	3.92%	2.94%
It is better to agree with other medical team members than to voice a different opinion	22.55%	40.20%	12.75%	15.69%	8.82%
The physician's responsibilities include coordination between his or her work team and other support teams	35.29%	49.02%	5.88%	5.88%	3.92%
Medical team members share responsibilities for prioritizing activities in high workload situations	33.33%	51.96%	10.78%	2.94%	0.98%
All members of the medical team are qualified to give me feedback	30.39%	44.12%	11.76%	10.78%	2.94%

reduced working hours and fewer night shifts; this might not be possible considering the current situation with limited healthcare resources and a rapidly increasing number of patients [46]. In addition, the respondents thought that work overload was a major challenge faced by healthcare practitioners in Saudi Arabia. These findings indicated that workforce and healthcare organization planning is an important factor in providing treatment and care, and must be included in any framework for managing the COVID-19 outbreak.

Also, the respondents suggested that effective leadership, support from senior staff, and collaboration between all teams from different disciplines were crucial factors for handling the COVID-19 crisis [25]. Therefore, this aspect was also incorporated in the framework for managing the COVID-19 outbreak in Saudi Arabia.

On the other hand, the participants thought that lack of training was a challenge faced by healthcare practitioners. About this topic, one important observation detected in the survey was related to the possibility that junior team members could take control of treatment, prevention, and care during the crisis. In this regard, due to the rapid increase in COVID-19 cases, a shortage of healthcare practitioners may occur and a situation may arise in which members of the junior team

have to make some decisions related to treatment and care. Therefore, it is essential that they are adequately trained and have enough skills to handle the COVID-19 crisis. In these circumstances, the support from all stakeholders including physicians, patients, and members of other disciplines in hospitals is necessary. Regarding this issue, some studies have identified that stakeholders participation and skills training are important approaches to ensuring the preparedness of hospitals in pandemic management [47–51]. In this sense, the training and skills development of healthcare practitioners is a crucial aspect required in any general framework for managing the COVID-19 outbreak in Saudi Arabia.

The outcomes regarding errors and compliance with procedures reflected that human errors are inevitable, but can be addressed by adopting strict policies, measures, and methods in hospitals. One of the main causes of concerns was that more than 60% of the participants have stated that their team members frequently disregard rules and guidelines (hand washing, treatment protocols/clinical pathways, sterile field, etc.), which may result in serious damages and can become a source of spreading the infection. Consequently, it was assessed that operational and human errors can result in serious damages if not properly addressed [52,53], and there is a need for strict guidelines such as isolation, quarantine, border control, social-distancing, sanitation, etc., for controlling the spread of the COVID-19 [54]. This can be achieved by improving stakeholder participation, effective leadership, frequent training, and skills enhancement [48–50]. It is also important to protect healthcare practitioners working in hospitals, and steps must be taken to enforce an effective and supportive organizational culture with strict procedures and compliances, which makes effective and efficient use of resources, and develops operative strategies to improve the efficiency and effectiveness of healthcare operations [55,56]. Therefore, the implementation of strict procedures to control the spread of the COVID-19 infection is an issue that must be taken into account in the operation of a framework for managing the COVID-19 pandemic.

A regular debriefing of procedures and decisions after a session or shift is an important part of developing and maintaining effective team coordination and leadership. In addition, incident reporting, team coordination through effective communications, stakeholders feedback, and sharing of responsibilities are important factors in relation to information management, reviews, and situation monitoring. Previous studies [57–60] have indicated the importance of effective communication not only in the management of healthcare operations, but also among the public population in taking a preventative attitude against infectious diseases and pandemics. Therefore, the effective share of information is crucial for frequent reviews of strategies, procedures and guidelines, since the pathogen causing the disease is new, and its impact, symptoms, and means of infection can be revealed over time from the observation of affected patients. Another feature implemented in the COVID-19 pandemic management framework was to develop and maintain effective team coordination through information sharing among the healthcare practitioners.

Participants also expressed that they faced several challenges due to the lack of medical equipment and resources, and a lack of support from the government and communities. Hence, another aspect included in the framework was maintaining an adequate supply of medicines and medical equipment, and obtaining the support of the government, communities and people.

Based on the previous analysis, it is possible to suggest the implementation of a general qualitative framework for managing the COVID-19 crisis in Saudi Arabian hospitals. As shown in Fig. 5, the framework consists of 5 interrelated operations.

The first operation involves planning and developing strategies for the management of the COVID-19 outbreak. This operation includes the analysis of current scientific issues related to the COVID-19 infection such as implementation of procedures and prevention methods to contain the spread of the virus, analysis of past experiences linked to pandemics or novel infectious diseases, measures to be taken in the face of new outbreaks of the pandemic, and other challenges. Also, it is
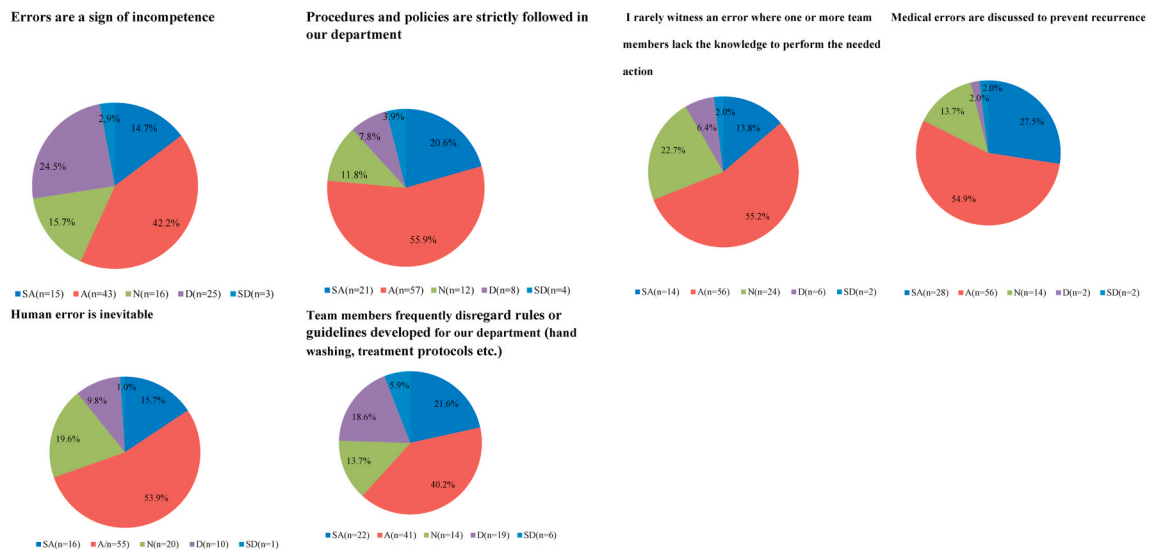
Fig. 3. Frequency distribution of practitioners' attitudes towards healthcare errors and procedural compliance (n = 102).

Table 3
Frequency distribution of challenges faced by the healthcare practitioners in dealing with the COVID-19 pandemic (n = 102).

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Work overload	17.65%	50.98%	23.53%	4.90%	2.94%
Poor salary	20.59%	47.06%	18.63%	10.78%	2.94%
Insufficient staff	22.55%	55.88%	14.71%	4.90%	1.96%
Poor organizational culture	18.63%	51.96%	18.63%	7.84%	2.94%
Poor leadership	19.61%	47.06%	17.65%	11.76%	3.92%
Limited or no access to technology	9.80%	47.06%	18.63%	13.73%	10.78%
Lack of training	16.67%	51.96%	14.71%	10.78%	5.88%
Lack of healthcare resources (devices such as ventilators/ accessories such as gloves, masks etc.)	17.65%	44.12%	17.65%	14.71%	5.88%
Lack of sufficient financial resources	12.75%	49.02%	18.63%	12.75%	6.86%
Lack of support from government	9.80%	46.08%	16.67%	15.69%	11.76%
Lack of support from community/people	14.71%	53.92%	17.65%	10.78%	2.94%
Poor operational framework for managing pandemic	12.75%	51.96%	15.69%	13.73%	5.88%

important to consider the development of key indicators to measure the progress of the COVID-19 pandemic, analysis of statistical data about the pandemic, and the development of approaches for the management of healthcare operations.

The second operation for managing the COVID-19 outbreak is related to management and communication between stakeholders such as healthcare practitioners, communities, international organizations, pharmaceutical corporations, research and development organizations, local government (Ministry of Health), among other participants. Effective communication between the stakeholders helps organize containment and treatment procedures to be adopted to control the spread of the COVID-19 pandemic and gain support in achieving and maintaining an inventory of necessary medical resources including medicines, medical equipment, test kits, etc. Similarly, effective communication facilitates cooperation between teams, management of workload, positive attitudes towards patients, sharing of
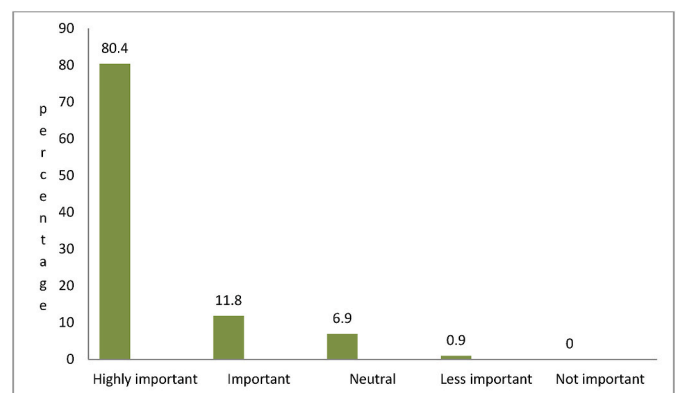

Fig. 4. Opinion of healthcare practitioners on a framework for healthcare operation (n = 102).

responsibilities, effective leadership, information sharing, and effective operational management of stakeholders.

The third operation considers the organizational and workforce planning that requires the implementation of an organizational culture that uses the available human and material resources efficiently and effectively, and minimizes work overload. The workload management, collaboration between teams, sharing responsibilities, effective leadership, and information sharing across the teams are important aspects to contemplate in the development of a framework to handle the COVID-19 outbreak. Similarly, determining the organizational structure for managing operations, developing policies, procedures, regulations and guidelines to be followed by the healthcare practitioners, adopting risk management strategies, and resource management techniques (efficient and effective use of resources) are also aspects linked to this component.

The fourth operation is related to the management of skills and knowledge among the healthcare practitioners. In this sense, it is necessary to develop an organizational structure that allows the training and acquisition of knowledge and skills of healthcare professionals. It is very important to train healthcare personnel, especially doctors and nurses who are directly involved with patients, regarding the safety procedures, treatment process, and guidelines that must be followed. Also, the implementation of approaches such as regular briefing and debriefing can help increase the knowledge and awareness and facilitate knowledge transfer. In addition, the support from all stakeholders, and
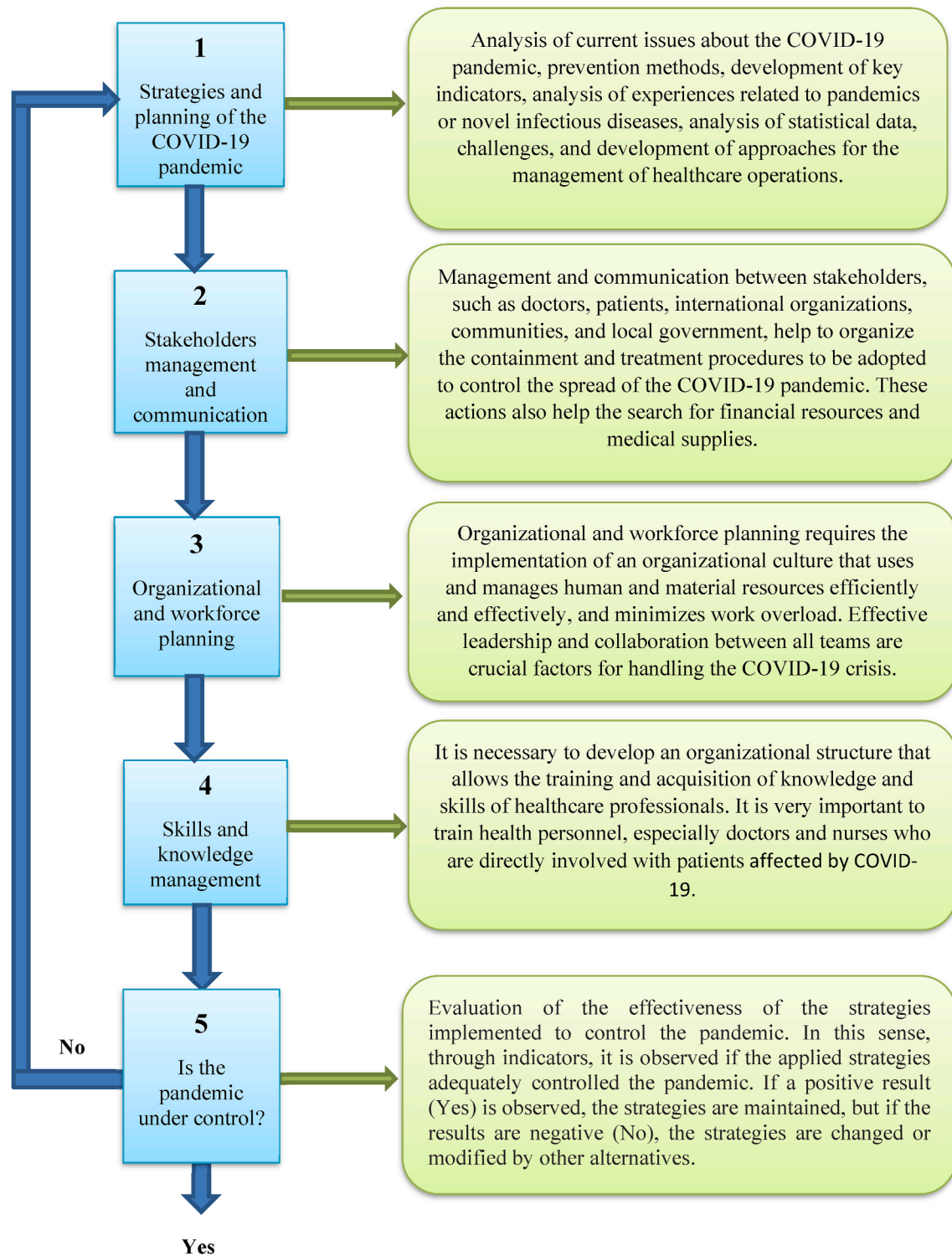
1 Strategies and planning of the COVID-19 pandemic	Analysis of current issues about the COVID-19 pandemic, prevention methods, development of key indicators, analysis of experiences related to pandemics or novel infectious diseases, analysis of statistical data, challenges, and development of approaches for the management of healthcare operations.
2 Stakeholders management and communication	Management and communication between stakeholders, such as doctors, patients, international organizations, communities, and local government, help to organize the containment and treatment procedures to be adopted to control the spread of the COVID-19 pandemic. These actions also help the search for financial resources and medical supplies.
3 Organizational and workforce planning	Organizational and workforce planning requires the implementation of an organizational culture that uses and manages human and material resources efficiently and effectively, and minimizes work overload. Effective leadership and collaboration between all teams are crucial factors for handling the COVID-19 crisis.
4 Skills and knowledge management	It is necessary to develop an organizational structure that allows the training and acquisition of knowledge and skills of healthcare professionals. It is very important to train health personnel, especially doctors and nurses who are directly involved with patients affected by COVID-19.
5 Is the pandemic under control?	Evaluation of the effectiveness of the strategies implemented to control the pandemic. In this sense, through indicators, it is observed if the applied strategies adequately controlled the pandemic. If a positive result (Yes) is observed, the strategies are maintained, but if the results are negative (No), the strategies are changed or modified by other alternatives.

Fig. 5. A qualitative framework for managing the COVID-19 pandemic in Saudi Arabia.

especially hospital management staff and co-workers, is essential to motivate healthcare personnel in developing positive attitudes towards acquisition of skills and knowledge in their work environment.

Finally, the fifth operation aims to evaluate the effectiveness of the strategies implemented to manage the Covid-19 pandemic. In this regard, through key indicators, it is observed if the applied strategies adequately controlled the pandemic. If a positive result (Yes) is observed, the strategies are maintained, but if the results are negative (No), the strategies are changed or modified by other alternatives. The

main key indicator is the number of cases of new infected people and deaths caused by the COVID-19 virus after implementing the strategies. The best strategy would be the one that makes this number remain constant at a value close to or equal to zero.

The main limitations of this study were the small sample size of participants and the fact that an intentional sampling method was used in 7 hospitals in Saudi Arabia. Therefore, the results of this research cannot be generalized to all hospitals in Saudi Arabia. Future studies should be aimed at including most of the Saudi Arabian hospitals.

5. Conclusion

The healthcare practitioners' attitudes towards the COVID-19 outbreak in Saudi Arabia suggested that healthcare professionals thought that effective communication and interaction between healthcare professionals and patients, workplace planning, health care organization, cooperation and communication between team members, and leadership were essential factors for handling the COVID-19 pandemic. Similarly, healthcare practitioners believed that training and skills development of health professionals, implementation of strict procedures to avoid medical errors, maintaining an adequate supply of medicines and medical equipment, and obtaining support from the government, the community, and people were imperative measures to control the spread of the COVID-19 pandemic.

In summary, planning and developing strategies for handling the COVID-9 pandemic, management and communication between stakeholders, organizational and workforce planning, skills and knowledge management, and evaluation were the main components of the general qualitative framework proposed in this study for managing the COVID-19 outbreak in Saudi Arabia. The propositions presented in this study can help the Saudi Arabian government implement an effective plan to control the spread of the COVID-19 pandemic in this country.

Conflicts of interest

There is no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.imu.2020.100491.

References

[1] WHO coronavirus disease (COVID-19). Dashboard. Available, https://covid19.who.int/. [Accessed 20 November 2020].

[2] Liu Y, Kuo R, Shih S. COVID-19: the first documented coronavirus pandemic in history. Biomed J 2020;43(4):328–33.

[3] Nicola M, Alsafi Z, Sohrabi C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): a review. Int J Surg 2020;78:185–93.

[4] Coronavirus disease 2019 (COVID-19).Symptoms of coronavirus. Available, https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html. [Accessed 20 November 2020].

[5] Coronavirus disease (COVID-19): how is it transmitted?. Available, https://www.who.int/news-room/q-a-detail/coronavirus-disease-covid-19-how-is-it-transmitted. [Accessed 20 November 2020].

[6] Abolfotouh M, Almutairi A, BaniMustafa A, et al. Perception and attitude of healthcare workers in Saudi Arabia with regard to Covid-19 pandemic and potential associated predictors. BMC Infect Dis 2020;20:719.

[7] Kassie BA, Adane A, Tilahun YT, et al. Knowledge and attitude towards COVID-19 and associated factors among health care providers in Northwest Ethiopia. PloS One 2020;15(8):e0238415.

[8] Hussain I, Majeed A, Imran I, et al. Knowledge, attitude, and practices toward COVID-19 in primary healthcare providers: a cross-sectional study from three tertiary are hospitals of Peshawar, Pakistan. J Community Health 2020:1–9.

[9] Ogolodom M, Mbaba A, Alazigha N, et al. Knowledge, attitudes and fears of healthCare workers towards the corona virus disease (COVID-19) pandemic in South-South, Nigeria. Health Sci J. Sp 2020;1. 002.

[10] Wahed WYA, Hefzy EM, Ahmed MI, Hamed NS. Assessment of knowledge, attitudes, and perception of health care workers regarding COVID-19, a cross-sectional study from Egypt. J Community Health 2020;45(6):1242–51.

[11] Proches C, Dorning A, Govender S. How leadership matters in healthcare – especially in a crisis. Available, https://theconversation.com/how-leadership-matters-in-healthcare-especially-in-a-crisis-141321. [Accessed 20 October 2020].

[12] Zhang M, Zhou M, Tang F, et al. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. J Hosp Infect 2020;105:183–7.

[13] Perrotta D, Grow A, Rampazzo F, et al. Behaviours and attitudes in response to the COVID-19 pandemic: insights from a cross-national Facebook survey. Aavailable, https://doi.org/10.1101/2020.05.09.20096388.this.version posted.July.15; 2020. Accessed 17 0ctober 2020.

[14] Kuguyo O, Kengne A, Dandara C. Singapore COVID-19 pandemic response as a successful model framework for low-resource health care settings in Africa? OMICS A J Integr Biol 2020;24(8).

[15] Wilson Z, Whitehead K. A cross sectional survey to assess healthcare professionals' attitudes to and understanding of probiotics. Clin Nutr ESPEN 2019;34:104–9.

[16] Mukamba N, Chilyabanyama O, Beres L, et al. Patients' satisfaction with HIV care providers in public health facilities in Lusaka: a study of patients who were Lost-to-follow-up from HIV care and treatment. AIDS Behav 2019;24(4):1151–60.

[17] FrontEnders. Attitude for healthcare professionals | hospital and patient relationship. frontenders. Available, https://www.frontenders.in/blog/importance-of-attitude-for-healthcare-professionals.html. Published 2020. Accessed 20 April 2020.

[18] Health & Care Professions Council. Professionalism in healthcare professionals. Health & Care Professions Council; 2020. Available, https://www.hcpc-uk.org/globalassets/resources/reports/professionalism-in-healthcare-professionals.pdf. [Accessed 20 April 2020].

[19] Turja T, Van Aerschot L, Särkikoski T, et al. Finnish healthcare professionals' attitudes towards robots: reflections on a population sample. Nurs Open 2018;5(3):300–9.

[20] Heyward-Chaplin J, Shepherd L, Arya R, et al. Audit of healthcare professionals' attitudes towards patients who self-harm and adherence to national guidance in a UK burns and plastic surgery department. Scars Burn Heal 2018;4. 205951311876410.

[21] Fenelon N, Dely P, Katz M, et al. Knowledge, attitudes and practices regarding rabies risk in community members and healthcare professionals: Pétionville, Haiti. Epidemiol Infect 2017;145(8):1624–34. 2013.

[22] McAllister S, Coxon K, Murrells T, et al. Healthcare professionals' attitudes, knowledge and self-efficacy levels regarding the use of self-hypnosis in childbirth: a prospective questionnaire survey. Midwifery 2017;47:8–14.

[23] Kumbrija S, Milaković S, Jelinić J, et al. Health care professionals - attitudes towards their own health. Acta Med Croat: Časopis Hrvatske akademije medicinskih znanosti 2007;61:105–10.

[24] Alshahrani W. A literature review of healthcare professionals' attitudes towards patients with mental illness. J Med Res Health Educ 2018;2(1):1–5.

[25] Ratanjee V. What healthcare workers need from leaders in COVID-19 crisis. 2020. Available, https://www.gallup.com/workplace/308957/healthcare-workers-need-leaders-covid-crisis.aspx. [Accessed 20 October 2020].

[26] Ives J, Greenfield S, Parry J, et al. Healthcare workers' attitudes to working during pandemic influenza: a qualitative study. BMC Publ Health 2009;9:56.

[27] Raven J, Wurie H, Witter S. Health workers' experiences of coping with the Ebola epidemic in Sierra Leone's health system: a qualitative study. BMC Health Serv Res 2018;18(251).

[28] Usher K, Durkin J, Bhullar N. The COVID-19 pandemic and mental health impacts. Int J Ment Health Nurs 2020;29:315–8.

[29] Brasaite I, Kaunonen M, Martinkenas A, Suominen T. Health care professionals' attitudes regarding patient safety: cross-sectional survey. BMC Res Notes 2016;9 (1).

[30] Lapke M, Garcia C, Henderson D. Healthcare professionals' attitudes towards privacy in healthcare information systems. In: America's conference on information systems (AMCIS); 2015. San Juan, Puerto Rico.

[31] Basholli A, Lagkas T, Bath P, Eleftherakis G. Healthcare professionals' attitudes towards remote patient monitoring through sensor networks. In: 2018 IEEE 20th international conference on e-health networking, applications and services (healthcom); 2018.

[32] A systemic resilience approach to dealing with Covid-19 and future shocks. OECD; 2020.

[33] Leung T, Zhou X, Wu. Pandemic management framework for governments in fighting the novel coronavirus (Covid-19). Available, https://www.pwccn.com/en/issues-based/covid-19/blue-paper.pdf. [Accessed 17 October 2020].

[34] Framework for implementation of COVID-19 community mitigation measures for lower-resource countries. Available, https://www.cdc.gov/coronavirus/2019-ncov/global-covid-19/community-mitigation-measures.html. [Accessed 18 October 2020].

[35] A policy framework for tackling the economic and social impact of the COVID-19 crisis. Available, https://www.ilo.org/wcmsp5/groups/public/dgreports/dcomm/documents/briefingnote/wcms_745337.pdf. [Accessed 17 October 2020].

[36] Framework for the response of integrated health service delivery networks to COVID-19. Available, https://iris.paho.org/bitstream/handle/106.65.2/522 69/PAHOIMSHSSHSCOVID-19200021_eng.pdf?sequence=1&isAllowed=y. [Accessed 17 October 2020].

[37] Monitoring and evaluation framework for COVID-19 response activities in the EU/EEA and the UK. Available, https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-framework-monitor-responses.pdf. [Accessed 17 October 2020].

[38] Updated COVID-19 contain framework: a guide for local decision-makers. 2020. Available, https://www.gov.uk/government/publications/containing-and-managing-local-coronavirus-covid-19-outbreaks/covid-19-contain-framework-a-guide-for-local-decision-makers. [Accessed 17 October 2020].

[39] Alsharif A. Applying eHealth for pandemic management in Saudi Arabia in the context of COVID-19: survey study and framework proposal. JMIR Med Inform 2020;8(11):e19524.

[40] Likert R. A technique for the measurement of attitudes. Archives of psychology 1932;140:1–55.

[41] Etikan I. Comparison of convenience sampling and purposive sampling. Am J Theor Appl Stat 2016;5(1):1.

[42] Taber KS. The use of Cronbach's alpha when developing and reporting research instruments in science education. Res Sci Educ 2018;48:1273–96.

[43] World Health Organization. Off-label use of medicines for COVID-19. Who.int. Available, https://www.who.int/news-room/commentaries/detail/off-label-use-of-medicines-for-covid-19. [Accessed 21 April 2020]. Published 2020.

[44] Ghandi M. Can people spread the coronavirus if they don't have symptoms? 5 questions answered about asymptomatic COVID-19. Available, https://theconv

ersation.com/can-people-spread-the-coronavirus-if-they-dont-have-symptoms-5-questions-answered-about-asymptomatic-covid-19-140531. [Accessed 20 October 2020].

[45] Malik M. Abuse and ageism during COVID-19. Available, https://www.psych iatrictimes.com/view/elder-abuse-and-ageism-during-covid-19. [Accessed 20 October 2020].

[46] Al Amir K. COVID-19: Saudi Arabia expects 200,000 cases if measures not followed. Gulfnews.com. Available, https://gulfnews.com/world/gulf/saudi/covi d-19-saudi-arabia-expects-200000-cases-if-measures-not-followed-1.158626 3454490. Published 2020. Accessed 21 April 21 2020.

[47] Baron S, McPhaul K, Phillips S, et al. Protecting home health care workers: a challenge to pandemic influenza preparedness planning. Am J Publ Health 2009;99 (S2):S301–7.

[48] Hashim A, Jean-Gilles L, Hegemann-Lindencrone M, et al. Did pandemic preparedness aid the response to pandemic (H1N1) 2009? A qualitative analysis in seven countries within the WHO European Region. J Infect Public Health 2012;5 (4):286–96.

[49] Brazzi L, Lissoni A, Panigada M, et al. Simulation-based training of extracorporeal membrane oxygenation during H1N1 influenza pandemic. Simulat Healthc J Soc Med Simulat: The Journal of the Society for Simulation in Healthcare 2012;7(1): 32–4.

[50] Colvard M, Hirst J, Vesper B, et al. Just-in-time training of dental responders in a simulated pandemic immunization response exercise. Disaster Med Public Health Prep 2014;8(3):247–51.

[51] Li-Vollmer M. Health care decisions in disasters: engaging the public on medical service prioritization during a severe influenza pandemic. J Participat Med 2010; 14(2):e17.

[52] White LF, Pagano M. Reporting errors in infectious disease outbreaks, with an application to Pandemic Influenza A/H1N1. Epidemiol Perspect Innovat 2010;7 (12).

[53] Mirelles CM. Unused and expired medicines: a national pandemic. Symbiosis J Ecol Sustain Med 2007;4(2):40–1.

[54] World Health Organization. Addressing ethical issues in pandemic influenza planning discussion papers. Apps.who.int. Available, https://apps.who.int/iris /bitstream/handle/10665/69902/WHO_IER_ETH_2008.1_eng.pdf. [Accessed 21 April 2020]. Published 2020.

[55] Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the COVID-19 outbreak. The Lancet Psychiatry 2020;7(4):e15–6.

[56] Adams JG, Walls RM. Supporting the health care workforce during the COVID-19 global epidemic. J Am Med Assoc 2020;323(15):1439–40.

[57] Vaughan E, Tinker T. Effective health risk communication about pandemic influenza for vulnerable populations. Am J Publ Health 2009;99(S2):S324–32.

[58] Reynolds B, Quinn S. Effective communication during an influenza pandemic: the value of using a crisis and emergency risk communication framework. Health Promot Pract 2008;9(4):13S–7S.

[59] Locatelli S, LaVela S, Hogan T, et al. Communication and information sharing at VA facilities during the 2009 novel H1N1 influenza pandemic. Am J Infect Contr 2012;40(7):622–6.

[60] Elledge B, Brand M, Regens J, Boatright D. Implications of public understanding of avian influenza for fostering effective risk communication. Health Promot Pract 2008;9(4):54S–9S.