

8-31-2021

## A Convergent Parallel Study on Knowledge, Perceptions, and Attitudes of Mainstream Workers during COVID-19

Farhan Alshammari

*College of Nursing, University of Hail, Hail City 2240, Saudi Arabia, f.alshammari@uoh.edu.sa*

Romeo Mostoles Jr

*College of Nursing, University of Hail, Hail City 2240, Saudi Arabia, r.mostoles@uoh.edu.sa*

Eddieson Pasay-an

*College of Nursing, University of Hail, Hail City 2240, Saudi Arabia, edspasayan@yahoo.com*

Sultan Alshammari

*Ministry of Health, Hail City, Kingdom of Saudi Arabia, s.alshammari@moh.sa*

Follow this and additional works at: <https://scholarhub.ui.ac.id/mjhr>



Part of the [Epidemiology Commons](#), and the [Public Health Education and Promotion Commons](#)

---

### Recommended Citation

Alshammari F, Mostoles R, Pasay-an E, Alshammari S. A Convergent Parallel Study on Knowledge, Perceptions, and Attitudes of Mainstream Workers during COVID-19. *Makara J Health Res.* 2021;25.

# A Convergent Parallel Study on Knowledge, Perceptions, and Attitudes of Mainstream Workers during COVID-19

Farhan Alshammari<sup>1</sup>, Romeo Mostoles Jr.<sup>1</sup>, Eddieson Pasay-an<sup>1\*</sup>, Sultan Alshammari<sup>2</sup>

<sup>1</sup>College of Nursing, University of Hail, Hail City 2240, Saudi Arabia

<sup>2</sup>Ministry of Health, Hail City, Kingdom of Saudi Arabia

## Abstract

**Background:** This study explores and assesses the knowledge, perceptions, and attitudes of mainstream workers during the COVID-19 pandemic in the Ha'il Region, Kingdom of Saudi Arabia.

**Methods:** Using convergent parallel mixed-methods design, 502 frontline workers were enlisted via snowball and purposive sampling. Descriptive statistics and thematic analysis were used to analyze the quantitative and qualitative data, respectively.

**Results:** There is a well-prepared response to COVID-19, namely, a commendable knowledge, attitude, and practices (KAP) gap documented in reliable information concerning the virus, specifically, awareness that COVID-19 can be a potentially fatal disease (100%); that droplets from infected people (29.8%) can spread the disease; and taking actions to prevent the spread of COVID-19 in the community can save their lives. Four themes and three subthemes yielded: (1) actual, tangible knowledge with subtheme pieces of information; (2) the extent of danger with subtheme uncertainties; (3) precautionary measures; and (4) a yearning to know more, with the subtheme of novel information.

**Conclusions:** Communication among health authorities and at-risk individuals in response to COVID-19 must be facilitated. This is to support those in the healthcare industry in shaping an intervention strategy that emphasizes both preparation and protection.

**Keywords:** attitudes, communication, COVID-19, pandemic, perceptions, Saudi Arabia

## INTRODUCTION

In March 2020, the World Health Organization (WHO) announced that 282 individuals in four countries were diagnosed with COVID-19: 278 in China, two in Thailand, one in Japan, and one in the Republic of Korea.<sup>1</sup> The outbreak spread to neighboring Asian countries, and as far as Australia, the US, and Europe.<sup>2</sup> The WHO continuously monitored and maintained communication with the affected countries. There were also developments in case investigations for infected individuals.<sup>3</sup> Yet, despite the information and support provided, the number of COVID-19 cases increased exponentially. To this end, the WHO assessed the outbreak's alarming level of proliferation and severity. With the numbers of affected people increasing all over the world, the disease outbreak was proclaimed by the World Health Organization a public health emergency of international concern,<sup>4</sup> and in March 11 of 2020, it was declared a pandemic.<sup>5</sup>

One country after the other responded to the shocking increase in COVID-19 cases. China started broadcasting

public educational messages for the prevention of the disease and the strengthening of environmental hygiene in public places. In Thailand, the public was made aware of the establishment of risk communication guidance. The Department of Disease Control created a hotline to inform people with related symptoms returning from China, especially from those areas affected by the outbreak.<sup>1</sup> As the problems persisted, contact tracing was introduced—a typical response to this kind of international public health concern. The Republic of Korea, for instance, steered the same kinds of contact tracing and other epidemiological investigations as those conducted by authorities in Japan. According to WHO, there has been a considerable decline in the number of COVID-19 cases in March 11, 2020.<sup>3</sup> Some countries—such as Hong Kong, Singapore, and Taiwan—appeared to contain the spread of the virus.<sup>6</sup> Then, another wave of COVID-19 surged in March 17, 2020,<sup>7</sup> alarming government authorities, who suggested containment of the virus through quarantine.<sup>8</sup>

The enforcement of community and home quarantine by government authorities was adopted by Gulf countries, such as Saudi Arabia. Free of the virus for the first three months following the initial outbreak in China, Saudi Arabia confirmed its first case on March 02, 2020.<sup>9</sup> The fast growth rate of confirmed cases has since piled up, increasing to 171 cases by March 17.<sup>10</sup> As a result of the increasing numbers of COVID-19 cases, the Saudi authorities responded quickly to establish programs to

### \*Corresponding author:

Eddieson Pasay-an  
College of Nursing, University of Hail,  
Hail City, Saudi Arabia  
E-mail: e.pasayan@uoh.edu.sa

contain the problem. These included the creation of the health ministry's COVID-19 follow-up committee to implement and address measures.<sup>11</sup> These included suspending all international flights to and from the Kingdom,<sup>12</sup> the dissemination of COVID-19 prevention information by the Ministry of Health (MOH) through social media, government websites, and advertisements,<sup>13</sup> and the suspension of sports activities, conferences, and large gatherings.<sup>14</sup>

This study, conducted between March and June 2020 is of paramount importance in its support of Saudi government efforts to reduce, if not eliminate entirely, the number of COVID-19 cases. In this context, assessing COVID-19 gap of knowledge, attitudes, and perceptions of the workers in the mainstream community will identify communication flaws and help to engage staff and responders working with national health authorities to create an action plan. The KAP gap in this study refers the difference between what people know and what people do in relation to Corona Virus Disease.

This study assesses the knowledge, perceptions, and attitudes of mainstream workers during the COVID-19 pandemic in the Ha'il Region, Kingdom of Saudi Arabia. In this study, the KAP gap refers to what people know to be true regarding the disease. Most importantly, the results of this study will serve to inform the health authorities or the policymakers on the actual knowledge, attitudes, and perceptions of the stakeholders so that they will be able to reach the people that they intend to reach with the right information at the right time. As such, having been apprised of the current status of the situation, policy makers can assess and strengthen their ongoing programs at both national and local levels, helping the community to engage and involve itself in response to the challenges of COVID-19. Exploring such problems promotes the engagement and cooperation of stakeholders, policymakers, and the community as a whole to strengthen public health. The results of this study are tailor made for a strategy that will prepare and protect individuals, families, and communities as a whole.

## METHODS

The study used a convergent parallel mixed-methods design. The samples comprised 502 mainstream workers employed in different establishments (e.g., restaurants, spas/salons, pharmacies, and banks) in the capital of Ha'il. "Mainstream workers" refers to persons working in establishments who have constant interactions with customers, such as salesmen, janitors, security guards, salon staff, and food handlers. These mainstream workers cater to the needs of the customers or their clients during the surge of pandemic. Snowball sampling was used to collect the data in the quantitative aspect, while purposive sampling was used for the qualitative part. Participating

frontline workers expressed their willingness to participate, their ability to speak and comprehend English, directly interact with customers, and make themselves available for the scheduled interviews.

A survey using a self-administered questionnaire on a Google Form was used to collect the data. The link was shared with contact persons within different units of the participating establishments (banks, salons/spas, and malls) and then with other mainstream workers. Answering the Google survey questionnaire indicated that the participants had waived their informed consent to sign in person before a researcher.

Regarding the qualitative aspect, the researchers scheduled dates for face-to-face interviews with subjects, taking social distancing requirements into consideration. The participants for the qualitative phase were those mainstream workers who had participated in the quantitative phase. The researchers originally invited 20 participants but saturation was reached on the 12<sup>th</sup> participant. These frontline workers, comprising three food handlers, one spa salon attendant, two pharmacy assistants, three janitors, two market salesmen, and one security guard. The interviews were conducted at a time and place most convenient for the participants. Each interview took 20–25 minutes to complete.

The questionnaire was adapted from the Risk Communication and Community Engagement (RCCE).<sup>15</sup> The RCCE developed the tool purposely to guide the policy makers in developing a plan comprising a basic evidence-based source for engaging and communicating effectively with the stakeholders. According to RCCE,<sup>15</sup> "The tool is designed to support risk communication, community engagement of staff and responders working with national health authorities, and other partners to develop, implement, and monitor an effective action plan for communicating effectively with the public, engaging with communities, local partners, and other stakeholders to help prepare and protect individuals, families, and the public's health during the early response to COVID-19." (p. 2)

The RCCE suggests that some dimensions of the action program that was developed as a guide may vary across countries. This depended upon their risk levels, how people perceive the needs and local capacities, as well as their current scenarios; thus, the need to modify was imperative. The researchers therefore modified the questionnaire slightly to align it with the Saudi Arabian context. Three items were removed from the 20-item original question since it only asked general information about demographics. These three items were included in the demographic characteristics questionnaire (Part I). The 17-item question in the quantitative phase focused on the various questions concerning information about knowledge, attitudes, and perceptions, the most at-risk

populations, communication patterns and channels, health services, and the participant situations during COVID-19 (Part II). Examples of questionnaire items include: "Have you heard about COVID-19?" "Where do you receive news about COVID-19?" and "What is your source, or channel?" Three panels of experts validated the questionnaire. Two were policy makers from the MOH, and one was a psychometrician. The quantitative questionnaire yielded a Cronbach's alpha of 0.89.

The qualitative questions served as a guide for the interviewers. The original developer of the quantitative instrument suggested that the same questions used in the quantitative tool may be used in the interview. However, some of the questions were rephrased to further explore participant answers. Follow-up questions were asked to clarify the participant answers, such as "What do you mean?" and "Can you expand further?"

The study protocol was approved by the Institutional Review Board (IRB) of the University of Ha'il with IRB number H-2020-114. In this study, the researchers were required to fully inform potential subjects that participation was not mandatory and that they could drop out at any time. This information was provided in a cover letter attached to the research questionnaire (Google Form) and the letter inviting respondents to participate (qualitative data gathering).

An Excel sheet was used to analyze the data. The frequency and percentage were employed to determine the demographic characteristics of front liners. Conversely, thematic analysis was used to analyze the qualitative data. The researchers generated the theme using the four phases of initialization, construction, rectification, and finalization.

## RESULTS

### Quantitative results

The majority of the participants were aged 26–30 (29.9%), and almost all were females (89.6%). The participants had limited work experience, 1–5 years for most (46.8%). The majority (86%) were from the sales department, followed by restaurant waiters at 3.9% (Table 1).

Table 2 presents information about the knowledge, attitudes and perceptions, communication patterns and channels, health services, and situations of the participants regarding COVID-19. The participants possessed a commendable amount of good information about COVID-19, and were aware that it could cause disease (100%). Of the 502 participants, 423 reported that the information they had most commonly heard about COVID-19 concerned its symptoms (20.6%), how to protect themselves from the disease (20.5%), and how the disease is transmitted (20.1%). Interestingly, 36% claimed

**TABLE 1.** Demographic information of the participants (N = 502)

Sociodemographic	Frequency (N)	Percentage (%)
<b>Age</b>		
20–25	140	27.9
26–30	150	29.9
31–35	145	28.9
36 and above	67	13.3
<b>Sex</b>		
Male	52	10.4
Female	450	89.6
<b>Years of Experience</b>		
1–5	235	46.8
6–10	220	43.8
11 and above	47	9.4
<b>Type of personnel</b>		
Janitorial	12	2.4
Sales department	432	86.0
Laborer	10	1.9
Restaurant waiter	20	3.9
Food handler	13	2.6
Pharmacy assistant	15	2.9

that their sources of information about this disease were the MOH (36%) and the internet (27.3%). Indeed, they most trusted the information they obtained from the MOH (56.7%).

Most of the participants believed that risk from COVID-19 was very dangerous (74.5%), and they thought that the elderly were at greatest risk to become infected (38.6%). Of note, while 42.6% of the participants thought that they would likely become sick with the new disease, 31.7% claimed that they did not know if they would become infected. The frontline workers recognized that droplets from infected people (29.8%) and direct contact with infected people (28.3%) were the means by which COVID-19 is spread. However, 19.8% believed that COVID-19 could be spread through the air. The frontline workers identified fever as the main symptom (27.7%), followed by shortness of breath and breathing difficulties (25.7%). They understood that the disease could be prevented by regular handwashing with alcohol and/or soap and water (32.6%), by avoiding close contact (31.3%), and by covering the mouth and nose when coughing or sneezing (31.3%).

As for the perceptions of frontline workers and their families regarding the prevention of illness from COVID-19, 35.3% reported washing their hands regularly with an alcohol-based cleaner or soap and water, covering their mouths and noses when coughing and sneezing (33.7%), and avoiding close contact with others. As such, all of the frontline workers (100%) believed in the importance of taking actions to prevent the spread of COVID-19 in the community. Hypothetically, the participants would go to

the hospital/health unit (55.4%) should they develop symptoms, and 44.6% would stay in quarantine. The frontline workers would like to learn more about protecting themselves from the disease (29.5%), the symptoms of the COVID-19 (27.2%), how it is transmitted (23.9%), and the most at-risk groups (19.5%). Remarkably, all of the participants (100%) claimed that COVID-19

generates stigmas and that they stayed away from those with the virus. Regarding the practices of the frontline workers when they have the flu, 39.6% usually wore a mask and 31.7% claimed to stay at home. The participants usually received information about the flu and other diseases from MOH (66.2%) and the internet (31.5%).

**TABLE 2.** Information on knowledge, attitudes and perceptions, communication patterns and channels, health services, and situations of the participants on COVID-19 (N = 502)

Questions	Frequency (N)	Percentage (%)
<b>What do you know about the new coronavirus disease?</b>		
It's a virus that can cause a disease	502	100
<b>What kind of information have you received about the disease?</b>		
How to protect yourself from the disease?	422	20.5
Symptoms of the new coronavirus disease	423	20.6
How it is transmitted	413	20.1
What to do if you have the symptoms	405	19.7
Risks and complications	391	19.0
	2054*	
<b>Where did you hear about the new coronavirus from? What channels or sources?</b>		
Radio	21	1.9
TV	96	8.8
Social Media (twitter, Facebook)	120	11.1
Internet	295	27.3
Ministry of Health	389	36.0
Community health workers	130	12.0
Red Cross Red Crescent volunteers	31	2.9
	1082*	100
<b>Which channel/who do you trust the most to receive information related to coronavirus?</b>		
Radio	13	1.8
TV	129	17.6
Social Media (WhatsApp, twitter, Facebook)	171	23.4
Ministry of Health (MOH)	415	56.7
Red Cross Red Crescent volunteers	4	0.6
	732*	
<b>How dangerous do you think the new coronavirus risk is?</b>		
Very dangerous	374	74.5
More or less dangerous	128	25.5
	502	100
<b>Who do you think is at highest risk to get the coronavirus?</b>		
Children under 5 years old	316	27.8
Elderly persons	438	38.6
Pregnant women	246	21.7
Health workers	136	12.0
	1136*	100
<b>Do you think you are likely to become sick with the new coronavirus?</b>		
Yes	214	42.6
No	129	25.7
Don't know	159	31.7
	502	100
<b>How does the coronavirus spread?</b>		
Droplets from infected people	436	29.8
Airborne	290	19.8
Direct contact with infected people.	414	28.3
Touching contaminated objects/surfaces	324	22.0
	1464*	100
<b>What are the main symptoms?</b>		
Fever	485	27.7
Cough	400	22.9

Table 2. continue

Questions	Frequency (N)	Percentage (%)
Shortness of breath and breathing difficulties	449	25.7
Diarrhea	416	23.8
	1750*	100
<b>Do you know how to prevent it?</b>		
Wash your hands regularly using alcohol or soap and water	453	32.6
Drink only treated water	67	4.8
Cover your mouth and nose when coughing or sneezing	435	31.3
Avoid close contact with anyone who has a fever and cough	436	31.3
	1391*	100
<b>What have you and your family done to prevent becoming sick with coronavirus in the recent days?</b>		
Washing hands regularly using alcohol-based cleaner or soap / water	469	35.3
Covering mouth and nose when coughing or sneezing	449	33.7
Avoid close contact with anyone who has a fever and cough	413	31.0
	1331*	100
<b>Do you consider important to take actions to prevent the spread of coronavirus in your community?</b>		
Yes	502	100
<b>What to do if you or someone from your family has symptoms of this disease?</b>		
I will go to the hospital / health unit	399	55.4
I would stay in quarantine	321	44.6
	720*	100
<b>What more would you like to know about the disease?</b>		
How to protect yourself from the disease?	307	29.5
Symptoms of the new coronavirus disease	283	27.2
How it is transmitted	249	23.9
Most at risk groups	203	19.5
	1042*	100
<b>What do you usually do if you have a regular flu?</b>		
I have never had the flu	56	7.4
Nothing, I continue with my normal life. After some time the flu goes away	118	15.6
I stay at home, so I don't infect others	240	31.7
I wear a mask	300	39.6
I drink tea until I recover	34	4.5
I seek advice from my neighbors	10	1.3
	758*	100
<b>From where/who do you usually receive information on flu and other diseases?</b>		
TV	14	2.2
Internet	200	31.5
MOH	420	66.2
	634*	100

\*Multiple responses

### Qualitative results

The results of the one-on-one interviews yielded four themes and three subthemes, including (1) tangible knowledge with subtheme pieces of information, (2) extent of the danger with subtheme uncertainties, (3) precautionary measures, and (4) a desire to know more, with the subtheme novelty of information.

#### Theme 1: Tangible knowledge

This theme refers to participant understanding of the COVID-19, specifically knowledge used by the participants to protect themselves from getting the infection. When asked if they had heard about the COVID-19, all participants responded affirmatively, and knew that the

virus can cause disease. Asked about the kinds of information they received and where they had heard information about the disease, the participants responded:

P2: "I read from the internet that COVID-19 is a virus that is typically transmitted from person to person through the exhalation of respiratory droplets." (P2 is a male Indian food handler).

P4: "If a person has a runny nose, fever, and sore throat, they will say you are a positive, but with the constant phone messages I got from the Ministry of Health, I

learned that runny nose and fever are just symptoms." (P4 is a Saudi security guard in one of the banks).

P7: "It is caused by mild respiratory infections like the common cold but also more severe infections. That is what my friend who is working in the hospital [healthcare personnel] told me." (P7 is a male Indian working as a market salesman in a grocery).

P11: "It is caused by mild respiratory infections like the common cold but also more severe infections." (P11 is a Pakistani national who served as an assistant pharmacist in a pharmacy boutique in the center of the city).

Some participants had a full grasp of the information about COVID-19, which was acquired from a variety of sources, such as the health authorities, the internet, and social media. This is Pieces of information (Subtheme 1), which was based on their first-hand experiences and supplementary facts about COVID-19. Some of the frontline workers claimed that the information they received about the virus pertained to transmission and early signs:

P12: "Before the virus spread, I just knew that it is a virus like tuberculosis, SARS, and MERSCOV ... but this is only my opinion. I am not so sure yet because I do not really know the full story of COVID, but what I believe is that COVID-19 can be transmitted through drinking unclean water." (P12 is a male Egyptian food handler in a restaurant).

P10: "I don't know about the virus, but from what I know this virus can be acquired from persons in hospitals [nurses]. Although, based on my observations, not only those from the hospital [healthcare personnel] but any person can have the virus. From what I heard from the advertisement of the Ministry of Health, this virus can be transmitted from one person to another person." (P10 is a female Saudi pharmacy assistant in one of the hospitals in the region).

P3: "An employee from the Ministry of Health came to the store and said that we need to wear a mask, and we should not remove it while we are at work. That is why I believe that it is transmitted from one person to another, so I agree with P10. But please don't take this as a definite answer because the information on Facebook said that transmission is from a droplet of saliva and touching contaminated objects." (P3 is a female Filipino janitor in one of the hospitals).

P5: "It could be airborne. I believe this because of the fast spread. Like tuberculosis, the virus is suspended in the air." (P5 is a male Indian serving as a food handler).

### *Theme 2: Extent of danger*

This theme pertains to the perceptions of mainstream frontline workers as to the effects of acquiring the disease. The recognition of this perceived danger captures not only their health concerns but also its impact on their work. Asked about their perceptions regarding the hazards of the COVID-19, the participants said:

P1: "The COVID-19 is very dangerous as it can lead to death right away. On the other hand, it is dangerous because if you test positive you will be quarantined and no one will be there for you. If you come into contact with someone who has the disease and you have a high temperature, they will quarantine you." (P1 is a male Filipino janitor working in a hospital).

P6: "I do not know how dangerous it would be. However, one thing is for sure: once you acquire the disease then your work is also in danger." (P6 is a male Egyptian salesperson working in one of the malls).

P9: "It is highly dangerous because if you have a runny nose, fever, and sore throat, people will tell you that you are positive and that you need to self-isolate, even it is not COVID-19...they always tell you to go for self-quarantine. How about your daily income?"

P12: "It is a dangerous respiratory infection because even if you have the common cold you need to be quarantined. I consider it a very dangerous disease because it is transmitted from person to person through exhalation of respiratory droplets from the nose and mouth and close contact, and maybe I can no longer attend to my job."

When asked about the risk of getting sick with the new COVID-19, most of the participants described uncertainties (subtheme 2). This involves not knowing what is to come while they are working as mainstream frontline workers. This was articulated by P3, P4, P5, P9, and P11:

P3: "In my own opinion, I believe that I am at risk of getting sick from the new COVID-19 because I am exposed. Like those healthcare workers in our hospital, we are also at risk because we are exposed every day."

P4: "Of course, yes, because COVID-19 is everywhere and I am always dealing with customers. We even have the face shield but having a face shield is not a guarantee that you won't get the disease."

P5: "Yes, this is actually my worry because anyone could have COVID-19 when you are outside; you are not safe. Merely taking an order from a customer means that I could already have contracted the disease."

P9: "I am just concerned, you know, because anyone can get sick with COVID-19 if you are not wearing a mask and

washing your hands, especially before and after going to the public toilet. With this, I think I am overthinking that I can get the disease anytime." (P9 is a female Filipina working in a women's spa).

P11: "Very risky for me and I am afraid that I will get it because my work deals with talking to people when they need something. Maybe these customers already have this COVID-19."

#### *Theme 3: Precautionary measures*

The precautionary measures theme refers to participant interventions in protecting their health against COVID-19. It emphasizes the safeguards they take while on the frontline catering to the needs of the people. To some extent, the participants demonstrated their understanding of the measures suggested by the health authorities.

Asked about the measures they or their families regularly took to prevent COVID-19, the participants shared that:

P3: "I always uses alcohol every time before I eat."

P5: "I do not know but I always eat healthy foods that are rich in vitamin C. "

P7: "I avoid unprotected direct contact with live animals and surfaces in contact with animals."

P9: "I do not eat contaminated foods and eliminate standing water."

P10: "I take a bath every day, take my vitamins, eat fruits and vegetables, and sleep 6 to 8 hours."

The participants verbalized that important actions must be considered to prevent the spread of the COVID-19 in their communities. Three participants voiced their concerns emphatically:

P1: "I strongly agree that actions to prevent the spread of the disease in the community must be considered. Although I know that people in the community have already been informed of the preventive measures, we still have to take our own actions to prevent further spread."

P8: "My idea is to have information dissemination for people in the community. It is important that people in the community seriously follow the regulations given by the government. " (P8 is a male Filipino janitor working in a hospital).

P7: "Absolutely, to be able ...umhhh...to be aware and prevent the spread of the COVID-19. "

P2: "In my opinion, if we all take precautions, I think we can get over the spread of the virus. "

#### *Theme 4: The desire to know more*

The theme of knowing what is true involves the act of discerning more about COVID-19. It is the articulation of the participants' desire to seek additional information about COVID-19, in addition to what they have learned from health authorities. The participants were actively engaged in offering their opinions as to what additional information they need to have about COVID-19:

P7: "I really want to know more about how to protect myself because I want my family to be protected from acquiring the virus in case I have it."

P11: "What is the exact cause of the virus? That is what I really want to understand. If I am reading about it on the internet, most of the terms used are medical, so that is why I do not understand."

P9: "I appreciate that we were given more information on necessary precautionary measures to avoid the spread of the disease in my workplace and in my home."

P10: "For me, I want to know if there is already a medicine for the disease."

While the health authorities were proactive in disseminating information, some participants were concerned about the novelty of information (subtheme 3) given to them. For example, three participants expressed their concerns about the reliability of new information regarding transmission of the virus:

P8: "I just want it made clear whether the virus can be transmitted through the air. Although more information is coming, I am not sure what is true and what is not."

P4: "I understand that there may be airborne transmission because it spreads very fast. This is what I really want to know. If yes, what should we do? Is there another preventive measure?"

P5: "I heard from a friend that airborne is really a way to spread the disease. However, on the internet, I cannot find out if it is true."

## **DISCUSSION**

This study assesses and explores the knowledge, perceptions, and attitudes of mainstream workers during the COVID-19 pandemic. In the quantitative phase, the mainstream workers were knowledgeable and possessed different information about the COVID-19. Indeed, most of their information about COVID-19 was correct. It is important to note that this information came mostly from the MOH, which means that the MOH's information



campaign has been effective. In fact, that there has been a substantial effort by all levels of government, including through their public awareness campaigns. As a result, there has been an increase in early measures to engage the public in prevention and to act on misleading information.<sup>16</sup> It is worth stating that the KSA is in the unique position to successfully deal with two outbreaks of viral origin.<sup>17</sup> As such, it is assumed that KSA can win the battle against this pandemic.

While the quantitative results revealed that participants were knowledgeable and possessed different information about COVID-19, it was also noted in the qualitative result that participants had a tangible knowledge. Both the qualitative and quantitative results implied that participants had a good grasp of the information they received from the health authorities and used it to protect themselves. In fact, the intensive efforts of the MOH have led to considerable improvements in infection control procedures in healthcare services.<sup>18</sup> Notably, the information conveyed by the mainstream workers in this study suggests that they have a good understanding of the COVID-19—likely a result of the MOH's exhaustive awareness campaign, communicated via its website, television broadcasts, and various social media. This has shaped a guide to COVID-19 that has been translated into 10 languages.<sup>18</sup> Other researchers believe that the number of cases would be higher if these precautionary measures and restrictions had not been considered.<sup>19</sup> These most recent results may be useful to inform policymakers on further public health interventions, awareness-raising campaigns, policies, and health education programs.

Most of the mainstream workers believed that the virus is dangerous, and this was apparent in the quantitative results. Further, they knew that the elderly is the most at-risk group, which could be due to weakened immune systems, and they were considered likely to contract the new COVID-19. Moreover, the workers in the mainstream understood the modes of transmission, symptoms, and prevention of the disease. This information, conveyed by frontline workers, suggests that they are mindful about the factors associated with the risks of contracting COVID-19. The awareness of general population about risk perception concerning contraction and complications from the high infectivity of COVID-19—that it can be transmitted between individuals through unseen respiratory droplets—has been noted in recent studies.<sup>20,21</sup> The results of this study show that both mainstream workers are knowledgeable about the incubation period of COVID-19.<sup>22</sup> In this study, the mainstream workers recognized the extent of the danger of COVID-19. It was observed that the participants were anxious about the possibility of becoming infected with COVID-19. This study's findings support those of several other studies.<sup>20,23</sup> The uncertainties expressed by the participants in this study show that, while they are

cautious enough of their movements and practices, they still feel uncertain about the situation. As such, most of their preventive practices involve continuing to wearing facemask and shields, and to practice hand hygiene, social distancing, and cough etiquette. As a result of their uncertainties about the situation, the participants expressed a growing concern regarding the protective and personal hygienic measures required to avoid COVID-19 infection. This finding is true of most participants in other recent studies, as they took precautions such as avoiding crowded places, practicing proper hand hygiene, and wearing masks.<sup>20,21</sup> This indicates a general willingness among participants to make behavioral changes in the face of the COVID-19 pandemic. This is also true for healthcare workers.<sup>24</sup> These practices are critical in preventing the transfer of COVID-19 from individual to individual. Indeed, it is commonly known among the public that the main transmission routes of COVID-19 are droplets and contact,<sup>25</sup> which means that personal protective equipment is crucial for controlling the spread of COVID-19. In fact, one of the ways to control new life-threatening epidemics in their early stages involves optimal infection prevention and control actions, as well as maximal protection, such as masks, gloves, gowns, and eye protection.<sup>26</sup> This means that it is important to provide people with health education about COVID-19 infection to prevent the spread of the disease.

Both the quantitative and qualitative results found that mainstream workers and their families practice regular hand washing using alcohol-based cleaners or soapy water. Further, the participants considered it important to take actions to prevent the spread of COVID-19 in their communities, and that they would go to the nearest hospital should they develop symptoms. These findings imply that the participants are cognizant of the recommended procedures and that they were willing to follow them. This finding is similar to the recent study in which participants made frequent use of sanitizers, washed their hands often, and wore masks to protect themselves from infection.<sup>27</sup> This provides specific evidence regarding the increasing attention participants pay to personal hygienic measures to avoid COVID-19 infection. Good hand hygiene is recognized as an effective defense against COVID-19 among the general population<sup>20,21,23</sup> and healthcare workers.<sup>28</sup> In fact, hand hygiene is accepted globally as a principal means of infection prevention and control, and it has been demonstrated as an efficient method of reducing the transmission of common respiratory viruses, including human COVID-19.<sup>5,25</sup> Frequent hand washing can aid in the prevention of COVID-19 transmission from suspected or identified patients. Moreover, eating vegetables and fruits, wearing a mask, following preventive sneezing and cough etiquette, and avoiding hand shaking are all well-accepted means of preventing infectious respiratory diseases.<sup>26</sup> This finding suggests that health authorities should continue to raise public awareness of the burden

on health systems and the calculated allocation of measures for health professionals with underlying health conditions to minimize their risk. As a result of the participants' views, the virus prevention practices of the mainstream workers were included in the precautionary measures. This suggests that the respondents were cognizant of the virus's mode of transmission and its symptoms, and had developed an adequate awareness of preventive measures. This was possibly due to the government and media emphasis on preventive measures. As noted above, the MOH began taking precautionary measures prior to the reporting of all cases and before the WHO declared COVID-19 an epidemic. This was due to the idea that starting earlier would prevent a severe increase in the number of cases in Saudi Arabia and avert a COVID-19 epidemic within the kingdom.<sup>19</sup> While there are new cases of COVID-19 every day, these numbers vary. The data are considered reasonable as a result of the precautions and restrictions established by the MOH.<sup>19</sup> It is interesting to note that the frontline workers in the mainstream would like to know more about the disease. This suggests that there is a need for more wide-ranging government and health authority education programs with an emphasis on uniformity of data. COVID-19 educators should take a preemptive approach and focus on dispelling misinformation— inconsistent ideas and incorrect information.<sup>20</sup> To reduce distress, interventions need to be in place to tackle knowledge gaps among the public.<sup>29</sup> This has been seen in China, where reduction of distress is partly attributed to the government's effective prevention and control measures.<sup>30</sup> Further, the mainstream workers articulated their desires to know more about the novelty of information surrounding COVID-19. While the MOH has proven to be a strong communication system,<sup>19</sup> amalgamated clinical information could be circulated via a knowledge synthesis procedure instituted by the government. Given the dynamic nature of the pandemic, public health journalists and health correspondents should work with government to ensure the distribution of precise, non-sensational, timely, regular, and specific information.<sup>31</sup>

Because health authorities are expected to deliver solutions to the public within a vacuum of improbability in the face of a new pandemic, the government ought to handle pandemic-related ambiguities efficiently and proactively at the policy level. Governmental and health care agencies, institutions, and professional societies can help by contributing to and constantly updating information and resources. Information from reliable sources must be disseminated at all levels as it becomes available. Communication that is concise, clear, transparent, timely, and considerate will help develop a sense of control among health care providers.<sup>29</sup> While it is commendable that the MOH has done its part to train healthcare workers and provide sufficient infrastructure/spaces and protocols for COVID-19 health system improvement

strategies must involve the community.<sup>19</sup> Involving the community promotes engagement and cooperation of stakeholders, policymakers, and the community as a whole to strengthen the public health. Moreover, a tailor-fitted guideline needs to be considered<sup>32</sup> while engaging the community.

While this study makes important contributions to policymaking information, we recognize that limitations may affect generalization of the results. For example, we purposely included only those mainstream workers who could speak and comprehend English. We suggest therefore that similar studies in the future include the general population, regardless of their language. Additionally, the study's results can be made more generalizable by clustering by locality.

## CONCLUSIONS

Given the informed predisposition of the frontline workers in the mainstream of the Ha'il Region, two-way communication between health authorities and at-risk populations in response to COVID-19 can be facilitated with consideration in multiple languages. This is to support individuals shaping an intervention strategy that will prepare and protect the health of the workers, their families, and the public during the early response to COVID-19.

## ACKNOWLEDGMENT

The authors would like to extend their gratitude to Scientific Research Deanship of the University of Ha'il, Saudi Arabia through project number of COVID-1919 in supporting this study.

## CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

## FUNDING

This research was funded by the Scientific Research Deanship of the University of Ha'il, Saudi Arabia through project number of COVID-1919.

*Received: June 8, 2021 | Accepted: August 30, 2021*

## REFERENCES

1. World Health Organization. *Situation Report 1: Novel Coronavirus (2019-nCoV)*. New York: World Health Organization, 2020.
2. Nawrat A. *Coronavirus outbreak: the story so far*. U.K.: Pharmaceutical Technology, 2020.
3. World Health Organization. *WHO Director-General's opening remarks at the media briefing on COVID-19*. New York: World Health Organization, 2020.

4. World Health Organization. *Rolling updates on coronavirus disease (COVID-19)*. New York: World Health Organization, 2020.
5. World Health Organization. *Novel Coronavirus (2019-nCoV) Situation Report-3*. New York: World Health Organization, 2020.
6. Beaubien J. *Hong Kong has contained coronavirus so far—But at a significant cost*. NPR, 2020.
7. Lin L, Wang J. *Singapore, Taiwan, and Hong Kong Face Second Wave of Coronavirus Cases*. New York: The Wall Street Journal, 2020.
8. Nair C. *What all the countries that contained coronavirus have in common*. Global Institute for Tomorrow and author: The Sustainable State, 2020.
9. Arab News. *Saudi Arabia announces the first case of coronavirus*. Saudi Arabia: Arab News, 2020.
10. Saudi Gazette. *Saudi Arabia reports 38 new cases of coronavirus, bringing total to 171*. Saudi Arabia: Saudi Gazette, 2020.
11. Saudi Press Agency. *Novel coronavirus COVID-19 follow-up committee holds its 9th meeting*. Saudi Arabia: Saudi Press Agency, 2020.
12. Arab News. *Saudi Arabia suspends international flights starting Sunday to prevent the spread of coronavirus*. Saudi Arabia: Arab News, 2020.
13. Saudi Press Agency. *Kingdom's government decides to suspend attendance at workplaces in all government agencies for a period of (16) days except for health, security, military, and electronic security*. Saudi Arabia: Saudi Press Agency, 2020.
14. Saudi Press Agency. *Ministry of Sports: Suspending all sport activities in the Kingdom and closing of private sports halls and centers*. Saudi Arabia: Saudi Press Agency, 2020.
15. World Health Organization. *Risk Communication and Community Engagement (RCCE)*. New York: World Health Organization, 2020.
16. World Health Organization. *Saudi Arabia join forces to fight COVID-19 nationally, regionally and globally*. New York: World Health Organization, 2020.
17. Barry M, Al Amri M, Memish ZA. COVID-19 in the Shadows of MERS-CoV in the Kingdom of Saudi Arabia. *J Epidemiol Glob Health*. 2020;10:1–3.
18. Al-Hanawi MK, Angawi K, Alshareef N, Qattan AMN, Helmy HZ, Abudawood Y, *et al*. Knowledge, attitude and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: A cross-sectional study. *Front Public Health*. 2020;8:217.
19. Alshammari TM, Altebainawi AF, Alenzi KA. Importance of early precautionary actions in avoiding the spread of COVID-19: Saudi Arabia as an Example. *Saudi Pharm J*. 2020;28:898–902.
20. Huynh G, Nguyen TNH, Tran VK, Vo KN, Pham LA. Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. *Asian Pac J Trop Med*. 2020;13:260–5.
21. Taghrir MH, Borazjani R, Shiraly R. COVID-19 and Iranian medical students; A survey on their related-knowledge, preventive behaviors and risk perception. *Arch Iran Med*. 2020;23:249–54.
22. Khader Y, Al Nsour M, Al-Batayneh OB, Saadeh R, Bashier H, Alfaqih M, *et al*. Dentists' awareness, perception, and attitude regarding COVID-19 and infection control: Cross-sectional study among Jordanian dentists. *JMIR Public Health Surveill*. 2020;6:e18798.
23. Minhas S, Chaudhry RM, Sajjad A, Manzoor I, Masood A, Kashif M. Corona pandemic: Awareness of health care providers in Pakistan. *AIMS Public Health*. 2020;7:548–61.
24. Zhang M, Zhou M, Tang F, Wang Y, Nie H, Zhang L, You G. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hosp Infect*. 2020;105:183–7.
25. Wenzel RP, Bearman G, Edmond MB. Lessons from severe acute respiratory syndrome (SARS): Implications for infection control. *Arch Med Res*. 2005;36:610–6.
26. Pellegrinelli L, Galli C, Bubba L, Cereda D, Anselmi G, Binda S, *et al*. Respiratory syncytial virus in influenza-like illness cases: Epidemiology and molecular analyses of four consecutive winter seasons (2014-2015/2017-2018) in Lombardy (Northern Italy). *J Med Virol*. 2020;92:2999–3006.
27. Lai X, Wang X, Yang Q, Xu X, Tang Y, Liu C, *et al*. Will healthcare workers improve infection prevention and control behaviors as COVID-19 risk emerges and increases, in China? *Antimicrob Resist Infect Control*. 2020;9:83.
28. Azlan AA, Hamzah MR, Sern TJ, Ayub SH, Mohamad E. Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. *PLoS One*. 2020;15:e0233668.
29. Sukeri S, Idris Z, Zahiruddin WM, Shafei MN, Idris N, Hamat RA, *et al*. A qualitative exploration of the misconceptions, knowledge gaps and constructs of leptospirosis among rural and urban communities in Malaysia. *PLoS One*. 2018;13:e0200871.
30. Bansal P, Bingemann TA, Greenhawt M, Mosnaim G, Nanda A, Oppenheimer J, *et al*. Clinician wellness during the COVID-19 pandemic: Extraordinary times and unusual challenges for the allergist/immunologist. *J Allergy Clin Immunol Pract*. 2020;8:1781–90.e3.
31. Reddy P. *Front line talk: South Africa health care workers' response to the Coronavirus (COVID-19) pandemic*. Paper presented at: National Joint Operational and Intelligence Structure (NATJOINTS); 2020 July 12:11421.
32. Albaqawi HM, Pasay-An E, Mostoles R Jr, Villareal S. Risk assessment and management among frontline nurses in the context of the COVID-19 virus in the northern region of the Kingdom of Saudi Arabia. *Appl Nurs Res*. 2021;58:151410.