Fall 12-14-2021

Attitudes, Practices, and Perceptions towards Covid-19 Patients among Respiratory Therapists in Saudi Arabia.

Rayan Almadni

ACCEPTANCE

This thesis, ATTITUDES, PRACTICES, AND PERCEPTIONS TOWARDS COVID-19 PATIENTS AMONG RESPIRATORY THERAPISTS IN SAUDI ARABIA, by Rayan Almadni, was prepared under the direction of the Master's Thesis Advisory Committeeof the Respiratory Therapy department at Georgia State University. The committee in partial fulfillment of requirements accepts it for the Master's of Science degree in Respiratory Therapy at Byrdine F. Lewis School of Nursing and Health Professions, Georgia State University.

The Master's Thesis Advisory Committee, as representatives of the faculty, certifies thatthis thesis has met all standards of excellence and scholarship as determined by the faculty.

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ATTITUDES, PRACTICES, AND PERCEPTIONS TOWARDS COVID-19 PATIENTS AMONG RESPIRATORY THERAPISTS IN SAUDI ARABIA.

By

Rayan Almadni, BSRT

A Thesis

Presented in Partial Fulfillment of Requirements for the Degree of

Master of Science

in

Health Sciences

in

the Department of Respiratory Therapy

Under the supervision of Dr. Rachel Culbreth

in

the Byrdine F. Lewis School of Nursing and Health Professions

Atlanta, Georgia

2021

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By
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(Under the Direction of Dr. Rachel Culbreth)

ABSTRACT

BACKGROUND: The coronavirus disease SARS-CoV-2 or COVID-19 has taken the lives of more than 3 million people across the world, with more than 160 million cases reported. Respiratory therapists (RTs) play an important role in the treatment of COVID-19, including managing ventilators and administering breathing treatments. **PURPOSE**: The purpose of this study was to evaluate attitudes, practices, and perceptions about COVID-19 disease and the COVID-19 vaccine among respiratory therapists in Saudi Arabia. **METHODS**: The study utilized an online, cross-sectional survey with 36 questions administered to a convenience sample of RTs in Saudi Arabia. The survey is divided into five sections: attitudes, practices, perceptions, vaccination questions toward COVID-19 and demographics questions. Data was analyzed using descriptive statistics, independent samples t-test, and one-way ANOVA tests. A significance level was set at 0.05. All analyses were performed in SPSS version 27. **RESULTS**: The total sample consisted of 38 respiratory therapists consisting of three education levels: associate's degree (n=2, 5.3%), bachelor's degree (n=32, 84.2%), and master's degree (n=4, 10.5%). The majority of the participants were males (66 %, n=25), while the females comprised 34 % (n=13). The participants in the study had a mean age of 29.81 (SD ± 6.0). The mean and S.D. of experience as a respiratory therapist were (2.24, ±1.26). The respondents who worked in a public hospital were 27 (71.1%), while those in private hospitals were 11(28.9%). Thirty-six (94.7%) of the participant considered frontline providers, and only two (5.3%) participants declared that they were not. In this study, 32 out of 38 respiratory therapists had previously treated COVID-19 patients in Saudi Arabia. There were no statistically significant differences between male and female respondents in the attitude subscales. The statistically significant findings were found between male and female respondents in the practice subscales. **CONCLUSION**: In conclusion, the majority of respiratory therapists in Saudi Arabia showed positive attitudes and adequate practices regarding COVID-19 prevention and treatment. More studies are needed to assess the correlates of negative COVID-19 perceptions and vaccination among high-priority populations.

KEY WORDS: Attitude, Practice, Perception, Respiratory therapy, COVID-19, Coronavirus, outbreak, Vaccine, and Saudi Arabi.

ACKNOWLEDGMENTS

I would like to express my gratitude to my thesis chair, Dr. Rachel Culbreth, for the unwavering support, motivation, and constructive criticisms during this research process. Her guidance helped me throughout the research and writing of this thesis. I consider myself fortunate to have her as a committee chair. Besides my thesis chair, I would like to thank the rest of my thesis committee: Dr. Douglas Gardenhire and Prof. Laryssa Frederick, for their great feedback, comments, and time to facilitate this process. Last but not least, I would like to thank my family and my friends for their spiritual support during the process of preparing and writing my thesis. My sincerest thanks to my close and supportive circle of friends who have always been there for me. I am indebted to Mr. Ahmad Alharbi for our special friendship, motivation, warmth, and kindness. I also want to thank Mr. Abdulaziz Alolayan for his kindness, support, and great advice and ideas in more ways than one.

Rayan Almadni

Fall, 2021

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CHAPTER I

Introduction

On March 11, 2020, the World Health Organization announced that a respiratory disease had become a global pandemic. By the time of reporting, it had affected more than 110,000 people and influenced more than 4000 deaths worldwide (World Health Organization, 2020). The Centers for Disease Control and Prevention (CDC) stated that the severity of COVID-19 symptoms could be varied from no symptoms to severe, and the main symptoms include cough, shortness of breath, and fever (CDC, 2020). Coronavirus is caused by a virus that can spread from person to person by close contact (within 6 feet) with a person who has COVID-19 through respiratory droplets delivered when an infected person coughs, sneezes, talks, or touching surfaces (CDC, 2020).

COVID-19 could induce severe respiratory symptoms, and the most severe symptoms would be managed under the care of respiratory therapists (Hester et al., 2020). Knowledge regarding a disease could affect healthcare providers' attitudes and practices such as respiratory therapists (RTs), and the lack of awareness towards infection prevention and treatment practices may impact the numbers of infected people (Mceachan et al., 2016). Therefore, understanding attitudes and practices towards COVID-19 among RTs could develop the quality of treatment, reduce the spread of the virus, and avoid occupational infections.

Statement of the Problem

The rapid spread of COVID-19 worldwide has put a significant burden on healthcare providers, particularly those at the forefront of pandemic control, such as respiratory therapists. There is an inadequacy of studies on how RTs perceive the COVID-19 risk of infection, as well as vaccine beliefs and practices. Like all healthcare practitioners, respiratory therapists are called upon to improve their knowledge to achieve a confident attitude and practice in treating infectious patients to move forward with changes taking place in healthcare circumstances.

Purpose of the Study

This study aims to evaluate the level of attitudes, practices, and perceptions about COVID-19 disease between respiratory therapists in Saudi Arabia.

Research questions that will support guidance the study structure include:

1) What are the attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?
2) Are there differences in demographics with regards to attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?
3) What is the self-reported vaccine prevalence among RTs in Saudi Arabia?
4) Are there differences in COVID-19 vaccination status and perceived effectiveness among RTs in Saudi Arabia?

Assumptions

Attitudes, practices, and perceptions towards any disease play a fundamental role in creating successful treatment strategies. RTs are proficient in caring for patients with any illness that affects the respiratory system. Since their importance on the healthcare team, respiratory therapists should have a high level of knowledge regarding recent updates about COVID-19 disease to face the pandemic. It is expected that study participants can respond honestly and to the best of their abilities. This study also assumes that the RTs in Saudi Arabia have adequate access to the COVID-19 vaccine.

Summary

In brief, the significant acceleration of COVID-19 cases raises the need to study the level of attitudes, practices, and perceptions among RTs. This research will examine perceived COVID-19 risk, adherence to infection control practices, vaccine uptake, and vaccine perceptions among RTs in Saudi Arabia. This research will inform education interventions aimed at correcting any misconceptions about COVID-19 for Saudi Arabian RTs. Additionally, this research will inform vaccine uptake campaigns for RTs, who are invaluable healthcare providers on the frontlines of COVID-19.

CHAPTER II

Review of the Literature

This chapter will present a literature review on respiratory therapists' role in fighting COVID-19, residents' knowledge, attitudes, and practices regarding COVID-19, healthcare providers' knowledge, attitudes, and practices regarding COVID-19, and acceptance of COVID-19 vaccine among healthcare providers. Internet search and web databases like PubMed, Medline, CINHALL, and Google Scholar were accessed for this review. Search keywords used include respiratory care, respiratory therapy, the role of respiratory therapy, COVID-19, attitudes, practices, perceptions, COVID-19 vaccine, healthcare, and healthcare providers.

Introduction

The coronavirus disease SARS-CoV-2 or COVID-19 has taken the lives of more than 3 million people across the world, with more than 160 million cases reported. The disease has affected not only the health of people but their livelihoods and normal routines. Respiratory therapists (RTs) are becoming more and more important with the increase in cases of coronavirus. They are trained to deal with lung illnesses and disorders. Respiratory therapists treat people with respiratory diseases caused by conditions and viruses such as the coronavirus. Respiratory Therapists, who are the first line of defense for the people suffering from Covid-19, should have a positive attitude of dealing with the problem and practices towards the Covid-19 patients to manage infected patients successfully. It is urgent to have adequate perceptions towards COVID-19 infection and infection control for all respiratory therapists because of their exposure to COVID-19 and the high demand of

RTs in healthcare.

Respiratory therapists' role in fighting COVID-19

Tu et al (2020) showed how respiratory therapists contributed to the fight against the new devastating coronavirus disease in Wuhan. Wuhan is the origin of the coronavirus disease that allegedly began in a market in 2019 and spread worldwide. Due to its mode of transmission through the air when an infected person sneezes, coughs, breaths heavily, or speaks leading to the release of droplets of saliva that enter the eyes, mouth, or nose, the rates of infection have been alarming. According to Tu et al (2020), the coronavirus disease escalated the importance of respiratory therapists, something that changed their situation in society. They had been ignored in China for a long time. In China, respiratory care is something new. Unlike other medical professions, it has less than 25 years since its acknowledgment. Coronavirus may have led to more attention and acknowledgement for respiratory therapy in China.

With the increased reports of Covid-19 in the country and specifically Wuhan, the government had no choice but to invest more in respiratory therapy to gap the spread of the virus. During that period, the healthcare organizations experienced hard pressure because of insufficient essential care resources. The logical dispersion of insufficient medical utilities is important in avoiding the collapse of the public health system. The work of respiratory therapists for COVID-19 patients included obtaining vital signs, lung ultrasounds, arterial blood gas measurements and interpretation, and chest computed tomography (CT) scans. Moreover, the respiratory therapists assembled the patients' medical history and worked alongside physicians during patient classification (Tu et al., 2020). Many Covid-19 victims require respiratory support. The support demands numerous

equipment such as nasal cannula (NC), non-invasive ventilation (NIV), face masks, and invasive ventilation among others. Respiratory therapists are needed for close observation of patients and equipment. Tu et al (2020) argue that the therapists helped when the disease first broke out in Wuhan by monitoring the bedside parameters as well as recommended oxygen therapy and delivery. Various challenges characterized the initial Covid-19 outbreak in Wuhan due to insufficient intensive care resources, the uncertainty of virus transmission, and the characteristics of the virus.

Additionally, the majority of the physicians did not have reliable knowledge and understanding about the ventilators used. With the help of respiratory therapists who had respiratory assistance knowledge and practice experience, they were seen as powerful in Wuhan's fight against the disease. They were not only knowledgeable in the use of ventilators but were also involved in training non-ICU medical staff on how to treat seriously ill patients under mechanical ventilation (Tu et al., 2020).

Tu et al (2020) also discussed how respiratory therapists helped with Covid-19 patient airway management. Accidental extubation (i.e., removal of the endotracheal tube placed for mechanical ventilation), aerosolization, bronchoscopy, intubation, and suctioning can lead to infection. Without well-trained and experienced respiratory therapists, the risk of infection for non-COVID-19 patients could be high. In Wuhan, an emergency team of airway management was formed. The group involved professionals such as respiratory therapists, anesthesiologists, and intensivists. The professionals help in giving systemized training to nurses as well as non-ICU physicians, including extensive risk determination for coronavirus patients. According to Tu et al (2020), respiratory therapists were involved in determining the risk of upper airway dysfunction, cough

efficacy, the volume of sputum, and functioning of ventilators during clinical treatment. Moreover, they enhanced nebulizers for aerosol diffusion reduction, helped in fiberoptic bronchoscopy, oxygen therapy, sputum culture, and intubation.

In Wuhan and like in other cities across the globe, respiratory therapists helped transporting critical patients. Covid-19 patients regularly require chest CT scan reassessment according to the disease development. Patients who are assisted under mechanical ventilation need frequent imaging tests. Transporting critically ill Covid-19 patients from the ICU can lead to adverse outcomes, like unplanned extubations or sudden cardiovascular events. For this reason, respiratory therapists are required to know all types of oxygen therapies and emergency procedures, such as ACLS (advanced cardiovascular life support. Again, Tu et al (2020) summarizes that respiratory therapist were fundamental in the fight against COVID-19 in Wuhan, China. Despite the fact that their work was not recognized after the city recovered, the Chinese government recognized their contribution by listing the occupation as one of the country's various medical practices.

General populations' knowledge, attitudes, and practices regarding COVID-19

Zhong et al (2020) did an online survey about knowledge, practices, and attitudes (KAP) regarding coronavirus among Chinese people when the disease rapidly broke out. According to the article, the fight against coronavirus is continuous in China. They advise that for successful results to be achieved, people have to follow restriction guidelines, but this is determined by their knowledge, attitudes, and practices regarding coronavirus based on KAP theory. The outbreak of the SARS epidemic in the year 2003 shows that awareness and views about infectious sicknesses are linked to the degree of panic emotion among people. As a result, infection prevention may become increasingly difficult. To enhance

the management and control of the outbreak in China, Zhong et al (2020) argue that knowing the people's understanding of coronavirus at this important time is urgent.

According to the outcomes of the research conducted by Zhong et al (2020), more than 90 percent of the participants showed that they were aware of Covid-19. The results showed that 90.8 percent of the participants believe that the disease will ultimately get controlled. Approximately 97 percent reported to have confidence that the country can successfully defeat the disease. However, the practices of Chinese people seemed extremely careful. Almost all of them did not go to overcrowded areas (96.4%). They strictly put on masks when they were away from their homes (98.0%) when the virus spread rapidly across the country.

Conclusively, the findings show that the general population of Chinese individuals who were high socioeconomic status, specifically women, have had reliable knowledge about the disease. They also had optimistic attitudes with the belief that the Covid-19 pandemic will be defeated and people will turn to their normal lives. The research also showed that people carry out necessary practices regarding the fight against the virus through face mask-wearing, hand washing routines, and social distancing or regularly sanitizing to reduce chances of infection. Moreover, the reliable knowledge about Covid-19 is linked to optimistic attitudes as well as appropriate practices regarding Covid-19. According to Zhong et al (2020), this indicates that education initiatives about Covid-19 focused on enhancing its understanding and knowledge are essential for stimulating hopeful attitudes keeping safe practices. It is expected that, with the help of the government, the Chinese people will succeed in defeating Covid-19.

Healthcare providers' knowledge, attitudes, and practices regarding COVID-19

Malik et al (2020) discussed practices, knowledge, and attitudes of medical practitioners about Covid-19 as well as risk determination to stop the spread. Healthcare professionals have an important task of lowering infections and deaths. However, healthcare workers are frequently on the front lines and exposed to many different viruses and bacteria, including COVID-19. The article says that healthcare personnel stand at high risk of getting infected with the virus due to the exposure to patients when they lack good knowledge and understanding about Covid-19. Malik et al (2020) detailed that on 20th February 2020, 2050, Covid-19 cases were announced in China among healthcare professionals. Most of the cases reported were because of lower understanding and practical experience to handle Covid-19 patients. With enough knowledge among the healthcare workers, a positive attitude, and reliable practices, the avoidance of cross-infections from patients and good care delivery can be achieved. Moreover, reliable preventive measures and risk determination of healthcare groups are essential for a working reaction to new infectious diseases like coronavirus.

There was a level of confusion among some respondents concerning the risk of transmission via virus-infected food and the essential and efficient reliability of antibiotics in treating Covid-19. Malik et al (2020) show doubts and misunderstandings among healthcare professionals. Until today, there is no proof that the virus can be transmitted to people through contaminated food.

Regarding treatment, some anti-malarial, antiviral, and anti-inflammatory medications have shown promise for COVID-19. The reliability of antibiotics as a way of treating coronavirus disease is not clear. According to Malik et al (2020), the foundations

of vagueness concerning antibiotics became apparent in the study. However, many respondents (60.5%) believed that antibiotics are not reliable therapy for coronavirus disease. Antibiotics cannot treat or reduce the severity of Covid-19 because they are specifically meant to fight bacterial infections that might occur when a person is infected with the virus. It cannot be relied on as preventive medicine for Covid-19 infection. The study indicates the presence of rumors concerning the use of azithromycin alongside hydroxychloroquine. Although some clinical trials indicated the combination of the two remedies could treat Covid-19, the studies involved an unreliably few numbers of patients for a conclusive argument.

The authors argue that ineffective strategies in improving understanding and readiness among medical personnel about Covid-19 in Pakistan indicated that health professionals did not have good preparation and management to prevent COVID-19 disease. For this reason, Malik et al (2020) decided to determine the healthcare workers' knowledge, attitude, risk determination strategies, and practices. The research found out that most respondents were prepared to handle the outbreak. Pharmacists showed a significantly reduced degree of knowledge. The pharmacists' practices showed that they stood at a high risk of getting infected, unlike the nurses and physicians. The reason could be attributed to the idea that pharmacists do not interact directly with the patients and might not take serious caution. With minimal evidence, there was no understanding of antibiotics usage for Covid-19 treatment among the healthcare workers. With the increasing cases of infections, public health strategies are needed to train healthcare workers to handle emergencies and other related pandemics like the COVID-19.

Jemal et al (2020) carried out multicenter research in Ethiopia to understand medical practitioners' awareness, attitude, practice, and prevention regarding Covid-19. They interviewed 397 healthcare workers in the country. According to the study, 350 respondents, which are around 88.2 percent, showed sufficient knowledge regarding Covid-19. Approximately 75.5 percent of them argued that coronavirus does not have any known treatment or vaccine. In terms of attitude, it was established that 94.7 percent of the respondents had a positive attitude about coronavirus disease. Most of them (75.6%) argued that the disease is a critical illness, while 69.3 percent acknowledged that they could get infected. The acknowledgment that they can be infected indicates that most of them understand their situation as front-line workers and proximity to patients. Around 51.4 percent of the interviewed healthcare workers think that taking hot drinks reduces the chances of getting infected with the virus, and 38.5 percent perceive that Covid-19 does not spread in high-temperature areas. 15.4 percent had the idea that herbal medicine can treat coronavirus disease. Jemal et al (2020) also provided results about practices of healthcare workers in regards to Covid-19. According to the research findings, 252 or 63.5 percent of the respondents reported reliable COVID-19 prevention practices. As a result, 67.3 percent of healthcare workers interviewed use face masks all the time, whereas 81.4 percent of them wash their hands regularly. A small group of about 22.4 percent indicated that they keep social distance. These practices became common globally as the WHO argued that the spread could be significantly reduced. Jemal et al (2020) study showed a lack of a positive link between knowledge, practice, and attitude about Covid-19.

Jemal et al (2020) gave an extensive explanation of the findings. According to them, the findings agree with another report that concluded that approximately 90 percent of

healthcare professionals know about coronavirus disease. The high rate (90%) of awareness concerning coronavirus among health practitioners has been attributed to the extensive availability of information from the time the pandemic started across the world. This information was propagated by mainstream media as well as social media and the internet. Additionally, they could have got informed by the government through frequent updates about the disease in the country. Most governments worldwide came up with a policy of sensitizing the citizens through radios and television stations about the virus. It is enhanced by the relationship of informational sources with an understanding of the disease, coinciding with other research findings. Jemal et al (2020) found that most of the healthcare personnel in Ethiopia collected information about coronavirus from social media and television channels. The percentages were 73.6 percent and 71.5 percent, respectively.

Jemal et al (2020) also indicated that the COVID-19 information source positively correlates with healthcare workers understanding of COVID-19. The results also showed a strong correlation between information sources and the healthcare worker's knowledge of Covid-19. Social media, television, radio, and the ministry of health website are sources where healthcare providers can gather information about COVID-19. People who use social media for information purposes had around 75 percent opportunity of understanding a lot about the disease compared to those not using social media as a source of information. On the other hand, studies in Saudi Arabia and UAE showed that a small group of healthcare providers using social media as a source for COVID-19 information. The conclusion coincides with studies done in China, Iran, and Vietnam, where the major source of knowledge was identified as social media. Moreover, Jemal et al (2020) research indicated a favorable relationship between disease understanding and people perception.

Most healthcare workers with adequate Covid-19 knowledge had a favorable belief about the fight against the disease and its prevention. The more they were informed about Covid-19, the more their confidence in handling people who had contracted the virus. The study showed a general dependable view about coronavirus of 94.7 percent among Ethiopian healthcare professionals. Approximately 63.5 percent of the respondents reported reliable practice regarding the prevention strategies of the virus. 67.3 percent frequently used face masks, while only 36.4 percent washed hands frequently using soap and water. The study concludes that most healthcare workers in Ethiopia have a reliable understanding and a positive view towards Covid-19, although they practice coronavirus safety measures less frequently. The source of information greatly influences the knowledge and understanding of the virus among healthcare workers.

Zhang et al (2020) researched health workers' knowledge, practice, and attitude about Covid-19. They did a cross-sectional survey in China that involved 1,357 healthcare employees in 10 hospitals. It was done in Henan province, one of the cities that witnessed serious infections. The city is also near the perceived place of origin of the virus, Wuhan. The research was done during the early and middle periods of the disease outbreak. According to Zhang et al (2020), the study of healthcare workers' knowledge and the issues impacting their attitudes and practices can give a basis for stopping more spread of the virus among healthcare employees. Almost half of the respondents in this study (46.5%) comprised of nurses, while 36.5 percent were doctors. The majority of the participants (36%) had worked in the profession for more than nine years. Those categorized as frontline healthcare workers formed 42.6 percent of the participants. Among the active participants in the study, 89 percent showed to have enough coronavirus knowledge.

Doctors indicated increased knowledge levels (39%). According to Zhang et al (2020), knowledge is essential for developing prevention ideas, forming positive perceptions, and enhancing positive habits. The cognition and attitude of a person affect the way they cope with challenges. The study established that knowledge had a direct effect on attitudes.

An increase in healthcare professional's knowledge about the disease increased their confidence in preventing it. Jemal et al (2020) also talked about this idea in their study done in Ethiopia. Moreover, Zhang et al (2020) argue that health personnel possessing a high understanding of coronavirus believed that visitors to the country with high-risk elements for coronavirus like recent travel to places with high transmission rates must reveal their predisposition. An essential reason for initial infections among medical workers was the failure to plan for personal protective equipment. Zhang et al (2020) study indicate that 85 percent of the participants showed that they were afraid of getting infected while working. The negative attitude towards handling patients with the disease emanates from the fact that they must deal with different emergency scenarios. The authors also point out that there was increased fatigue among doctors that might have been related to them working in the ICUs compared to paramedics during the outbreak. The highly experienced healthcare workers with more than five years of practice were less likely to get tired, which shows that they have specific skills and experience in handling public health emergencies.

Zhang et al (2020) found that frontline employees showed high confidence in fighting the virus, unlike non-frontline workers. The encouragement and positive attitude shown by frontline professionals are possible due to the government material and policy support. The government facilitates frontline workers with significant material support and care, which leads to increased confidence while dealing with the pandemic. There is

insufficient knowledge among new and low education attainment healthcare workers in China. Therefore, it is expected that with increased education and training on working in Covid-19 situations, the knowledge and attitudes towards preventing the disease can be increased.

A survey by Bhagavathula et al (2020) gives information about knowledge and perceptions about Covid-19. During early March, alarming cases of the new disease were reported across the world. It forced its announcement as a pandemic. By the end of March 2020, more than 110,000 cases had been confirmed in more than 100 countries. Almost 4000 deaths were reported. Bhagavathula et al (2020) stated that the World Health Organization implemented various online training meetings and resources about coronavirus in different languages to enhance preventive plans. It also raised awareness and conducted healthcare workers' readiness functions. The wrong information about the disease complicated the work and preparedness of healthcare workers, leading to the rapid spread of infections in the hospital setting. The study came up with conclusions about knowledge and beliefs. According to the authors, there were many gaps between doctors and other healthcare workers. The misunderstandings about the virus were varied, with some believing that bats spread it. The group of respondents believing this idea was 65.7 percent of the total participants. More than 85.6 percent of the participants acknowledged that hand hygiene, mouth and nose covering when coughing and being away from the sick could reduce the spread of Covid-19. Most of the doctors interviewed (84%) argued that Covid-19 could cause pneumonia, respiratory failure, and ultimately death. Slightly more than 83.2 percent of them also agreed that supportive care is the single medication that was at that time available. However, Bhagavathula et al (2020) said that the knowledge among

participants regarding questions concerning methods of transmission and incubation span was poor.

Jemal et al (2020) show that more than 78 percent of healthcare professionals showed a positive perception of coronavirus. Many of those who participated in the study (92.7%) understood that infected people should reveal their travel history. Eighty-seven percent indicated that hand washing using soap and water might stop the spread of the virus. A high number of them (84.3%) understood that symptoms of the disease become apparent in two to 14 days of catching the virus. Medical students believed that vaccination against Covid-19 would not be enough to stop the spread of coronavirus. The study done by Bhagavathula et al (2020) shows that knowledge and perception of the disease differed across various groups of healthcare professionals. They concluded that most healthcare workers had limited knowledge of Covid-19 but indicated positive perceptions to stopping the spread of Covid-19 during the initial outbreak. They also established that one-third of healthcare workers rely on government websites for more details about coronavirus, which means that regular government updates about the disease on their websites effectively impact the fight against the virus.

Saqlain et al (2020) surveyed Pakistan healthcare workers about knowledge, attitude, practice, and perceived hurdles between healthcare professionals toward coronavirus. A total of 414 participants took part in the survey, with 120 being doctors, 189 pharmacists, and 105 nurses in Pakistan. The study established that many healthcare workers (93.2%) had reliable knowledge and understanding of the disease. A significantly low number of them had a positive attitude towards the fight against infection, with a mean of 8.43. Good practice was recorded among a large number of participants, 88.7 percent.

In this survey, the source of information also proved crucial, with 87.68 percent of the participants indicating that they have used social media to get information. The findings of this research are consistent with previous studies that have reported a positive contribution of social media in information and knowledge transmission among healthcare workers. Saqlain et al (2020) concluded that there are limitations in certain factors of knowledge and practice that must be looked into through awareness and educational activities. It was also established that healthcare professionals used less reliable sources of information. The researchers recommend that health sectors should offer an effective training policy that focuses on all healthcare professionals so that deterrent and Covid-19 reducing measures can be fully implemented.

Acceptance of COVID-19 vaccine among healthcare providers'

Qattan et al (2021) performed an online questionnaire about the acceptability of a COVID-19 vaccine between healthcare providers in Saudi Arabia. According to the article, vaccines against COVID-19 are finally accessible, and several countries are already reserving supplies of the vaccine, as well as Saudi Arabia. Given the approval of the Pfizer-BioNTech vaccine by the Saudi Food and Drug Authority, the country is planning a phased COVID-19 vaccine distribution. In Saudi Arabia, the COVID-19 vaccine is being prioritized for healthcare providers, the elderly, and patients with chronic and autoimmune disorders. However, any immunization program's efficacy relies on high vaccine acceptability, with public confidence in the vaccine being the significant contributor. Vaccine hesitancy is inherent without such confidence. The article stated that vaccine hesitancy is defined as the refusal or delay in receiving immunization despite the availability of vaccination. As the World Health Organization (WHO) announced, vaccine

hesitancy is one of the ten global concerns. Qattan et al (2021) mentioned in their article that numerous researchers show that healthcare providers might be vaccine-hesitant, and their levels of hesitation could impact public hesitancy and rejection of vaccines.

According to the study results conducted by Qattan et al (2021), 50.52% of the participants were willing to accept the COVID-19 vaccine if it was offered free by the government, whereas 49.48% were unwilling to accept the vaccine. Qattan et al (2021) discovered that approximately 17% of the participants had a history of being infected with COVID-19, and 20.21 had earlier rejected a vaccination advised by a physician. Among the 50.52% who were willing to accept the COVID-19 vaccine, 49.71% wanted to be vaccinated as soon as possible after the vaccine became possible. On the other hand, 50.29% of participants would wait until the vaccine's safety was verified before accepting vaccination. In their discussion, Qattan et al (2021) mentioned that two reasons could describe the low rate of accepting the COVID-19 vaccine between healthcare providers. The first reason is that their article was conducted at the same time when the Saudi government has signed the COVID-19 vaccine. During that time, the spread of false anti-vaccination information on various social media platforms had increased, which may have contributed to the creation of hesitation about the vaccine. The second reason is that the daily confirmed cases in Saudi Arabia started to decrease, which could reduce concerns among healthcare providers and contributed to lower acceptance of the vaccine.

Conclusion

The rate at which Covid-19 has spread and affected human beings is unimaginable. A large number of deaths, currently recorded at 3.34 million people, shows how unprepared the world is to pandemics like this. The various works of literature that were written in 2020 document and provide more information about the disease and how it affected healthcare professionals across the world. As the first line of defense, healthcare workers' understanding, knowledge, attitude, and practices toward the virus are important. Almost all the research done on this subject indicates good knowledge among healthcare professionals about Covid-19. Their attitude varies discriminately according to their previous to this kind of situation, education, and equipment availability. Most studies discussed indicate that there is high adherence to recommended Covid-19 practices. However, there is a considerable lack of research on respiratory therapists' perceptions towards COVID-19 prevention, treatment, and vaccination. Respiratory therapists' perceptions are tremendously important, as they are the healthcare workers who are most commonly treating COVID-19 patients in hospital settings.

CHAPTER III

Methodology

Introduction

In this study, the researcher explored the attitudes, practices, and perceptions towards COVID-19 among RTs in Saudi Arabia. The research was completed employing an online survey posted through social media. The online version of this survey was performed using Qualtrics. This chapter is organized to describe the methods that were used to conduct this research.

Research Questions

The research questions that were investigated in order to help guide the study were:

1) What are the attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?
2) Are there differences in demographics with regards to attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?
3) What is the self-reported vaccine prevalence among RTs in Saudi Arabia?
4) Are there differences in COVID-19 vaccination status and perceived effectiveness among RTs in Saudi Arabia?

Instrumentation

Georgia State University Institutional Review Board (IRB) approved this project. The project's IRB application qualified as exempt research. In order to assess attitudes, practices, and perceptions towards COVID-19, the questionnaire used was a modified

survey based on related articles (Bhagavathula et al., 2020; Lee et al., 2021; Zhang et al., 2020; see also Qattan et al., 2021). The survey included five sections: attitudes, practices, perceptions, and vaccination questions toward COVID-19 and demographics questions. Further, the demographic information from all the participants regarding their experience, age, gender, education level, and type of facility is considered.

Sample

The inclusion criteria included any active RTs in Saudi Arabia who were currently working in public or private healthcare facilities at the time of the survey. Participants were recruited from social media via Twitter and WhatsApp. Qualtrics was used to administer the survey and collect the data. The survey link and recruitment material were posted on Twitter by local popular RTs accounts and some WhatsApp groups for RTs in Saudi Arabia. Exclusion criteria included any non-RTs, RTs not practicing in Saudi Arabia, and current RT students who are not actively practicing yet. The target sample size was 50 participants.

Research Design

The research included an online, cross-sectional survey with 36 questions in Saudi Arabia. The survey was divided into five sections: attitudes, practices, perceptions, and vaccination questions toward COVID-19 and demographics questions.

Data analysis

In the study, SPSS was utilized to analyze the data (version 27). All results of quantitative variables regarding attitudes, practices, perceptions, and vaccination would be described either as mean (M), standard deviation (SD), or frequency (percentage %). Independent samples T-tests were applied to compare male and female groups with each domain's attitudes and practices. One-way ANOVA tests were conducted to assess the differences in attitudes and practices among the other demographics data as well as the differences in COVID-19 vaccination status and perceived effectiveness. Descriptive statistics were used to assess RTs perceptions towards COVID-19 and the self-reported vaccine prevalence among RTs.

Summary

Overall, the methodology aims to assess the level of attitudes, practices, perceptions, and vaccination towards COVID-19 patients among RTs in Saudi Arabia. This chapter presented information on the instrumentation, research questions, population, research design, data collection, and data analysis applied in the study. The instrument assessed four subscales: attitudes, practices, perceptions, and vaccination.

CHAPTER IV

Findings

The purpose of this study was to evaluate attitudes, practices, and perceptions about COVID-19 disease among (RTs) in Saudi Arabia. This chapter provides the results of the data analysis of the survey. Statistical Package for the Social Sciences 27 (SPSS 27) was used to conduct the statistical analyses. This chapter illustrates the findings related to the following research questions:

1) What are the attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?
2) Are there differences in demographics with regards to attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?
3) What is the self-reported vaccine prevalence among RTs in Saudi Arabia?
4) Are there differences in COVID-19 vaccination status and perceived effectiveness among RTs in Saudi Arabia?

Demographic Findings

The demographics data was obtained to present a description of the population, Table 1. The sample included 38 respiratory therapists divided into three education levels: associate's degree (n=2, 5.3%), bachelor's degree (n=32, 84.2%), and master's degree (n=4, 10.5%). The majority of the participants were males, 66 percent (n=25), while the females were 34 percent (n=13). The participants in the study had a mean age of 29.81 (SD ± 6.0). The mean age for participants with an associate degree = 33 (SD ± 4.24), and the mean age for participants with a bachelor's degree = 28.42 (SD ± 5.0). The mean age for participants with a master's degree was 39 years (SD ± 6.58). The mean and S.D. of experience as a

respiratory therapist were (2.24, ±1.26). The respondents who worked in a public hospital were 27 (71.1%), while those in private hospitals were 11 (28.9%). In this study, 32 out of 38 respiratory therapists had previously treated COVID-19 patients in Saudi Arabia. Lastly, all respiratory therapists engaged in the study are registered RTs with the Saudi Commission for Health Specialties.

Table 1. Demographic data among respiratory therapists in Saudi Arabi

Demographics	N (%), Mean (SD)
Gender	
Male	25 (66%)
Female	13 (34%)
Age	29.81 years (6.0 years)
Education Level	
Associate's Degree	2 (5.3%)
Bachelor's Degree	32 (84.2%)
Master's Degree	4 (10.5%)
Experience in the field	
1-2 years	16 (42.1%)
3-4 years	7 (18.4%)
5-7 years	5 (13.2%)
8 or more years	10 (26.3%)
Type of healthcare facility	
Public hospital	27 (71.1%)
Private hospital	11 (28.9%)
Frontline Healthcare Provider	
Yes	36 (94.7%)
No	2 (5.3%)
Treated COVID-19 Patients	
Yes	32 (84.2%)
No	6 (15.8%)

Note. SD=Standard Deviation

Missing data

All participants who completed higher than 80% of the survey were kept since they can be employed for several comparisons.

Findings Related to Research Question 1

The first research question asked, "What are the attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?" Table 2 presents mean scores (M) and standard deviations (SD) of Saudi RTs' attitudes regarding COVID-19 infection control, and table 3 shows the perceptions of respiratory therapists towards COVID-19**,** while table 4 shows mean scores (M) and standard deviations (SD) of Saudi RTs' practices regarding COVID-19 infection control. Higher scores corresponded with a higher agreement to the listed statements. Scores could range between 1-5.

Table 2. Attitudes towards COVID-19 infection control among RTs in Saudi Arabia

Item No.	**Perceived Risk of COVID-19 infection**	**Mean**	**Std. Deviation**
A1	What do you think is the possibility of your COVID-19 infection?	3.58	1.15
A2	If you test positive for COVID-19, how severe do you think your infection would be?	2.62	1.13
Total		3.06	1.0
Efficacy beliefs **To what extent do you think the precautionary behavior is an effective way to reduce the risk of COVID-19 infection?**			
A3	Practicing personal hygiene such as wearing facial masks and hand hygiene.	4.21	1.06
A4	Social distancing such as avoiding crowded places.	3.97	1.15
Total		4.09	1.03

Table 3. Perceptions of Respiratory Therapists towards COVID-19

Perception Statement	N (%)
COVID-19 symptoms appear in 2-14 days	
Yes	35(92.1%)
No	1(2.6%)
Unsure	2(5.3%)
COVID-19 is fatal	
Yes	28(73.7%)
No	3(7.9%)
Unsure	6(15.8%)
Flu vaccinations are sufficient for preventing COVID-19	
Yes	10(26.3%)
No	18(47.4%)
Unsure	8(21.1%)
Sick patients should share their recent travel history with healthcare providers	
Yes	37(100%)
No	0
Unsure	0
Washing hands with soap and water can help in prevention of COVID-19 transmission	
Yes	33(86.8%)
No	1(2.6%)
Unsure	3(7.9%)
The COVID-19 vaccine should be mandatory for all citizens and residents inside Saudi Arabia.	
Yes	31(81.6%)
No	3(7.9%)
Unsure	3(7.9%)

Table 4. Practices towards COVID-19 infection control among RTs in Saudi Arabia

Item No.	Preventive Behavior Practices	Mean	Std. Deviation
In the last week, how often did you practice the followings?			
P1	I wore a facial mask or covering.	4.24	1.05
P2	I washed my hands frequently or used hand sanitizer.	4.53	.86
P3	I avoided visiting crowded places.	3.71	1.03
P4	I carefully removed my personal protective equipment (i.e., contact isolation gown, facial covering, etc.)	4.32	1.01
P5	I participated in a COVID-19 infection control training.	2.95	1.43
P6	I quarantined with members of my household.	2.92	1.34
Total		3.77	0.67

Findings Related to Research Question 2

The second research question asked, "Are there differences in demographics with regards to attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?" Tables from 5 to 9 present mean scores (M) and standard deviations (SD) of the differences in demographics concerning attitudes and perceptions towards COVID-19 infection control between Saudi RTs, while table 10 presents mean scores (M) and standard deviations (SD) of the differences in demographics regarding practices towards COVID-19 infection control among Saudi RTs.

Table 5. Comparing Means of COVID-19 Perceptions by Gender

	Males M (SD) or N (%)	**Females M (SD) or N (%)**	**P-value**
COVID-19 Perceived Risk			
What do you think is the possibility of your COVID-19 infection?	3.56(1.29)	3.62(.87)	.063
If you test positive for COVID-19, how severe do you think your infection will be?	2.88(1.1)	2.15(1.14)	.714
Efficacy- To what extent do you think the precautionary behavior is an effective way to reduce the risk of COVID-19 infection?			
Practicing personal hygiene such as wearing facial masks and hand hygiene.	4.2(1.08)	4.23(1.09)	.585
Social distancing such as avoiding crowed places.	4.08(1.11)	3.77(1.23)	.434
RT perceptions towards COVID-19			
COVID-19 symptoms appear in 2-14 days. Yes No Unsure	 23 (92%) 1 (4%) 1 (4%)	 12 (92.3%) 0 1 (7.7%)	---
COVID-19 is fatal Yes No Unsure	 20 (83.3%) 1 (4.2%) 3 (12.5%)	 8 (61.5%) 2 (15.4%) 3 (23.1%)	---
Flu vaccinations are sufficient for preventing COVID-19 Yes No Unsure	 8 (35%) 9 (39%) 6 (26%)	 2 (15.4%) 9 (69.2%) 2 (15.4%)	---
Sick patients should share their recent travel history with healthcare providers Yes	 24(100%)	 13(100%)	---
Washing hands with soap and water can help in prevention of COVID-19 transmission Yes No Unsure	 21 (87.5%) 1 (4.2%) 2 (8.3%)	 12 (92.3%) 0 1 (7.7%)	---
The COVID-19 vaccine should be mandatory for all citizens and residents inside Saudi Arabia. Yes No Unsure	 21 (87.5%) 1 (4.2%) 2 (8.3%)	 10 (77%) 2 (15.3%) 1 (7.7%)	---

Note. *Significant at $P < .05$

Table 6. Comparing Means of COVID-19 Perceptions by Level of Education

	ASRT M (SD) or N (%)	BSRT M (SD) or N (%)	MSRT M (SD) or N (%)	P-value
COVID-19 Perceived Risk				
What do you think is the possibility of your COVID-19 infection?	2.5(.7)	3.6(1.1)	3.75(1.5)	.40
If you test positive for COVID-19, how severe do you think your infection will be?	1.5(.7)	2.6(1.08)	3.25(1.5)	.21
Efficacy- To what extent do you think the precautionary behavior is an effective way to reduce the risk of COVID-19 infection?				
Practicing personal hygiene such as wearing facial masks and hand hygiene.	4.0(1.4)	4.16(1.11)	4.75(.5)	.568
Social distancing such as avoiding crowed places.	3.5(.7)	3.9(1.2)	4.75(.5)	.33
RT perceptions towards COVID-19				
COVID-19 symptoms appear in 2-14 days.				
Yes	1 (50%)	30 (93.8%)	4 (100%)	---
No	1 (50%)	0	0	
Unsure	0	2 (6.2%)	0	
COVID-19 is fatal				
Yes	2 (100%)	22 (71%)	4 (100%)	---
No	0	3 (9.7%)	0	
Unsure	0	6 (19.3%)	0	
Flu vaccinations are sufficient for preventing COVID-19				
Yes	2 (100%)	6 (20%)	2 (50%)	---
No	0	16 (53.3%)	2 (50%)	
Unsure	0	8 (26.7%)	0	
Sick patients should share their recent travel history with healthcare providers				---
Yes	2 (100%)	31 (15.4%)	4 (100%)	
Washing hands with soap and water can help in prevention of COVID-19 transmission				---
Yes	1 (50%)	29 (93.5%)	3 (75%)	
No	1 (50%)	0	0	
Unsure	0	2 (6.5%)	1 (25%)	
The COVID-19 vaccine should be mandatory for all citizens and residents inside Saudi Arabia.				---
Yes	2 (100%)	25 (80.6%)	4 (100%)	
No	0	3 (9.7%)	0	
Unsure	0	3 (9.7%)	0	

Note. *Significant at P < .05

Table 7. Comparing Means of COVID-19 Perceptions by Experience Level

	1-2 years M (SD) or N (%)	3-4 years M (SD) or N (%)	5-7 years M (SD) or N (%)	8 or more M (SD) or N (%)	P-value
COVID-19 Perceived Risk					
What do you think is the possibility of your COVID-19 infection?	4 (.96)	3.14(1.2)	3.6(1.14)	3.2(1.3)	.24
If you test positive for COVID-19, how severe do you think your infection will be?	2.63(1.0)	2.71(.95)	2(1.2)	2.89(1.4)	.58
Efficacy- To what extent do you think the precautionary behavior is an effective way to reduce the risk of COVID-19 infection?					
Practicing personal hygiene such as wearing facial masks and hand hygiene.	4.25(1.0)	3.86(1.4)	3.8(1.3)	4.6(.69)	.43
Social distancing such as avoiding crowed places.	3.87(1.0)	3.71(1.5)	4(1.2)	4.3(1.1)	.75
RT perceptions towards COVID-19					
COVID-19 symptoms appear in 2-14 days. Yes No Unsure	 14(87.5%) 0 2(12.5%)	 7(100%) 0 0	 5(100%) 0 0	 9(90%) 1(10%) 0	---
COVID-19 is fatal Yes No Unsure	 10(62.5%) 1(6.25%) 5(31.25%)	 6(100%) 0 0	 2(40%) 2(40%) 1(20%)	 10(100%) 0 0	---
Flu vaccinations are sufficient for preventing COVID-19 Yes No Unsure	 3(20%) 7(46.7%) 5(33.3%)	 1(16.7%) 3(50%) 2(33.3%)	 0 5(100%) 0	 6(60%) 3(30%) 1(10%)	---
Sick patients should share their recent travel history with healthcare providers Yes	 16(100%)	 6(100%)	 5(100%)	 10(100%)	---
Washing hands with soap and water can help in prevention of COVID-19 transmission Yes No Unsure	 14(87.5%) 0 2(12.5%)	 6(100%) 0 0	 5(100%) 0 0	 8(80%) 1(10%) 1(10%)	---
The COVID-19 vaccine should be mandatory for all citizens and residents inside Saudi Arabia. Yes No Unsure	 13(81.25%) 1(6.25%) 2(12.5%)	 5(83.3%) 1(16.7%) 0	 4(80%) 1(20%) 0	 9(90%) 0 1(10%)	---

Note. *Significant at P < .05

Table 8. Comparing Means of COVID-19 Perceptions by the Type of Healthcare Facility

	Public hospital M (SD) or N (%)	Private hospital M (SD) or N (%)	P-value
COVID-19 Perceived Risk			
What do you think is the possibility of your COVID-19 infection?	3.67(1.14)	3.36(1.2)	.47
If you test positive for COVID-19, how severe do you think your infection will be?	2.5(1.14)	2.91(1.13)	.33
Efficacy- To what extent do you think the precautionary behavior is an effective way to reduce the risk of COVID-19 infection?			
Practicing personal hygiene such as wearing facial masks and hand hygiene.	4.33(1.1)	3.91(1.0)	.27
Social distancing such as avoiding crowed places.	4(1.2)	3.91(1.0)	.83
RT perceptions towards COVID-19			
COVID-19 symptoms appear in 2-14 days. Yes No Unsure	 26(96.3%) 0 1(3.7%)	 9(81.8%) 1(9.1%) 1(9.1%)	 ---
COVID-19 is fatal Yes No Unsure	 20(77%) 2(7.7%) 4(15.3%)	 8(72.7%) 1(9.1%) 2(18.2%)	 ---
Flu vaccinations are sufficient for preventing COVID-19 Yes No Unsure	 7(28%) 12(48%) 6(24%)	 3(27.3%) 6(54.5%) 2(18.2%)	 ---
Sick patients should share their recent travel history with healthcare providers Yes	 26(100%)	 11(100%)	 ---
Washing hands with soap and water can help in prevention of COVID-19 transmission Yes No Unsure	 23(88.5%) 0 3(11.5%)	 10(90.9%) 1(9.1%) 0	 ---
The COVID-19 vaccine should be mandatory for all citizens and residents inside Saudi Arabia. Yes No Unsure	 22(84.6%) 2(7.7%) 2(7.7%)	 9(81.8%) 1(9.1%) 1(9.1%)	 ---

Note. *Significant at $P < .05$

Table 9. Comparing Means for Experience Treating COVID-19 Patients

	Yes M (SD) or N (%)	No M (SD) or N (%)	P-value
COVID-19 Perceived Risk			
What do you think is the possibility of your COVID-19 infection?	3.59(1.18)	3.5(1.1)	.63
If you test positive for COVID-19, how severe do you think your infection will be?	2.58(1.14)	2.83(1.16)	.79
Efficacy- To what extent do you think the precautionary behavior is an effective way to reduce the risk of COVID-19 infection?			
Practicing personal hygiene such as wearing facial masks and hand hygiene.	4.22(1.1)	4.17(1.17)	.86
Social distancing such as avoiding crowed places.	3.94(1.22)	4.17(.75)	.09
RT perceptions towards COVID-19			
COVID-19 symptoms appear in 2-14 days. Yes No Unsure	 29(90.6%) 1(3.1%) 2(6.3%)	 6(100%) 0 0	---
COVID-19 is fatal Yes No Unsure	 23(74.2%) 3(9.7%) 5(16.1%)	 5(83.3%) 0 1(16.7)	---
Flu vaccinations are sufficient for preventing COVID-19 Yes No Unsure	 9(30%) 15(50%) 6(20%)	 1(16.7%) 3(50%) 2(33.3%)	---
Sick patients should share their recent travel history with healthcare providers Yes	 31(100%)	 6(100%)	---
Washing hands with soap and water can help in prevention of COVID-19 transmission Yes No Unsure	 27(87.1%) 1(3.2%) 3(9.7%)	 6(100%) 0 0	---
The COVID-19 vaccine should be mandatory for all citizens and residents inside Saudi Arabia. Yes No Unsure	 26(83.9%) 2(6.5%) 3(9.6%)	 5(83.3%) 1(16.7) 0	---

Note. *Significant at $P < .05$

Table 10. The Differences in Respiratory Therapy Demographics regarding Practices towards COVID-19 Infection Control

Variables	Mean (SD)	P-value
Gender		
Male	3.68(1.16)	.02
Female	3.94(.38)	
Education level		
ASRT	3.5(.94)	
BSRT	3.78(.70)	.79
MSRT	3.92(.39)	
Experience in the filed		
1-2 years	4.0(.69)	
3-5 years	3.3(.83)	.11
5-7 years	3.9(.3)	
8 years or more	3.69(.53)	
Type of healthcare facility		
Public hospital	3.7(.7)	.30
Private hospital	3.95(.59)	
Frontline healthcare provider		
Yes	3.75(.69)	.40
No	4.2(.24)	
Treated COVID-19 Patients		
Yes	3.8(.65)	.28
No	3.5(.78)	

Note. *Significant at $P < .05$

Findings Related to Research Question 3

The third research question asked, "What is the self-reported vaccine prevalence among RTs in Saudi Arabia?" Table 11 shows the self-reported vaccine prevalence among RTs in Saudi Arabia.

Table 11. Self-reported vaccine prevalence among Saudi RTs

Item No.	Self-reported vaccine prevalence among Saudi RTs		n, (%)
V1	Have you received the COVID-19 vaccine?	Yes No	36 (94.7%) 2 (5.3%)
V2	Why did you not receive the COVID-19 vaccine?	The vaccine is ineffective The vaccine is harmful I do not want to be forced to take the vaccine The vaccine has not been tested thoroughly	1(2.6%) 0 1(2.6%) 0
V3	Which COVID-19 vaccine did you receive?	Pfizer Moderna AstraZeneca Johnson & Johnson Other (Pfizer + AstraZeneca)	27(79%) 0 5(15%) 0 2(6%)
V4	If you received a vaccine that requires 2 doses, did you receive both doses?	Yes No	30(78.9%) 6(15.8)
V5	Have you ever been infected with COVID-19?	Yes No Unsure	14(36.8%) 21(55.3%) 3(7.9%)
V6	Have you ever tested positive for COVID-19?	Yes No Unsure	12(31.6%) 25(65.8%) 1(2.6%)
V7	Have you had a family member that was infected and/or tested positive for COVID-19?	Yes No	31(81.6%) 7(18.4%)
V8	Have you had a friend that was infected and/or tested positive for COVID-19?	Yes No Unsure	35(92.1%) 2(5.3%) 1(2.6%)
V9	Have you known anyone to die from COVID-19?	Yes No Unsure	28(73.7%) 8(21.1%) 2(5.3%)

Findings Related to Research Question 4

The fourth research question asked, "Are there differences in COVID-19 vaccination status and perceived effectiveness among RTs in Saudi Arabia?" Table 12 shows mean scores (M) and standard deviations (SD) of the differences in COVID-19 vaccination status and perceived effectiveness among RTs in Saudi Arabia.

Table 12. The Differences between Vaccination Status and Perceived Effectiveness

The differences between vaccination status and perceived effectiveness	Have you received the COVID-19 vaccine?		If you received a vaccine that requires 2 doses, did you receive both doses?	
	Yes	**No**	**Yes**	**No**
How effective do you think the COVID-19 Vaccine is?	1.97±.81	3.5±.70	1.83±.65	2.67±1.2
	P value= .013		P value= .019	
How effective do you think the vaccine is against the new variants of COVID-19, like the delta variant?	2.5±.94	2.5±2.1	2.3±.79	3±1.4
	P value= 1.0		P value= .095	
If public health officials recommend booster shots of the vaccines for long-term protection against COVID-19, will you receive the booster shots?	1.25±.6	1.0±.000	1.23±.63	1.33±.52
	P value= .57		P value= .717	

Note. * Significant at P < .05, Ranges for Effectiveness Questions are 1- Extremely Effective to 5- Extremely Ineffective, and the Ranges for the Third Question are 1- Yes, 2- No, and 3- Unsure.

CHAPTER V

Interpretation of findings

This chapter will present a discussion of the findings presented in chapter IV. The chapter is divided into six major sections: an overview of the study, discussion of findings, implications for research, recommendations for future research, study limitations, and conclusions.

Overview of the Study

This research aimed to evaluate attitudes, practices, and perceptions about COVID-19 disease and the COVID-19 vaccine among respiratory therapists in Saudi Arabia. The research questions that were investigated in the discussion in order to help guide the study were:

1) What are the attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?
2) Are there differences in demographics with regards to attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?
3) What is the self-reported vaccine prevalence among RTs in Saudi Arabia?
4) Are there differences in COVID-19 vaccination status and perceived effectiveness among RTs in Saudi Arabia?

Discussion of Findings

Findings Related to Research Question 1

The first research question asked, "What are the attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?" The overall results revealed that the participants believe they are at high risk of contracting COVID-19. However, most of the participants believe that their infection will not be severe. This finding was supported by Zhang et al (2020), who asserts that most of the participants confirmed that they were concerned about becoming infected while working. The majority of the respiratory therapists (RTs) reported that precautionary behavior effectively reduces the risk of COVID-19 infection, similar to Bhagavathula et al (2020), who states that most of the participants confirmed that precautionary behavior could limit the spread of Covid-19.

The total result of the perceptions toward COVID-19 showed that the participants had a positive perception of coronavirus. The majority of the participants informed that COVID-19 symptoms appear in 2-14 days (92.1%), COVID-19 is fatal (73.7%), washing hands with soap and water can help in the prevention of COVID-19 transmission (86.8%), and the COVID-19 vaccine should be mandatory for all citizens and residents inside Saudi Arabia (81.6%). Almost half of the participants believed that flu vaccinations are insufficient for preventing COVID-19 (47.4%). All participants confirmed that sick patients should share their recent travel history with healthcare providers. These findings were supported by Bhagavathula et al (2020), who asserts that more than 78 percent of healthcare professionals showed a positive perception of coronavirus.

The total results of the respondents' practice subscales reported reliable practice regarding the COVID-19 and its preventive behavior. This finding is consistent with the results of Jemal et al (2020), who informs that 63.5% of the respondents recorded reliable practice of the COVID-19 and the prevention strategies of the virus, as well as Saqlain et al (2020), who indicates that a large number of the respondents (88.7%) reported good practice towards the disease.

Findings Related to Research Question 2

The second research question asked, "Are there differences in demographics with regards to attitudes, practices, and perceptions towards COVID-19 infection control among RTs in Saudi Arabia?" The total result of the perceived risk of infection and efficacy beliefs subscales toward COVID-19 showed no statistically significant differences in demographics. There was a statistically significant difference (p = 0.045) between RTs' perceptions towards COVID-19 and level of education with the statement, "Washing hands with soap and water can help prevent COVID-19 transmission." The majority of BSRT agreed with the statement. On the other hand, 75% of MSRT agreed with the statement, while only 50% of ASRT agreed. There was a statistically significant difference (p = 0.026) between RTs' perceptions towards COVID-19 and their experience with the statement, "COVID-19 is fatal." All participants with 3-4 years and more than eight years of experience believed that COVID-19 is fatal. There were insufficient participants to conduct analyses in comparing the means whether the participant is a frontline healthcare provider or not. There were statistically significant differences between males and females in practices subscales (p =.020). Females showed more reliable practices (M=3.94, SD=.38) than males (M=3.68, SD=1.16).

Findings Related to Research Question 3

The third research question asked, "What is the self-reported vaccine prevalence among RTs in Saudi Arabia?" Thirty-six participants out of thirty-eight (94.7%) said that they received the COVID-19 vaccine. The reasons that the participants refused the COVID-19 vaccine, whether it was ineffective or did not want to be forced to be vaccinated. These findings were inconsistent with previous studies among healthcare providers. Qattan et al (2021) reported that 50.52% of the participants were willing to receive the COVID-19 vaccine, while 49.48% were unwilling to receive the vaccine. Additionally, Shekhar et al (2021) recorded that 36% of the respondents were willing to take the vaccine, and 56% were unsure or would wait to review more data, while only 8% did not plan to accept the vaccine. The fact that RTs work with COVID-19 patients more frequently may explain their high vaccination acceptance.

Seventy-nine percent of the participants said they received the Pfizer vaccine, and 15% said they had the AstraZeneca vaccine, while 6% declared that they had both Pfizer and AstraZeneca vaccines. Thirty participants out of thirty-six announced that they received two doses of the vaccine. More than half of those surveyed (55.3%) asserted that they had not been infected with COVID-19. The majority of the participants mentioned that they had a family member infected or tested positive for COVID-19 (81.6%) or that they had a friend infected or tested positive for COVID-19 (92.1%). Twenty-eight participants out of thirty-eight confirmed that they knew someone who died as a result of COVID-19.

Findings Related to Research Question 4

The fourth research question asked, "Are there differences in COVID-19 vaccination status and perceived effectiveness among RTs in Saudi Arabia?" There were statistically significant differences (p=0.013) between how effective the participants think the COVID-19 vaccine is and if the participants received (M=1.97, SD=.81) or refused (M=3.5, SD=.7) the vaccine. Participants who received the vaccine believed the vaccines were effective. This finding was supported by the result of Fares et al (2021), who recorded that 56.25% of the participant who accepted the vaccine said that the reason for accepting the vaccine was because they believed it was effective. Also, there were statistically significant differences (p=0.019) between how effective the participants think the COVID-19 vaccine is and if the participants received one (M=1.83, SD=.65) or two (M=2.67, SD=1.2) doses of the vaccine. Participants who received two doses of the vaccine believed the vaccines were effective.

Implications for Research

The findings of this study will allow respiratory therapy departments to evaluate respiratory therapists' attitudes, practices, and perceptions toward COVID-19 disease. This assessment is critical to enhancing attitudes, practices, and perceptions among RTs to provide COVID-19 patients with high quality of care. Additionally, the findings of this research will add to the literature, given that it is the first research investigating attitudes, practices, and perceptions about COVID-19 disease among respiratory therapists in Saudi Arabia.

Recommendations for Future Research

Due to the limited number of studies on this topic, further studies are recommended to examine respiratory therapists' attitudes, practices, and perceptions toward COVID-19 patients in order to face the pandemic. Therefore, it is strongly suggested that the study's assessment instrument be refined to achieve more reliable outcomes on the most effective attitudes, practices, and perceptions toward COVID-19 patients. In addition, replication of the study with larger sample size is recommended to validate the findings presented in this study. Lastly, more studies are required to determine the correlates of negative COVID-19 perceptions and vaccination among high-priority populations.

Study Limitations

Several factors limit the current study. The major limitation of this study was the small sample size that responded to the survey. There is a lack of studies that discusses effective attitudes, practices, and perceptions among respiratory therapists toward COVID-19 patients. As a result, it was difficult to compare the finding of this research to other studies correlated with respiratory therapy due to insufficient research conducted in this area. Lastly, the survey was conducted using social media; as a result, participants may not be RTs or not respond accurately or honestly to avoid representing themselves negatively.

Conclusion

This study is the first study to our knowledge that assessed attitudes, practices, and perceptions about COVID-19 disease among respiratory therapists in Saudi Arabia. The respiratory therapists in Saudi Arabia indicated that they are at high risk of contracting COVID-19, but their infection will not be severe. The study revealed that most respiratory

therapists in Saudi Arabia had positive attitudes, practices, and perceptions toward COVID-19 disease. Respiratory therapists are most often in contact with COVID-19 patients; therefore, their knowledge, attitudes, practices, and perceptions toward the virus are important.

Appendix A: Attitudes, Practices, Perceptions, and Vaccination Questions toward COVID-19 (Survey).

Dear Respiratory Therapist,

This research aims to evaluate the attitudes and practices towards COVID-19 patients among respiratory therapists in Saudi Arabia. Your sincere response is appreciated. We assure you of the confidentiality of the data.

Demographic information

D1. What gender do you identify as?

1. Male
2. Female

D2. What is your age?

_____

D3. What is the highest degree or level of school you have completed?

1. Associate's degree
2. Bachelor's degree
3. Master's degree, professional degree or higher

D4. Are you registered RTs with Saudi Commission for Health Specialties?

1. Yes
2. No

D5. How many years of experience do you have in the field?

1. 1-2 years
2. 3-4 years
3. 5-7 years
4. 8 years or more

D6. What type of healthcare facility do you work in?

1. Public hospital
2. Private hospital

D7. Do you consider yourself a frontline healthcare provider?

1. Yes
2. No

D8. Have you ever treated or worked with COVID-19 patients?

1. Yes
2. No

Attitudes

#	Perceived Risk of COVID-19 infection	Very low		Neither low nor high		Very high
A1	What do you think is the possibility of COVID-19 infection for you?	1	2	3	4	5
A2	If you test positive for COVID-19, how severe do you think your infection would be?	1	2	3	4	5

#	Efficacy beliefs	Not at all effective				Extremely effective
	To what extent do you think the precautionary behavior is an effective way to reduce the risk of COVID-19 infection?					
A3	Practicing personal hygiene such as wearing facial masks and hand hygiene.	1	2	3	4	5
A4	Social distancing such as avoiding crowded places.	1	2	3	4	5

#	Healthcare workers' perceptions towards COVID-19 **Please respond to the following questions to the best of your ability**.	NO	YES
A5	COVID-19 symptoms appear in 2-14 days	1	2
A6	COVID-19 is fatal	1	2
A7	Flu vaccinated is sufficient for preventing COVID-19	1	2
A8	Sick patients should share their recent travel history with healthcare providers	1	2
A9	Washing hands with soap and water can help in prevention of COVID-19 transmission	1	2
A10	The COVID-19 vaccine should be mandatory for all citizens and residents inside Saudi Arabia.	1	2

Preventive Behavior Practices

#	Preventive Behavior Practices	Never	Sometimes	Often	Always
	In the last week, how often did you practice the followings?				
P1	I wore a facial mask or covering.	1	2	3	4
P2	I washed my hands frequently or used hand sanitizer.	1	2	3	4
P3	I avoided visiting crowded places.	1	2	3	4
P4	I carefully removed my personal protective equipment (i.e., contact isolation gown, facial covering, etc.)	1	2	3	4
P5	I participated in a COVID-19 infection control training.	1	2	3	4
P6	I quarantined with members of my household.	1	2	3	4

Vaccination History

1. Have you received the COVID-19 vaccine?
    a. Yes (if yes, skip to question 3)
    b. No (if no, skip to next question 2)
2. Why did you not receive the COVID-19 vaccine (select all that apply)? (After this question, skip to the next section)
    a. I do not think the vaccine is effective
    b. I think the vaccine is harmful
    c. I do not want to be forced to take the vaccine
    d. I do not think the vaccine has been tested thoroughly
    e. Other _____
3. Which COVID-19 vaccine did you receive?
    a. Pfizer
    b. Moderna
    c. AstraZeneca
    d. Johnson & Johnson
4. If you received a vaccine that requires 2 doses, did you receive both doses?
    a. Yes
    b. No
    c. Unsure
5. Have you ever been infected with COVID-19?
    a. Yes
    b. No
    c. Unsure
6. Have you ever tested positive for COVID-19?
    a. Yes
    b. No
    c. Unsure
7. Have you had a family member that was infected and/or tested positive for COVID-19?
    a. Yes

b. No
c. Unsure

8. Have you had a friend that was infected and/or tested positive for COVID-19?
    a. Yes
    b. No
    c. Unsure
9. Have you known anyone to die from COVID-19?
    a. Yes
    b. No
    c. Unsure

Vaccine Efficacy Beliefs

10. How effective do you think the COVID-19 Vaccine is?
    1. Extremely effective
    2. Effective
    3. Neither effective nor ineffective
    4. Ineffective
    5. Extremely ineffective
11. How effective do you think the vaccine is against the new variants of COVID-19, like the delta variant?
    1. Extremely effective
    2. Effective
    3. Neither effective nor ineffective
    4. Ineffective
    5. Extremely ineffective
12. If public health officials recommend booster shots of the vaccines for long-term protection against COVID-19, will you receive the booster shots?
    a. Yes
    b. No
    c. Unsure

Appendix B: Cover Letter

Dear Respiratory Therapist,

You are invited to a research study because you have taken part in fighting the COVID-19 pandemic. This research aims to evaluate the attitudes and practices towards COVID-19 patients among respiratory therapists in Saudi Arabia.

Rayan Almadni is conducting this research study as part of the requirements of the master's degree in respiratory therapy from the Department of Respiratory Therapy at Georgia State University, under the guidance of Dr. Rachel Culbreth.

Although there will be no direct benefit to you from participating in this study, the information gathered will aid respiratory therapists in determining and evaluate which attitudes and practices are most beneficial in fighting the COVID-19 pandemic.

If you choose to participate, you will be required to complete the following survey, which should take no more than 10 minutes. Your participation is entirely voluntary, and you may refuse or discontinue taking the survey at any time without penalty or loss of benefits to which you are otherwise entitled.

Please note that your responses are used exclusively and entirely confidential for research purposes. To protect your privacy, no names or codes will be used to identify you or your survey.

Your completion and submission of the survey constitute your agreement to take part in the study. We look forward to the completion of your survey. However, you may withhold at any time by not completing or sending a blank survey if you decide not to participate in this study.

The information from this study may be published in journals and presented at professional meetings. This study does not cost the participant in any way, except the time spent completing the survey.

If you have any questions about this research, now or in the future, do not hesitate to contact Rayan Almadni at ralmadni1@student.gsu.edu or Dr. Rachel Culbreth at rculbreth@gsu.edu. The department's mailing address can be found at the bottom of this page. You may also contact the Georgia State University. Please note: Completion and submission of this survey imply that you have read this information and consent to participate in the research. You may skip questions or stop taking part at any time.

Sincerely,

Rayan Almadni

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