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Comprehensive analysis on COVID-19 and emergency department resource management: A Saudi Arabia perspective

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Abstract---The pandemic of 2019, coronavirus disease 2019 (COVID-19), resulted in substantial challenges within an entire generation worldwide. The ultimate and extent of the effect of this pandemic on the health of the general public, global economies, societal unity, and daily life is still not known. The uncertain behavior of the extent of this virus has led to great uncertainty in societies. This just keeps on developing as our knowledge develops regarding the nature of this virus and its characteristics with community responses. The current study has been framed with objectives of analyzing the influence and effects of the COVID-19 pandemic on individuals, society, hospitals and healthcare systems, and the mental health of people in Saudi Arabia. The study has also involved the analysis of difficulties faced in managing the COVID-19 pandemic with reference to supply chain management during the COVID-19 pandemic. We reviewed the previously published literature from various scientific websites to collect the desired data. In this Special Issue devoted to management of department resources for crisis and the COVID-19 pandemic, we plan to provide an outline for a better understanding of what COVID-19 means for emotional well-being administrations in the Kingdom of Saudi Arabia. This study also includes how the emotional well-being impacts of COVID-19 stretch to pretty much every component of society. The desire for fast progress and administrative development or improvement is clear, and it gives us hope that, if we work together, we can have a big impact on the emotional health of the population in the coming months and years.

Keywords---coronavirus, economy, healthcare, pandemic, saudi arabia, supply chain management.

Introduction

Coronaviruses are re-emerging infections that have created significant issues in both humans and animals [1]. The significant coronavirus infections that have caused a huge impact on the human world include three pandemics such as the severe acute respiratory syndrome (SARS); the Middle East Respiratory Syndrome (MERS); and the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) during the years 2002 to 2003, 2012, and 2019, respectively. On comparing these three significant infections, a highly negative impact has been caused by coronavirus disease 2019 (COVID-19), which was caused due to SARS-CoV-2[2–4] On March 11th, 2020, COVID-19 has been declared as a pandemic by the World Health Organization (WHO). According to the Centre for Disease and Control Prevention, the infective agent of COVID-19 is the seventh member of the coronavirus family discovered so far. The coronavirus affects the respiratory system, nervous system, and gastrointestinal systems of the human body [5].

Saudi Arabia, a West Asian country with a 35.3 million population, has been reported to have its first COVID-19 case on March 2nd, 2020 [6]. Followed by the first case, the pandemic spread rapidly, leading to the suspension of all social activities in Saudi Arabia within six days. After the suspension of social activities, the Saudi Arabian government requested 10 million USD from the WHO to provide medical care to its citizens. Individuals, families, and societal organizations in Saudi Arabia reacted with anxiety as the COVID-19 virus quickly spread throughout the country. As a result, adjustments were made to strategies and preventive measures, including welfare and relief efforts [7]. It is estimated that COVID-19 has infected around 200 different locations in Saudi Arabia. Hence, the kingdom was incapacitated for some time, but it was eventually brought under control by medical and legal action. Not only was there a smaller gap between infection and recovery, but there was also a smaller fraction of global infection, recovery, and mortality as a result of this [6].

The present literature review has been aimed at assessing the management of resources of the emergency department during the COVID-19 pandemic in Saudi Arabia. We have analyzed the literature to determine the impacts of COVID-19 on the health and business of the individuals in Saudi Arabia, followed by the management of resources in the hospitals and health care clinics during the COVID-19 pandemic in Saudi Arabia. The supply chain management and its involvement during the COVID-19 pandemic have also been analyzed in our current study.

COVID-19 in Saudi Arabia

Statistics of COVID-19 in Saudi Arabia

Khan et al. [8] have reported that Saudi Arabia tops the Gulf countries in terms of COVID-19 infection, even though the country has followed various restrictions since 2020. As of February 2021, a 97.6% recovery rate with a 1.7% mortality rate, suggesting a prevalence rate of around 0.7%.. The daily recovery rate were lower than newly infected cases during the starting stages (i.e., March and April 2020). This is the reason for a bigger increase in showing negative recovery-reported case statistics [6]. As per WHO reports, till date (August, 2022), COVID-19

infects 23340 per one million people in Saudi Arabia with a mortality rate of 266 per one million.

The impact of COVID-19 on the health and healthcare system

The health sector of all countries, from developed to underdeveloped, has been adversely affected by the COVID-19 pandemic during the years 2020 to 2022. The third of the 17 Sustainable Development Goals is centered on improving people's health (Ensure Healthy Lives and Promote Well-being for All at All Ages) [9]. It is not possible to estimate how long the current pandemic will last. The results of the epidemic and where it will end up are still unknown. Every one of the sustainable development goals is being affected in some way. Given the linked nature of these issues, the health-related sustainable development goal 3 is also adversely affected [10].

Functional health systems are essential for any individual, community, society, or country, not only for people's physical and mental well-being, but also for increasing overall economic productivity and human development. By their very nature, preventative, curative, rehabilitative, restorative, and health-promoting roles, as well as health-promoting roles, health systems play a role in all of these aspects of health. The requirement for a high-quality and fully functional healthcare system is ongoing, and it is not time-dependent or temporary in nature. Anything that makes it hard to get high-quality services is not only bad for people's health, but it also has the potential to cause people to die and cause big financial losses. As a response to the COVID-19 outbreak, numerous actions have been taken to reduce the number of hospital-acquired illnesses and better distribute the limited resources available in hospitals, particularly intensive care unit beds and ventilators. During this crisis, tertiary hospitals in Saudi Arabia put in place a number of protocols. The authors of this review list those protocols and talk about how they were put into place.

The COVID-19 epidemic has caused a shift in the priorities of the health system, which is not only finding itself to be overburdened but also finding that it has a reduced capacity to provide the services that it has up to this point been offering to communities. The disruption of logistics and supply, in particular of materials and equipment that were imported up to this point (active pharmaceutical ingredients of important pharmaceuticals, safety equipment, to name a few examples), has a severe effect on the provision of services. Other patients who have acute or chronic illnesses are finding it difficult to receive standard care as a result of hospitals and other health facilities that are swamped with COVID-19 patients. Concurrently with the fight against the COVID-19 pandemic, the national authorities need to make preparations for difficulties concerning the health of the population. The requirements of children, women, older people living with noncommunicable diseases, and those with specific needs should be addressed in critical areas that may be given priority.

The view of Saudi Arabian people on COVID-19 vaccination

Despite acceptance, hesitancy towards vaccination was higher among the citizens. Al-Mohaithef et al. [11] conducted a survey to predict the COVID-19 vaccine

acceptance rate among the Saudi Arabian people. The study has reported that around 64% of people were positive towards accepting the vaccination based on its availability. Vaccine acceptance was also found to be positively associated with marital status and being over the age of 45. In yet another piece of research conducted by Al-Zalfawi et al., the population of Saudi Arabia was polled about their knowledge of vaccines, their feelings about getting vaccinated, and their thoughts on the COVID-19 vaccine. This was a questionnaire-based survey, and the study has reported that the people of Saudi Arabia are aware of the COVID-19 vaccination; however, they were observed to exhibit a fearful nature when it came to accepting the vaccine due to a lack of scientific evidence, which seems reasonable [12]. A cross sectional study by Al-Hanawi et al. [13] has reported the similar results stating that the Saudi Arabian population are highly aware of COVID-19 and vaccination and positive attitude towards vaccine was also reported to be higher in average. Based on gender and age analysis, women and adults had higher knowledge than men and younger individuals.

Saudi Arabian Population and COVID-19 pandemic

A study by Lodha and De Sousa [14] found some definite evidence of COVID-19-related health problems, but it is only preliminary and must be validated by carefully planned longitudinal studies. Most population surveys show that COVID-19 is associated with signs of depression, anxiety, and stress. These feelings are caused by psychosocial stressors like disruptions in daily life, fears of getting sick, or worries about bad financial consequences. There have been reports of phobic anxiety, panic buying, binge-watching TV (which has been linked to less self-control, fatigue, trouble sleeping, and mood changes), and spending a lot of time on social media (which has been associated positively with an increased chance of stress and depression).

Alkhamees et al. [15] have studied the impact of COVID-19 on the people of Saudi Arabia. The study was conducted as an online-based survey due to fear of COVID-19. The researchers analyzed around 1160 individuals from the general population of Saudi Arabia and have reported that nearly 25% of the population involved in the study exhibited moderate-to-severe psychological impacts like stress, depression, etc., Among the respondents, around 12% belonged to the medical field, whereas 28% had first-degree relatives in the medical field, and their depression and anxiety levels were higher than the rest of the participants. Female were reported to be more prone to anxiety and stress related conditions during the COVID-19 pandemic, comparatively than male.

A study was conducted by Siddiqui et al. [16] to analyze issues among the Saudi Arabian population and foreign nationals residing in Saudi Arabia in terms of understanding COVID-19 disease and practicing preventive measures. The Saudi Arabian peoples' and non-Saudi nationals' understanding of the disease, COVID-19 and its impact on their social behavior in practicing preventive measures against COVID-19 has been investigated. The reaction of Saudi Arabian residents towards the strategies and safety precautions taken by the government for eradicating the transmission of COVID-19 were also studied. As per the obtained results, the study have reported that understanding COVID-19 and practicing preventive measures are significantly associated. But, the strength of association

was relatively weak. It was discovered that COVID-19 understanding and practicing preventive measures were carried out in a different manner across the five regions of Saudi Arabia. The literacy level of the respondents had an impact on the practice chosen to prevent COVID-19. This study added to the existing body of knowledge by looking at how knowledge and practice relate to each other and how they can be used to stop COVID-19 in the Saudi population.

Despite the fear of COVID-19 and its faster transmission, the treatment for cancer patients in military hospitals in Saudi Arabia remained intact. However, the number of patients diagnosed with cancer admitted during the COVID-19 pandemic was lower than usual [17]. As the social lives were found to be negatively impacted by COVID-19 pandemic due to a historical lockdown for more than a year, a study by Sagat et al. [18] was aimed at evaluating the effects of quarantine due to COVID-19 on various aspects of individuals. This study focused on factors such as the intensity of low back pain, the prevalence of back pain, and its associated factors. It was an analytical cross-sectional study. The findings of this study have reported that the prevalence has reached a significant increase during COVID-19 quarantine in both males and females at the age of 35 to 49 years, predominantly. The levels of stress before quarantine and after quarantine were found to be significantly varied between the individuals in Saudi Arabia. People in Saudi Arabia as a whole were said to be much more stressed out after being in quarantine.

The COVID-19 has also been reported to have a negative impact on clinical practitioners in Saudi Arabia. The individuals were observed to have deteriorated in terms of health and mental peace during the beginning stages of the COVID-19 pandemic. A study by Alhasan et al. has also reported a negative impact of COVID-19 on the educational systems and healthcare sectors, as well as the individual well-being of the people and clinical practitioners in Saudi Arabia [19]. Another cross-sectional study conducted by Almufarrijiet al. [20] has reported the impact of COVID-19 on neurosurgery clinical practitioners in Saudi Arabia. The study has stated that surgical skills of the neurosurgeon residents may be affected by an extended pandemic [21], and a negative impact was observed on the training period, mental health, academics, and recruitment of new residents [22]. Another online mode of survey conducted on the autism spectrum disorder individuals of Saudi Arabia by Alhuzimi et al. [23] as demonstrated that the COVID-19 pandemic has adversely affected the mental health of the parents and caretakers of autism spectrum disorder individuals. This study has also added that parental stress and emotional well-being have to be taken into account during pandemic situations since autistic spectrum disorder children exhibited aggressive behavior as their daily routines were modified due to quarantine and lockdown across the country.

Management of resources in healthcare units

Even before the first case was reported, Saudi Arabia was one of the countries which primarily took preventative measures to lessen the effects of COVID-19. This was accomplished by putting into place early precautionary measures, which allowed for the application of lessons learned from previous significant pandemic outbreaks, such as MERS and SARS, which are both coronaviruses. There are a

few different hypotheses that could explain why only two organizations are in direct authority over this emergency at this time. To begin with, the Saudi healthcare system is well-established politically, implying that irrelevant organizations find it difficult to easily penetrate the regulations and guidelines [24].

Furthermore, the culture of the organization is based on the system of public interpersonal communication, which is the strategy by which individuals in Saudi Arabia individually procure the beliefs, principles, and perceptions of the culture in which they find themselves. It makes sense that these behaviors are learned through experience in certain social and cultural settings [25]. The Ministry of Health (MOH) has, in conjunction with the "Saudi Center for Disease Control," released a guide and health education materials related to COVID-19 in various languages. The goal of these initiatives is to provide all citizens, both Saudi and non-Saudi, with information regarding scientific facts and preventative measures. This early involvement of the public in prevention and control measures, as well as efforts to counter claims and false information, have both been greatly expanded [8]. The requirements of patients were prioritized in Saudi Arabia's healthcare system, despite the existence of potential negative financial effects [25].

The aftermath of COVID-19 has had an effect on each and every economical aspect of almost all the countries globally. The healthcare sector was one of the adversely affected aspect, which has been confronted with numerous challenges while dealing with and respond to the pandemic. The failure of healthcare facilities all over the world to adequately prepare for their challenges was a significant factor that contributed to those challenges. Personal protective equipment, commonly known as PPE, was in short supply for healthcare personnel in numerous circumstances [26]. The spread of COVID-19 has been mitigated and controlled thanks to the stringent measures implemented by Saudi Arabia. In addition to imposing a curfew, these measures include the suspension of travels both in domestic and international modes, the change of schools and universities to a remote learning format, the implementation of social distance at workplaces, and the imposition of a curfew [27]. The execution of this temporary quarantine system led to a reduction in the level of participation demonstrated by the community members in clinical activities.

Throughout the course of the pandemic, the kingdom of Saudi Arabia has faced a number of difficulties. However, it has been able to take some precautions in order to mitigate the pandemic's effects. The protective and preventive measures including setting up of COVID-19 healthcare centers, providing free treatment and health care, making sure that there are fever clinics in all cities, public and private hospitals, and making sure that these places are set up in a way that only allows them to treat people with COVID-19 symptoms [28,29]. The success in enhancing the quality of healthcare policies, content, context, and processes is associated with a number of different factors [30].

A study has reported that practitioners in clinical field as well as other health care providers were well aware of the management of COVID-19 pandemic situation. Even though, various difficulties were faced by the health care providers and clinical practitioners at the beginning stages of COVID-19 pandemic, the plans for risk managements as well as controlling and preventing

the infection was found to be significantly appreciable among them. During the pandemic control, most of the hospitals (≥88%) in Saudi Arabia were having the isolation units for COVID-19 infected patients. The government also took lot of initiatives like providing booklets on precautionary measures against COVID-19 as well as by involving the general public in disease prevention activities in order to exclude the false information [31].

A study was conducted by Alsharif [32] in Saudi Arabia to investigate the National eHealth Strategy in managing the pandemic situations and have provided relevant suggestions as well. It was a questionnaire-based survey involving 316 professionals from the health care field from five different hospitals of Saudi Arabia. Based on the findings, the study reported that eHealth framework of Saudi Arabia has been lacking few important aspects like data management, awareness creation among public, decreasing access and reachability etc. As per the reports of Areej AlFattani et al. [33] Saudi Arabia's response to COVID-19 could provide a paradigm for better practices in dealing with the COVID-19 pandemic. The country took the WHO-recommended "whole-government" approach to controlling the COVID-19 pandemic. The Saudi population's extensive efforts, combined with increased awareness on COVID-19, helped decline the frequency and severity of illnesses, as well as the fatality rate of the coronavirus. Some of the most difficult difficulties the country has encountered have been the removal of slums, the ongoing demand for supplies in the healthcare sector, and balancing the impact of COVID-19 limits while keeping the government running.

Economic ramifications

The pandemic is anticipated to produce a deficit of 3.3 trillion dollars in 2020, which is equivalent to around 15% of the United States' gross domestic product. COVID-19 was estimated to be the third largest cause of mortality in the United States in 2020 [34]. The World Bank anticipates that the world economy will decrease by almost 8%, with poorer nations suffering the impact more strongly, while the world economy of around two trillion dollars is expected to be declined by the year 2022 as per the reports of United Nations [35]. It appears that workers with lower incomes were disproportionately affected by COVID-19. In a similar way, it seems like people of certain races and ethnicities have been affected more than Caucasians. Even though Saudi Arabia topped among the COVID-19 infected countries, various healthcare measures were taken by the Saudi Arabian government. The government has implemented a number of preventative measures in an effort to curb the spread of the sickness, one of which is providing free vaccinations to everyone older than 12 years old [36].

Supply chain management during COVID-19

The pandemic caused by COVID-19 has disrupted global supply networks, which has an effect on local inventory management. The limited availability of personal protection equipment has been the subject of a various studies in the past years. Despite this, there was a lack of available data regarding the extent to which this crisis disrupted other areas of the health care industry. A study by Alajmi et al. has studied about the scarcity of supply chain management and laboratory equipment during the COVID-19 pandemic. The backup supply, the recovery

plan, and the emergency and catastrophe agreement coverage were the processes that mitigated risk the most effectively. The majority of the organizations (more than half) claimed that they had mature resilience measures. As a result of this, we are forced to draw the conclusion that the laboratory and supplier inventory management, as well as the supply chain management, in Saudi Arabia had appropriate resilience processes. These steps worked well to keep the effects of the pandemic from being too disruptive, and they had a moderate effect on how the lab worked [37].

There were shortages of personal protective equipment even in the United States, a country widely known for having a healthcare system that appears to provide seemingly limitless access to medical supplies. Nearly 15% of practitioners revealed that they were unable to access N95 face masks; over 20% of practitioners mentioned that they were unable to access gloves; approximately 12% of practitioners disclosed that they were unable to access face masks; and approximately 50% of practitioners reported that they had no access to full suits or gowns. In addition, over 7% of physicians indicated that they were compelled to treat COVID-19 patients even without appropriate personal protective equipment, and over 80% claimed that they reused portions of their personal protective equipment [38].

A case study in Saudi Arabia by Alhanoufet al. [39] has reported the impacts on food supply chain by COVID-19 pandemic. The COVID-19 has negatively affected the food supply chain by increasing the food demand and decreasing the food supply. Transportation by sea, air, and land, as well as the distribution of food to retailers, wholesalers, and consumers, have all been impacted as a result of the limitations imposed by various governments. Additionally, items and money flows have been impacted because of the curfews [40]. In light of the fact that Saudi Arabia is concerned about maintaining the continuity of its food supply chain while simultaneously mitigating the negative effects of the pandemic, the country has already implemented a number of strategies for achieving sustainability and overcoming the negative effects of the pandemic. The nation has been able to pull through this difficult time because of the efforts that have been put toward achieving the goal of food security as one of the sustainability development goals in Vision 2030. To make sure that its food supply chain will work in the long run, Saudi Arabia plans to work toward setting up an optimal food supply source by encouraging international agricultural investment and setting up direct strategic partnerships with other countries. A recent study by Moosaviet al. [41] have reported a novel strategy involving simulation-based assessment for the supply chain management during COVD-19 pandemic. The study has indicated that currently available supply chain frameworks and designs are vulnerable to disruption severely due to its complexity. Hence, the supply chain system needs to be modified accordingly to withstand the pandemics like COVID-19.

Conclusion

Based on the available literature, we report that the COVID-19 pandemic has had negative impacts on all fields of humankind. The pandemic caused by COVID-19 is having a significant effect on healthcare systems all over the world, and the system of Saudi Arabia is no exception. A streamlined and effective healthcare

template is needed in order to effectively manage a pandemic like COVID-19. One of these frameworks should be able to be used to manage a wide range of health care services by combining different parts of health care and working with all relevant stakeholders.

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