

REVIEW

Why is Pakistan vulnerable to COVID-19 associated morbidity and mortality? A scoping review

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Summary

The scoping review was undertaken to outline the vulnerabilities of Pakistan's public health and healthcare system, which put the population at increased risk of coronavirus disease 2019 (COVID-19) associated morbidity and mortality. The major electronic databases were searched using both "text words" and "thesaurus terms," focusing on viral infections, COVID-19 and healthcare systems in Pakistan. The content of the selected articles was analyzed by using thematic approach. Out of the total 171 potentially relevant citations, 24 articles were included in the data synthesis. We found that the recent COVID-19 outbreak is a major threat to Pakistan's public health and healthcare system, and the country is not in a position to control spread of disease and provide required standards of care deemed necessary by the World Health Organization. A number of intertwined reasons that expose the Pakistani population at increased risk of COVID-19 associated morbidity and mortality, include public related demurrals, healthcare workforce related demurrals, organizational and regulatory voids, and travel patterns. To cope with the upsurge of COVID-19 in Pakistan, the regulators need to re-examine and recognize deficiencies in the healthcare system, and thereafter reinforce core capacities in workforce and monetary resources, surveillance, laboratory

ABBREVIATIONS: AIDS, acquired immunodeficiency syndrome; CDC, Center for Disease Control and Prevention; CoVs, coronaviruses; FE&DSD, Field Epidemiology and Disease Surveillance Division; IHR, International Health Regulations; MERS, Middle East Respiratory Syndrome; SARS, Severe Acute Respiratory Syndrome; SARSCoV-2, Severe Acute Respiratory Syndrome Coronavirus 2; SOP, standard operating procedure; WHO, World Health Organization.

services, and hospital preparedness for isolation and ventilation of patients.

KEYWORDS

coronaviruses, COVID-19, healthcare system, Pakistan, SARSCoV-2

1 | BACKGROUND

The emergence and reemergence of human coronaviruses (CoVs) has always triggered a new global threat.¹ In the 1960s, Tyrell and Bynoe identified the first CoV (named B814) in human tracheal organ cultures.¹ Broadly distributed CoVs are enveloped single-stranded RNA viruses with a characteristic “halo appearance” (i.e., a corona on electron microscopy). Since their first identification, CoVs have been graded into four subgroups: alpha, beta, delta and gamma.² Among these, alpha and beta CoVs are known to infect humans. The alpha coronavirus subgroup comprises of 229E and NL63, and the beta coronavirus subgroup includes OC43, HKU1, Severe Acute Respiratory Syndrome (SARS)-CoV and Middle East Respiratory Syndrome (MERS)-CoV. Four human CoVs (i.e., HCoV-229E, HCoV-OC43, HCoV-NL63 and HCoV-HKU1) are endemic in humans and are primarily related to moderate, self-limiting respiratory diseases. In comparison, SARS-CoV and MERS-CoV are zoonotic in origin and cause severe respiratory syndromes and pose a considerable threat to humans with their high mortality rates.³

In relation to CoVs, an outbreak of atypical pneumonia was first emerged in China in 2002 before spreading to 29 countries/regions in 2003. The disease was named SARS,⁴ and the causative agent was identified as a completely novel CoV, termed SARS-CoV.⁵ A total of 8098 patients were affected worldwide with a case fatality rate of 9.6% (774 deaths).⁶ Nearly, a decade after the SARS outbreak, another deadly MERS-CoV appeared in the Arabian Peninsula that caused severe viral pneumonia (i.e., MERS), and about 35% patients succumbed to MERS-CoV.⁷ Once again in December 2019, an outbreak emerged as a mysterious cluster of respiratory illnesses in Wuhan City, Hubei Province of China.⁸ The Chinese Center for Disease Control and Prevention (CDC) confirmed within a week that the latest outbreak is attributable to a new CoV and temporarily named it as “2019-nCoV.”⁹ On 11 February 2020, the International Committee on Taxonomy of Viruses named the virus as severe acute respiratory syndrome coronavirus 2 (SARSCoV-2), and the World Health Organization (WHO) named the disease caused by this virus as COVID-19.¹⁰ On 11 March 2020, considering the worldwide spread and death associated with COVID-19, the WHO categorized the disease as a pandemic. As of 25 May 2020, worldwide, a total of 5 307 298 confirmed cases of COVID-19 (mortality in 342 070 cases) have been documented by the WHO.¹¹

To date, there is a lot of ambiguity about various aspects of COVID-19, including epidemiology, transmission, clinical manifestation, pathophysiology and prevention and management. According to the reports, the clinical presentations in the confirmed cases of COVID-19 were very close to SARS-CoV and MERS-CoV infections.^{8,12,13} The median time from the onset of symptom to first hospital admission was 7 days, and to the intensive care unit admission was 10.5 days.⁸ The common symptoms at the onset of illness were fever, cough and myalgia or fatigue followed by less common symptoms, that is, sputum production, headache, haemoptysis and diarrhoea.^{8,12,13} Shortness of breath and breathing difficulties occurred in 55% of the patients.⁸ The consequences of infection were not limited to common respiratory symptoms but severe outcomes included pneumonia, acute respiratory distress syndrome, acute cardiac injury, secondary infections, kidney failure and death.^{8,13} According to the United States (US) CDC and the WHO, the best way to prevent the infection is to avoid being exposed to this virus and minimizing person-to-person spread.^{14,15} The management of COVID-19 patients relies on early detection, prompt isolation and initiation of effective infection prevention and control measures; delivery of symptomatic care for those with mild illness and optimized supportive care for those with severe disease.¹⁶ In this regard, the healthcare system and financial stability of nations plays a crucial role in achieving the required standards of prevention and management

strategies. Recently, the WHO has alarmed that the increase of COVID-19 cases from the Eastern Mediterranean Region is of great concern due to a number of deficits in their healthcare systems and financial instability.¹⁷

Pakistan is a low- and middle-income country that has been recently ranked 152th out of 189 countries with a Human Development Index value of 0.560.¹⁶ The country encountered a variety of healthcare challenges in last several decades and endured a great deal from many epidemics that had devastating effect on people in terms of morbidity, mortality and economic burden.^{18,19} In 2017, lower respiratory tract infections and tuberculosis were among the top causes of mortality in Pakistan.²⁰ Whereas, the majority of the pediatrics died from acute respiratory infections, diarrhea and sepsis in 2013.²¹ Due to failure to attain good healthcare standards, Pakistan has become a reservoir for infectious diseases, and thousands of people have succumbed to viral epidemics such as polio, acquired immunodeficiency syndrome (AIDS), measles, dengue, hepatitis and so forth (Figure 1).^{12,22-27} The dilemma could be gauged by the reemergence of polio virus in Pakistan, which has been exterminated, elsewhere.²²

Similarly, the unprecedented COVID-19 outbreak poses significant threat to Pakistan owing to a number of reasons. In Pakistan, the first case of COVID-19 was confirmed on 25 February 2020.²⁸ As of 25 May 2020, the number of confirmed cases surpassed 56 349, with 1167 fatalities.²⁹ Considering the upsurge of the confirmed cases and deficits in the healthcare system, the disease is expected to spread like wildfire across the country. On 23 April 2020, the WHO warned the Pakistani government that the country is at an increased risk of COVID-19 associated mortality and morbidity, if no appropriate counteractions are taken to curb the infection.³⁰ We undertook this review to outline the shortcomings of Pakistan's public health and healthcare systems, which place the population at increased risk of COVID-19 related morbidity and mortality. The policy makers may take benefit of our findings to avert the anticipated agony associated with COVID-19 as well as future infectious outbreaks.

2 | METHODS

2.1 | Design

We carried out a scoping review of literature informed by the methodological framework of Arksey and O'Malley.³¹ The five step framework involves (a) identifying the research question; (b) searching for relevant studies; (c) selecting studies; (d) charting the data and (e) collating, summarizing and reporting the results. Even though, the scoping review has a lot of

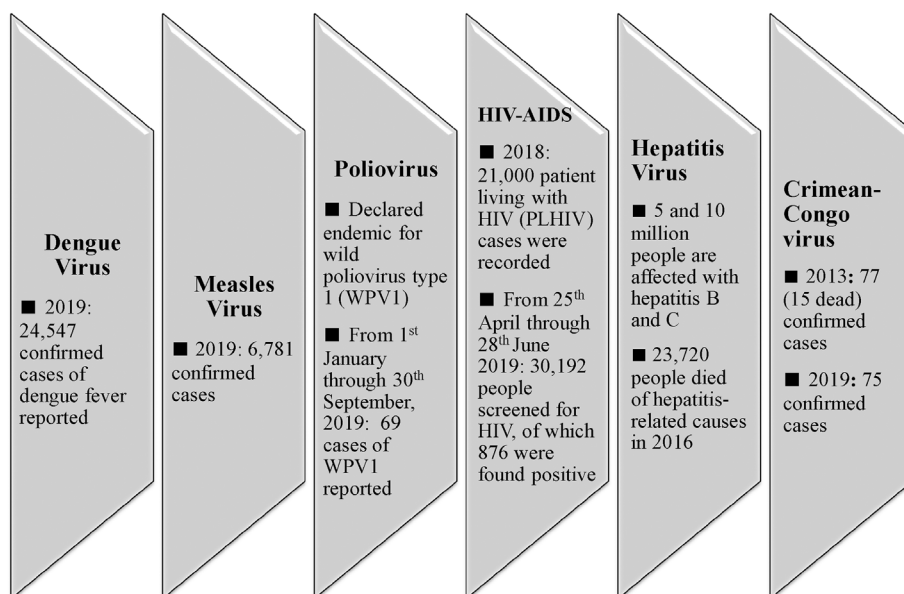


FIGURE 1 Most recent trend of emerging and reemerging viral infections in Pakistan

things in common with a systematic review, quality assessment is not necessary and the findings are generally published in a narrative format.³² This approach enabled us to gain an overview of the breadth of literature in a developing field, especially where an area such as COVID-19 is new and has not been comprehensively synthesized earlier.³¹

2.2 | Search strategy

The major electronic databases, that is, Embase, EconLit, Google Scholar, Medline, PubMed, ProQuest, Scopus, Springer Link and Science Direct databases, were searched using both “text words” and “thesaurus terms,” focusing on viral infections, COVID-19 and healthcare system in Pakistan. The references of selected papers were also examined to identify relevant literature. We also screened the databases of leading organizations, such as CDC, the WHO and so forth. The commentaries, editorials, perspective articles and book chapters were also included because of the limited data published in scientific journals. As provided in the flow diagram (Figure 2), the initial literature search resulted in 171 potentially relevant citations. Of these, 33 duplicates were detected in Endnote and were omitted. Out of the 138 remaining articles, 73 were excluded based on abstracts being irrelevant. Subsequently, 65 studies were carefully examined, and 44 articles were excluded at this stage for failing to present pertinent information. In the final grouping, 24 articles were selected for this review.

2.3 | Data extraction and analysis

The information emerging from the literature was classified using a purpose-designed data extraction tool. Each record outlined the existing information about the vulnerabilities of Pakistan's public health and healthcare systems.

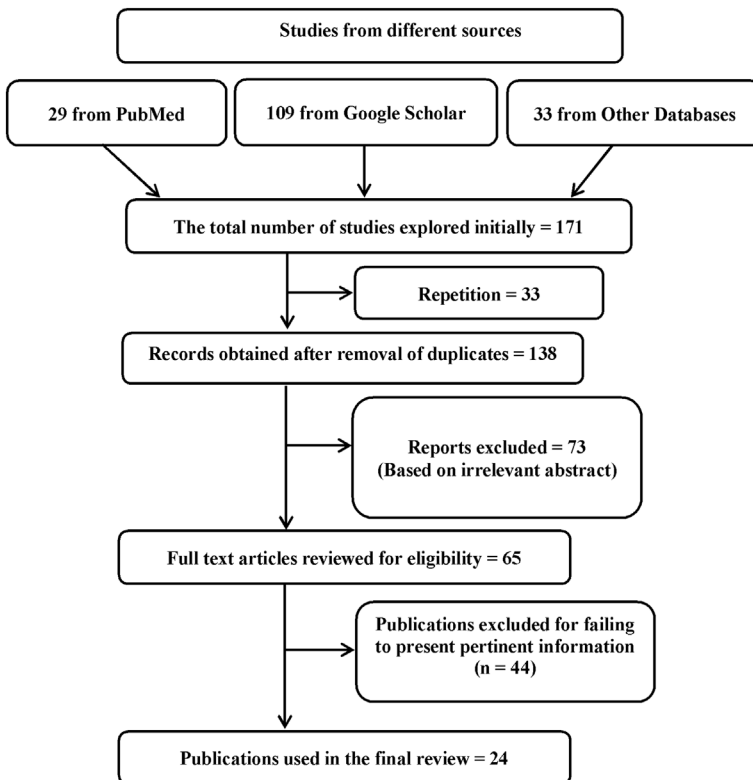


FIGURE 2 Flow diagram

The entered data were summarized, rechecked and charted using a data sheet. The content of the articles was analyzed by using thematic approach³³ and presented as a set of themes representing our key focus. The author name, year of publication, article type and vulnerabilities retrieved from articles are provided in Supporting Information File 1.

3 | FINDINGS AND DISCUSSION

Following the thematic approach, a total of four themes emerged. All themes summarized information about the vulnerabilities of Pakistan's public health and healthcare systems. Our assessment showed that the country is not in a position to provide required standards of care due to many intertwined reasons. These include, community and healthcare workforce related demurrals, organizational and regulatory voids and travel patterns. Fishbone diagram (Figure 3) was also created with the goal of grouping the causes³⁴ that create or contribute to a high risk of COVID-19 and other emerging infectious diseases in Pakistan and like nations. The themes are discussed below.

3.1 | Community level demurrals

Infectious diseases and poverty are closely associated. Existing literature indicates that the incidence rates of infectious diseases are highest in places where poverty is at its peak.³⁵ Unfortunately, about 25% of the people in Pakistan are living below the poverty line and poor hygiene practices are very common.^{19,33} They reside in very congested areas and most of them do not have access to hospitals and medications.³⁶ In view of this scenario, it is quite challenging for them to comply with the WHO's standard precautionary measures against COVID-19, including hand and respiratory hygiene, environmental cleaning, self-isolation, social distancing, use of personal protective equipment and so forth.

In addition, Pakistan's population consists of around one third of the urban residents (37%) and two thirds of the rural residents (63%).^{33,37} There are a plethora of factors that place rural communities at high risk of COVID-19 acquisition. The facilities at rural health centers are currently inadequate to cater to the needs of rural communities at times of disaster, as indicated by Shah et al.³⁶ In specific, the facilities lack space, beds and equipment required for

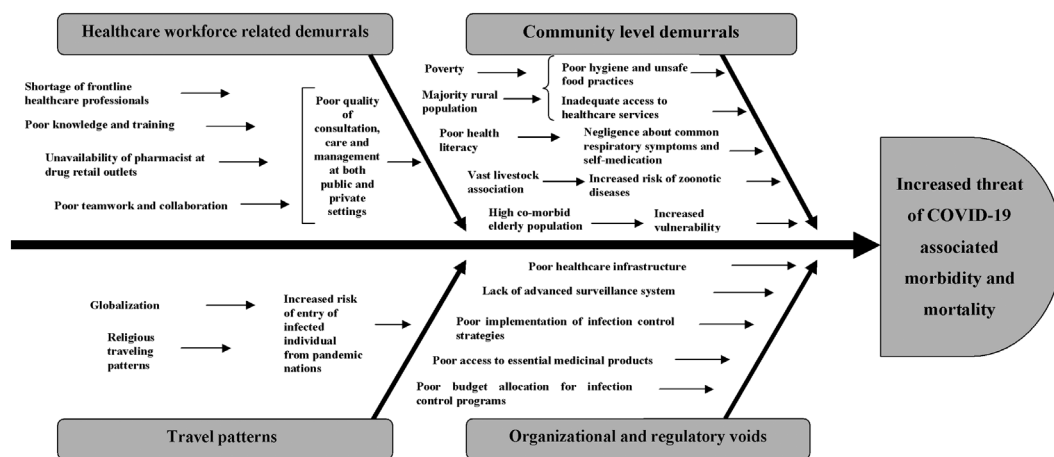


FIGURE 3 A fishbone diagram to show causes contributing to high risk of COVID-19 associated morbidity and mortality

disaster relief, and the healthcare staff at rural health centers lacks proper training and expertise. Considering the fact that most rural citizens are associated with the livestock industry and have little access to healthcare facilities,³³ they are undoubtedly at increased risk of COVID-19, especially if the virus spreads to animals in the future.

Furthermore, lack of knowledge and awareness driven by low literacy among Pakistani citizens leads to healthcare negligence.³⁸ For a variety of reasons, ranging from time shortages to financial constraints, the majority of the population does not seek advice from healthcare professionals³⁸ on common respiratory tract infections, and attempt to self-medicate with home-remedies or over the counter medicines.³⁹ Such practices could lead to delayed diagnosis of COVID-19 followed by increased risk of morbidity and mortality. The ignorance and noncooperative attitude exhibited by the general public can fuel the rapid spread of COVID-19 throughout Pakistan.⁴⁰ Recently, COVID-19 focused Pakistani studies revealed that social distancing was significantly influenced by situational awareness,⁴¹ and poor knowledge regarding transmission of COVID-19 was perceived as a major obstacle in infection control practices.⁴²

Pakistan is an agricultural country, and the people and its economy depends heavily on agriculture and natural resources. A total of about 40% of the total population in Pakistan is engaged in animal husbandry, livestock handling, fishing industry and forestry.¹⁹ Considering the fact that zoonotic diseases are gaining momentum in Pakistan, a One Health Hub was created under Field Epidemiology & Disease Surveillance Division (FE&DSD) with the goal of preventing and managing the zoonotic diseases of national and international concern through well-coordinated response by human, animal and environmental departments.⁴³ Regarding COVID-19, although the preliminary cases were linked to livestock (seafood market),⁴⁴ animal-to-human and human-to-animal transmission has not been greatly observed till date. However, at this point, the patterns of COVID-19 transmission cannot be firmly predicted due to persistent ambiguity about various aspects. Accordingly, Pakistani people with such high exposure to livestock should be deemed at greater risk of acquiring COVID-19 and other zoonotic diseases.

In Pakistan, the incidence of noncommunicable chronic diseases (i.e., hypertension, diabetes, cardiovascular disease and malignancy) is high,⁴⁵ and about 80% of elderly are suffering from such chronic illnesses.⁴⁶ This makes elderly population more susceptible to COVID-19 and associated mortality, as the WHO declared that the seriousness of the disease strongly corresponds to underlying host conditions, including age (elderly) and overall health (comorbid and immunity level).^{13,47}

3.2 | Organizational and regulatory voids

Pakistan has limited health system capacity for appropriate management of crisis.⁴⁸ The existing legislations and policies regarding infection control and prevention are far below the international standards.^{27,49} Although Pakistan developed its first national infection guidelines in 2006, implementation and compliance are not satisfactory.⁵⁰ The public healthcare settings do not have formal standard operating procedures (SOPs) that meet the national guidelines on hospital infection control and prevention.⁵¹ One study, for instance, confirmed that even simple hand washing facilities were not available at about one quarter (25%) of Pakistan's public sector hospitals.⁵² Another study revealed that disasters-related capacities and preparedness level of healthcare institutions in Pakistan was unsatisfactory.⁵³ According to a study, there were nonexistent SOPs for triage in Pakistani hospitals, thereby leading to mismanagement of patients during disasters.⁵⁴

Pakistan lacks a strong healthcare infrastructure.^{21,55-57} There are 5527 basic health units, 686 rural health centers and 5671 dispensaries in the country to serve the healthcare needs of a population of more than 207 million citizens.¹⁹ In 2018, only one bed was available for 1608 patients.¹⁹ In addition, the Pakistani health system is constantly being attacked by terrorists.²⁷ Approximately, 29% of healthcare facilities in Khyber Pakhtunkhwa were destroyed.^{58,59} As a result, regardless of the current governmental level efforts in response to the COVID-19, the number of hospitals and quarantine facilities in the country are less,⁶⁰ which may highly contribute to the delay in the diagnosis and treatment of infected patients, and ultimately results in morbidity and mortality. Another problem

is the limited capacity of laboratories and it seems challenging to scale-up the laboratory facilities,^{60–62} for screening of such a large population.

Along with the harrowing surge in COVID-19 cases, the whole world is witnessing the emerging vulnerabilities of pharmaceutical supply chain.⁶³ Previous Pakistani evidences indicated major gaps in access to essential medicines in Pakistan driven by deficits in the pharmaceutical supply chain and ambiguous pharmaceutical regulations.^{38,55,56,64,65} Unsurprisingly, due to sudden demand fluctuation, raw material availability issues and non-traditional distribution tactics several essential (such as antipyretic, analgesics and other flu and cough medicines) and life-saving medicines, facemasks, sanitizers and other protective equipment are currently short or scarcely available at high prices.⁴⁰ Taking into account this scenario, it will be a great challenge for the Pakistani government to fulfill the medicinal product related needs of the population, especially after the discovery of COVID-19 treatment and vaccination. Additionally, lack of access to basic medicinal products may also have severe consequences for patients with other communicable and noncommunicable diseases.

Pakistan also lacks well-defined system to eliminate the possibility of abrupt outbreaks and a robust infectious agent alarm system to address the threat of emerging germs.²⁷ According to the Global Health Security Index 2019, Pakistan attained 0.0 index scores in various aspects of healthcare system, including emergency preparedness and response planning, communication with healthcare workers, infection control practices and availability of equipment, cross-border agreements on public health emergency response and risk communication systems.⁶⁶ Although, a Disease Early Warning System was developed in 2005 through the collaboration of the WHO and the Federal Ministry of Health, it was not enforced properly.²⁵ Later in 2013, considering the upsurge of communicable diseases, and deficits in emergency response and preparedness, the Ministry of National Health Services, Regulations and Coordination established a division named FE&DSD. The aim of FE&DSD was to respond to outbreaks and epidemics, national and international events of public health significance and provide the necessary input to the concerned stakeholders. However despite meaningful governmental level efforts, recent outbreaks of AIDS, polio, dengue, hepatitis, measles and now COVID-19 (Figure 1) raise concerns and call for improvements in the functioning of FE&DSD.^{12,22–26}

The budgetary constraints further exacerbate all the aforementioned disparities in Pakistan,⁵⁶ as the spending on health has been less than 3% of gross domestic product.⁶⁷ Although, commendably, specific budget is earmarked by the government with the help of international funding for activities concerning COVID-19 control and prevention, but the prevailing mismanagement at lower hierarchy level⁵⁵ and biased distribution practices may endanger these efforts.⁶⁸

3.3 | Healthcare workforce related demurrals

Human resources for healthcare are identified as one of the core building blocks of a health system and workforce crisis are one of the major obstacles to the quality healthcare.⁶⁸ According to the WHO, the overall Pakistani health sector is confronted with an imbalance in the number, expertise and distribution of healthcare professionals and insufficient allotment of resources across various levels of healthcare.⁶⁹ Currently, one physician is available to serve every 963 persons in Pakistan.¹⁹ With regard to availability of healthcare professionals, a total of 220 829 registered doctors, 22 595 registered dentists and 108 474 registered nurses are actively working in Pakistan.¹⁹ The availability of pharmacists in Pakistan (1.6 pharmacists per 10 000 person population) is also meager compared to the target (five pharmacists per 10 000 person population) set by the WHO.⁷⁰ In addition, a number of studies have indicated that existing healthcare workforce were overburdened,^{21,71} and the mean consultation time (1.2–2.2 minutes) and the dispensing time (8.7–38 seconds) in the public sector facilities were suboptimal.^{72,73} Moreover, unavailability of qualified and trained community pharmacists at drug retail outlets add fuel to the fire,⁷⁴ as patients are not provided with required consultation and infection prevention measures for common infections.^{38,75–77} However, there are growing debates that pharmacists—being the first to be reached by patients in resource deprived settings—have all the abilities and expertise to forestall and resolve minor health issues, including infectious diseases, through proper

counseling.^{76,78} Well-trained community pharmacists can refer the critically ill patients (eg, presumptive COVID-19 patients) to specialized healthcare facilities. This has been borne out by a recent study, according to which “pharmacist job” was one of the substantial determinants of good COVID-19 infection control practices.⁴²

Apart from limited healthcare workforce, negligence, unaccountability, lack of follow up of existing infection control guidelines, and inadequate experience, knowledge and formal training of healthcare professionals about emerging diseases continue to severely derail the existing healthcare resources.^{49,50,79} The Joint External Evaluation task study (2016) of the International Health Regulations (IHR) raised concerns that staff members in Pakistan lack the requisite experience and background knowledge on control and prevention of health issues.^{80,81} Similarly, a previous study reported that healthcare professionals had suboptimal knowledge of preventive methods (72%) and diagnostic techniques (59%) and other aspects of MERS infection since advanced training and continued medical education were not mandatory in Pakistan.⁶⁸ Likewise, Khan et al has recently reported that front-line healthcare workers were not well aware of the COVID-19 related strategies for the prevention and control of infection, and were not prepared for the alarming situation in the country.⁸² Beside this, poor collaboration among all the healthcare professionals, such as physicians, clinical microbiologist, pharmacists and nurses⁸³ is other well-known factor that undermines infection control efforts.^{84,85} Taking into account all the aforementioned healthcare workforce related deficits, COVID-19 might put undue pressure on the healthcare professionals.

3.4 | Travel patterns

Pakistan is at high risk of transmission and spread of COVID-19 due to its travel patterns.^{86,87} Being a Muslim country, the majority of the Pakistani people visit religious places in Saudi Arabia and Iran for the Hajj/Umrah pilgrimage and other important religious events. This exposes Pakistani population to increased risk of COVID-19 transmission, as evidenced by the fact that the majority of the confirmed cases of COVID-19 had travel history to Iran.⁴⁰

Globalization is a multifaceted phenomenon and a driving force behind vibrant world economies.⁸⁸ Recognizing this, Pakistan has also established different sort of alliances with other nations around the globe, in particular with four border-sharing countries, namely China, Iran, India and Afghanistan. As a result, a number of workers, scholars and commodities travel in and out of the country.^{88,89} Therefore, in the current situation, when there is COVID-19 pandemic, the threat of harm posed to our vulnerable nation by COVID-19 tainted travelers is significant. For instance, the trade agreement with China has contributed to an influx of COVID-19 infected individuals from this regional epicenter.⁴⁰ Although, in response to alerts from Chinese authorities, Pakistani government has taken preventive steps in line with the IHR-2005 to prevent the entry of infection at the country's entry points, but has failed to prevent the contamination because of delays in enforcing immigration policies.^{40,90}

3.5 | The current situation

The Federal Government of Pakistan, in collaboration with the Ministry of National Health Services Regulations and Coordination, has prepared “The National Action Plan for The Corona Virus Disease (COVID-19) Pakistan” to better tackle the COVID-19 epidemic.⁴⁰ Although, Pakistani government is demonstrating its dedication toward the threat of COVID-19 and has taken a range of initiatives, the country is unable to take measures against COVID-19 like those seen in China. There are currently only a few quarantine centers in Pakistan and these centers are overflowing with patients and consequently, the “one person one room” policy has been badly violated.⁴⁰ Significant concerns exist over availability of medicinal products, including protective equipment, essential medicines and ventilators.^{91,92} The limited healthcare workforce combined with poor expertise further impedes the delivery of services needed for the standard management of patients.⁴⁰ In addition to existing workforce related issues, the morbidity and mortality of doctors and other healthcare workers has emerged as a new major concern.⁹³ As of 29 April 2020, the total

number of infected medical workers in the country has risen to 444 (i.e., 216 doctors, 67 nurses and 161 healthcare staff).⁹⁴ Due to fear of being infected, some healthcare professionals have shown reluctance to handle presumptive COVID-19 patients. In view of the increasing number of infected cases and lack of occupational safety measures and crucial protective suits for healthcare personnel,^{40,93} a further shortage of emergency response teams is anticipated in the near future. Moreover, currently only few Pakistani hospitals have the facility to test COVID-19 suspects.⁴⁰ Lapses in the screening system and resulting proliferation of COVID-19 warrant the implementation of a more efficient system.^{40,93} The ignorant and noncooperative attitude of patients and general public toward COVID-19 response is further drastically endangering all governmental level efforts.

Apart from concerns about morbidity, mortality and economic loss associated with COVID-19, there are significant concerns regarding the management of other communicable and non-communicable diseases due to ongoing lockdown in the country. A number of factors indicate collapsed healthcare system, particularly shortage of healthcare workforce, poor infrastructure, limited availability of pharmacist at community settings and poor availability of essential medicines at drug retail outlets.⁹⁴^{21,38,55,70}

4 | CONCLUSION

The COVID-19 is swiftly spreading in Pakistan. Although, low death rate due to COVID-19 has been reported so far, but what is likely to happen in the near future is uncertain at this moment. Nevertheless, considering the vulnerable public health and healthcare system, and sudden upsurge of the infected cases, the country is definitely at high risk of morbidity and mortality associated with COVID-19. A number of intertwined reasons that expose the Pakistani population at increased risk can be degraded into public related demurrals (i.e., poverty, poor literacy level, negligence, rural lifestyle, huge association with livestock industry and high prevalence of comorbidities), healthcare workforce related demurrals (i.e., poor caregiver to patient ratio, poor knowledge and training of healthcare professionals, poor teamwork and collaboration), organizational and regulatory voids (i.e., poor healthcare infrastructure, poor implementation of infection control strategies, limited access to essential medical products, poor surveillance system and budgetary constraints), and travel patterns (i.e., increased religious traveling patterns and globalization).

4.1 | Recommendations

The current COVID-19 situation and a number of vulnerabilities identified in this review warrants political leaders, religious figures, healthcare workforce (doctors, nurses, pharmacists and paramedics), scientists and the general public to unite together to take steps to counter this harrowing pandemic.

It is suggested that the regulators may consider examining and recognizing all the healthcare workforce related challenges and organizational and regulatory voids, and thereafter reinforce core capacities in workforce and monetary resources, surveillance, laboratory services and, especially, hospital preparedness for isolation and ventilation of patients. In this regard, the Pakistani National Institute of Health needs to play a more vigilant role not only in implementing protocols regarding COVID-19 prevention, transmission and detection, but also in training of healthcare professionals.

To minimize the impact of community related demurrals, Pakistani government may need to improve the communication patterns through ensuring the easy interpretation of operational scientific research, changes in behavior, mental resilience, and fact checking and fighting fake news.⁹⁵ Until the danger has been overcome, inhibiting people's movement and social activities through strict lockdown should be seen as the most promising approach. Otherwise, Pakistan cannot afford to suffer altogether from increased morbidity and mortality and economic loss. Nevertheless, heading for full lockdown and then maintaining it would be a great challenge for Pakistani government due to socioeconomic impact.

Regarding travel patterns, it is vital that high-risk countries like ours be adequately equipped with ample quantity of screening kits, and should not only revise the immigration policies, but also ensure their proper implementation to limit the further entry of COVID-19 travelers in Pakistan.

Although, Pakistani government is utilizing all the available resources and demonstrating its dedication toward the threat of COVID-19, we are of the opinion that Pakistan does not have the capacity to meet the required standards of care and address these issues on its own, so the international community is called upon to support Pakistan and like nations to mitigate the potential danger of COVID-19 by providing all types of resources needed to respond to this outbreak.

CONFLICT OF INTEREST

The authors have no competing interests.

AUTHOR CONTRIBUTIONS

Both authors participated in all phases of the study, including study conceptualization, design, data analysis, visualization and draft writing.

DATA ACCESSIBILITY

All data generated or analyzed during this study are included in this article.

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SUPPORTING INFORMATION

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