Logistic and Operation Management Research (LOMR), Vol. 2 No. 1 (2023)
https://doi.org/10.31098/lomr.v2i1.1311

Check for updates

Research Paper

Risk Management Nexus by Pakistan and China to Combat Novel Corona Virus in the Light of Actor-Network Theory

Wajahat Ali Ghulam[1*], Shujahat Ali[2], Waqas Ali[3]

[1]School of Management, University of Science and Technology of China, China
[2]Mirpur University of Science and Technology, Pakistan
[3]Limkokwing University of Creative Technology, Malaysia

Received: January 29, 2022	Revised: February 26, 2023	Accepted: May 2, 2023	Online: May 29, 2023

Abstract

This research paper presents the COVID-19 situation and early control measures the Government of Pakistan took. The first coronavirus case was confirmed in Pakistani on February 25, 2020. To avoid any disastrous situation, The Pakistani Government has done everything possible to reduce the number of coronavirus cases across its provinces as much as possible up until now. We have investigated Pakistan's thorough response compared to the neighboring country China. The researcher performed trend analysis based on the data from the official COVID-19 record website of the government of Pakistan and GitHub - JHU CSSE for China. The data indicates a decline in COVID-19 cases and a high recovery rate in Pakistan. No double-figure positive cases from the last few weeks are recorded as of March 16, 2023. We have compared the strategies of Pakistan to combat COVID-19 with China as it shut down its border from March 2020 to October 2023 to protect its social system.

On the other hand, Pakistan didn't shut down the border completely during COVID-19. According to the findings, we can state that no large-scale death toll has been recorded in Pakistan. Pakistan maintains its survival during COVID-19 due to the efficient cooperation of the stakeholders in the light of the Actor-Network Theory. Despite the lack of effective antiviral treatment, Pakistan took proactive steps to combat coronavirus. Furthermore, the lockdowns and other preventative measures implemented by the provincial governments led to decreased COVID-19 cases in the nation. The fact that only 4% of Pakistan's population is over 60 indicates less risk of a COVID-19 outbreak leading to a large-scale death toll. Despite the lack of effective antiviral treatment, Pakistan took proactive steps to combat coronavirus.

Keywords *Novel Corona Virus (COVID-19); Risk Management; Early Measures; Actor Network Theory (ANT)*

INTRODUCTION

AN INTRODUCTION AND OVERVIEW OF THE COVID-19

Authorities from the People's Republic of China reported encountering a brand-new strain of the contagious COVID-19 virus on January 2, 2020. The Government of Pakistan, working with the National Institute of Health, released a health advisory regarding novel coronaviruses after COVID-19 was discovered in Wuhan, Hubei, China. The coronavirus outbreak of 2019 is not new, and there were previous cases of the coronavirus outbreak in 2012, e.g., Severe Acute Respiratory

Corresponding author's email: ali2019@mail.ustc.edu.cn

Syndrome. However, many scientists worldwide believe that the coronavirus outbreak is not new because SARS-COV2 is considered the fifth type of coronavirus. It shares epidemiology's overlapping traits and dynamic developments. The Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) severe respiratory syndromes were caused by the novel coronavirus in the years 2012 and 2003, respectively (Waris et al., n.d.). These diseases are named after the novel coronavirus and are contained in many families that may cause illness and the phenomenon of coldness. The COVID-19 strain that is prevalent today is a novel one that has never been found in humans before. Some residents of Wuhan first mentioned the spread of certain infections from seafood to humans. A small percentage of patients said they had no previous contact with animals.

According to reports, a severe level of illness in people has been linked to MERS and SARS. Additionally, there are numerous associations between COV2 and COVID-19, and SARS. Further, the findings show that innumerable deaths have been reported in South Korea, China, Japan, and other international locations. Numerous studies are being conducted to identify the primary causes of viral infection. Ensuring efficient hospital and dedicated space facilities, medical supplies, supportive staff, and lifesaving medical aids are advised by WHO to detect and respond to viral infectious diseases and to prepare excellent care for infected and potential patients. The Pakistani government responded to the COVID-19 confirmation by implementing several countermeasures. First, the government established a framework to screen every traveler who had left one of the contaminated countries, such as China, South Korea, Japan, or Thailand, directly or indirectly. This framework was created in collaboration with the Civil Aviation Authority (Wu et al., 2020). The NIH has assumed an essential part in devising and circulating conventions concerning COVID-19 anticipation, transmission, and surrender, just as dispatching public mindfulness crusades. These concerns include using personal protective equipment like facemasks, treating suspected cases, choosing and transporting tests through infection-transmitting media, maintaining good hand and overall body cleanliness, and more (Saqlain et al., 2020). When COVID-19 began, Pakistan lacked diagnostic equipment, so suspicious samples were sent to odd research facilities. China and Japan later sent test kits to Pakistan.

The main symptomatic research center at the NIH is currently able to test samples from suspected cases within Pakistan (Suleman et al., 2017); additionally, at WHO-assigned COVID-19 test locations in seven medical clinics across the nation, two foci in Karachi and Quetta, one in Peshawar, Islamabad, and Lahore (Noreen et al., 2021). The administration has established isolation wards and isolate zones in display emergency clinics; however, media reports have highlighted that the majority of these medical clinics violate COVID-19 readiness rules, and despite developing new normalized disconnection regions, seclusion nets recently used during dengue fever episodes are currently being used for COVID-19 patients (Raza et al., 2020). Facemasks were available in sufficient quantities in Pakistan to meet the demands of its neighbors. Still, due to increased demand and travel costs to China, facemask supply in nearby Pakistani business sectors became depleted, unexpectedly increasing prices. Because Pakistan is a less developed country, the imposition of smart lockdown in Pakistan proved to be a successful measure to cope with a severe pandemic like COVID-19; however, COVID-19 still affected the daily wagers badly (Naeem et al., n.d.).

IMPACT OF COVID-19 ON PAKISTAN

29 suicide cases have been documented since January 2020 in Pakistani press media (reports in Urdu and English). There were 16 suicidal cases issues with COVID-19 involving 14 completions and four attempts (Mamun et al., n.d.). The pandemic has brought on a severe crisis in healthcare facilities and global economic hardships. This study showed that COVID-19 significantly negatively impacted healthcare workers' mental health. An effective targeted mental health support program is urgently required to support and lessen the long-term effects on healthcare workers' mental health and well-being(Riaz et al., n.d.). The government's relief program intervened to lessen public mental stress and enhance their quality of life. According to the IMF, by June 2021, Pakistan's GDP had recovered to 4% growth. The pandemic has brought on global economic hardships.

Compared to many other nations, Pakistan fared much better in the fight against the virus. A time of economic unrest came after the COVID-19 era. According to empirical data, from March to June of COVID-19, Pakistan's GDP decreased by 26.4% compared to pre-COVID-19 levels. Conversely, agriculture was relatively unaffected and only experienced a 2.1% decline. The industry suffered a loss of 6.7 %; services suffered a loss of 17.6% (Moeen et al., 2021a). Although the income of every household fell, high-income groups appeared to suffer losses more than low-income ones. It has been observed that Pakistan's rising unemployment coincided with a threefold rise in poverty (Moeen et al., 2021b). A severe financial crisis resulted from Pakistan's economy reporting negative GDP growth (-0.05) in 2020 for the first time in 60 years. The government's relief program intervened to lessen public mental stress and enhance their quality of life. According to the IMF, by June 2021, Pakistan's GDP had recovered to 4% growth (Wang et al., 2021). The pandemic harmed Pakistan's economy by reducing exports, remittances, and commerce. Every sector of the economy was hurt by demand and supply shocks brought on by the pandemic (Asghar et al., n.d.). The National Disaster Management Authority asked that the government not purchase facemasks and other necessary supplies to adapt to the situation. Pakistan's drug administration agency has also taken action against illegal stockpiles (Development & 2021, n.d.).

CURRENT SITUATION OF COVID-19 IN PAKISTAN

As of March 16, 2023, the "Ministry of Health, Government of Pakistan" reported one million five hundred seventy-eight thousand forty-six cases in the nation, of which "133" are new cases and "0" deaths. Since then, Pakistan has experienced a COVID-19 surge, increased active cases, and 30,645 fatalities. The total number of recovered cases recorded is 1,546,352, whereas 31,511,096 total tests have been conducted nationwide.

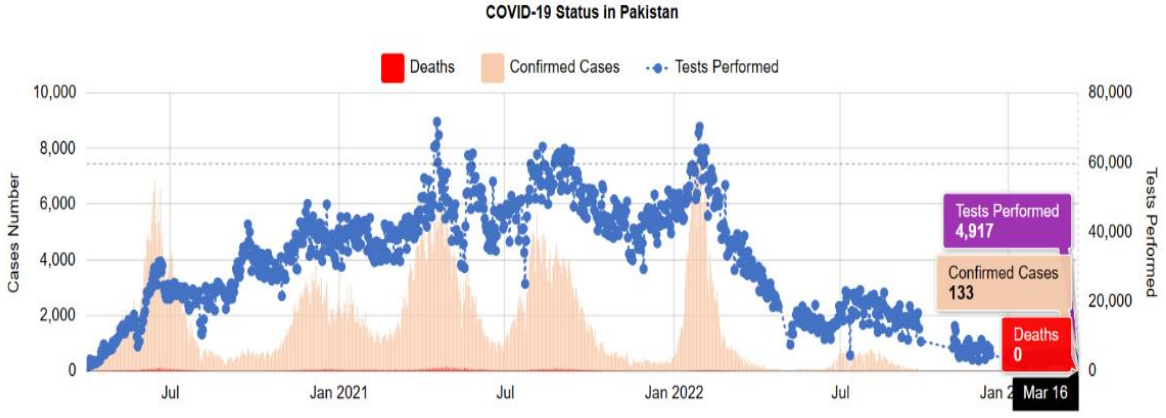


Figure 1. COVID-19 Health Advisory Platform by Ministry of National Health Services Regulations

Source: https://covid.gov.pk/

The majority of the critical industries are recovering now. Due to the government's quick action, the situation is stabilized now. Country-specific Standard Operating Procedures (SOPs) are created based on local, regional, and national requirements to ensure Personal Protective Equipment (PPE) during the pandemic (Noreen et al., 2020). Various institutions' SOPS were decided upon by governments (Shakespeare-Finch et al., 2020; Sharfuddin, 2020). To date, the spread of COVID-19 is under complete control in Pakistan. Pakistan adopted policies that have had a negative and significant effect on the economy, including "lockdown, stay-at-home, social isolation, cancellation of international flights, and healthcare care." However, the government's early preventative measures assisted in lowering the pandemic's peak and the number of infections in the nation. State officials responded to the coronavirus pandemic to protect residents and lessen severe economic damage by taking proactive precautions (Meo et al., n.d.).

This study aimed to determine the components involved in COVID-19 in various situations to assess the impact of interventions on COVID-19 spread in Pakistan. The contribution of the study is multifold. To the best of our knowledge, this is the first study to provide a brief analysis of early steps taken by Pakistan to combat COVID-19 in the light of Actor-Network Theory. Second, this study incorporates the role of different stakeholders involved in combating the coronavirus. This research highlighted the different steps the government of Pakistan took. It is worthwhile to examine the early response taken by Pakistan to combat COVID-19 efficiently. Additionally, by thoroughly understanding the current socioeconomic crises faced by Pakistan's resource-constrained settings, the peak period of the COVID-19 pandemic and the subsequent lockdown strategy adopted to stop the spread fill the current knowledge gap. The government, decision-makers, and practitioners in Pakistan and other nations with comparable socioeconomic and cultural structures to Pakistan can benefit from this assessment.

LITERATURE REVIEW

In recent years have been a massive COVID-19 outbreak worldwide (Freedman, 2020), (Leong et al., 2021), (Lum et al., 2020), (Sadhu et al., 2020). It affects most countries adversely, such as China (Quarterly & 2020, n.d.) (Sagane, Ishihama, & 2008). The United States, Italy (Stefanini et al., 2020), the United Kingdom (Freedman, 2020), Spain, and France (Organization, 2020), Australia (Shakespeare-Finch et al., 2020b), Turkey (Haktanir et al., 2022), Hong Kong (Haktanir et al., 2022), Africa (Ezenwa et al., 2020) and Pakistan (N. Khan et al., 2020), (Noreen et al., n.d.-a), including other countries (Hussain et al., n.d.). It is pertinent to mention that this outbreak results in multiple problems, including fear and death, at a significant level. Similarly, it affects all social institutions, such as the economy (Alradhawi et al., n.d.), education (Benatar & Daneman, 2020), health (Coetzee & Kagee, 2020), (Driggin et al., 2020), religion, family (Driggin et al., 2020), (N. Imran et al., 2020), media (Cinelli et al., n.d.), (Radwan et al., n.d.), recreation (Begović, 2022), (Brouder et al., 2020), (Davies, 2021) and politics as well.

THE MANAGEMENT OF COVID-19 BY ASIAN COUNTRIES

During the first year of the COVID-19 pandemic, countries in Asia (and Australia and New Zealand) had succeeded in suppressing the spread of COVID-19 compared to European countries and the USA. Vaccines had not been developed in the first few months of the pandemic. Even after their development, there have been issues related to limited vaccine access. Therefore,

nonpharmaceutical interventions (NPIs) have played, and are playing, important roles in preventing the spread of COVID-19. Evidence shows that combining these policies effectively suppressed the spread of COVID-19. Using a difference-in-differences method, (Rume et al., n.d.)found that the combination of school closures, workplace closures, restrictions on mass gatherings, public transportation closures, and lockdowns (stay-at-home requests and movement restrictions) were effective in the early stage of the pandemic across 149 countries (Miyawaki & Tsugawa, 2022).

Asian countries have had varying degrees of success in managing the COVID-19 pandemic. Some countries have been praised for their quick and effective response, while others have struggled to contain the spread of the virus. Here are a few examples of how some Asian countries have managed the COVID-19 pandemic:

China: China was the first country to report cases of COVID-19 and initially faced criticism for suppressing information about the virus. However, once the outbreak's severity became clear, the Chinese government implemented strict measures to contain the spread of the virus, including travel restrictions, lockdowns, and mass testing. These measures successfully brought the virus under control, and China has since been able to reopen its economy and resume normal activities largely.

South Korea: South Korea was also hit early by the pandemic but was able to quickly contain the spread of the virus through widespread testing, contact tracing, and isolation of infected individuals. The country also implemented strict social distancing measures and mask mandates and used technology such as mobile apps to track the spread of the virus. These measures have successfully kept the number of cases and deaths relatively low.

Japan: Japan has taken a more relaxed approach to managing the pandemic, focusing on individual responsibility rather than strict government mandates. The country has encouraged citizens to practice good hygiene and wear masks and has implemented limited restrictions on large gatherings. While Japan has not seen the same level of success as some other Asian countries, it has still managed to keep the number of cases and deaths relatively low compared to many other countries.

India: India has faced significant challenges in managing the COVID-19 pandemic due to its large population and limited healthcare infrastructure. The country has implemented strict measures such as lockdowns and travel restrictions but has struggled to contain the spread of the virus. India has also faced challenges accessing vaccines and medical supplies, leading to many cases and deaths.

Overall, the management of COVID-19 by Asian countries has varied widely depending on various factors, including the country's healthcare infrastructure, government response, and public compliance with safety measures. People, in general, may react distinctively to a plague across nations. In the beginning phase of the COVID-19 epidemic, individuals in Asian countries quickly started to wear facemasks; nevertheless, Europeans and North Americans restricted this training. Henceforth, there is low mass devastation regarding passing in Asia in opposition to European countries (Feng et al., n.d.). According to numerous studies, the COVID-19 outbreak harmed the South Asian region, prompting people to adopt serious safety measures like those in Pakistan (Noreen et al., 2020). These countries also adopted multiple measures to reduce the risk of the pandemic outbreak, including social distancing (Mehta, 2020), (Ramesh et al., 2020), isolation

(Yıldırım et al., 2021), lockdown (Mucci et al., n.d.), and many more (Lakshmi Priyadarsini & Suresh, 2020). This region also practices hand and respiratory hygienic conditions, social distancing, isolation, fear of infection, and other COVID-19 risk-reduction procedures (Banerjee et al., 2020).

LINK OF SUSTAINABILITY TO COVID-19

The general and most frequently used sustainability is "the capacity for present and future generations to meet their own needs without endangering the ability of the current generation to do so" (Muñoz-Pascual et al., 2019). The three objectives of economic development, social development, and environmental protection have been the basis for a few norms and affirmations of acceptability since the beginning. All accomplices especially grasp the thought in various private and public zones (Cai & 2020). The noteworthiness of including human well-being as one of the sustainability advancement objectives can be seen through the aftereffects of the ongoing COVID-19 pandemic. It is unusual for life to go on when the public's well-being drastically disintegrates because of a human well-being danger of a worldwide extent. Financial, social, and ecological problems are such, and the part of human well-being has been considered more to be a neighborhood, singular-level theme. Curiously, in the reasonable improvement objectives, it tends to be seen that the third objective is 'Good Health' (Ioannou et al., 2019).

SUSTAINABLE PRACTICES ADOPTED BY PAKISTAN TO COMBAT WITH COVID-19

With no effective antiviral treatment accessible (Wit et al., n.d.), a viable immunization will probably not be broadly accessible for at least six months. Therefore, the Government of Pakistan adopted "Good health and well-being" as a Sustainable Development Goal of the United Nations (2015). The Government of Pakistan successfully adopted numerous sustainable practices to combat COVID-19.

Furthermore, the COVID-19 wave is still hitting world countries and Pakistan, so there is an ongoing process of plans and sustainable practices, which can be considered to check the outcomes of the steps. Accordingly, medical care foundations should aim to upgrade the identification of cases and limit transmission hazards at all outskirts. Pakistan enforced all measures, plans, and intelligent lockdowns solely to protect the health and well-being of people. They implemented smart lockdowns to preserve health and well-being by giving money to low-income families. Therefore, it can be said that Pakistan adopted the "Good health and well-being" goal. These sustainable efforts were enforced as per guidelines and advisories issued by WHO and NIH. These sustainable practices resulted in productive results as WHO quoted Pakistan as a country to learn from, and it is considered the best country in South Asia for its effective management practices. The implementation of sustainable practices and results are depicted as follows:

SUSTAINABLE MANAGEMENT OF COVID-19 BY PAKISTAN

As recommended by the exploration research studies of (Management & 2020, n.d.), since no appropriate and successful treatment for the coronavirus is accessible, each nation is attempting to battle COVID-19 with its best-profited assets, strategies, and plans. China executed sustainable practices and achieved productive outcomes; for example, in preventing and managing the pestilence situation, China has made a significant contribution. Therefore, these sustainable theoretical measures laid a foundation to conclude with promising results. Furthermore, (Luo et al., n.d.) concluded that considering sustainable practices towards COVID-19 provides deep insight into the understanding of COVID-19 and may benefit from potential theoretical contributions and practical ramifications. Management as no concrete remedy for coronavirus is available yet. Therefore, the Government of Pakistan adopted sustainable practices in the paradigm of managing

the COVID-19 outbreak, such as discussed:

Appropriate reaction plans and essential administration are fundamental to maintaining the severity and stability of the country (Shammi et al., 2021). The Pakistani government took some action to prepare for the COVID-19 zoonotic disease after the announcement of the pestilence. First, the government developed a system with the help of the Civil Aviation Authority to screen each traveler who had legally or illegitimately left China and other contaminated nations like South Korea, Japan, and Thailand (N. Khan, Fahad, et al., n.d.). The Pakistani National Institute of Health (NIH) has assumed a significant part in contriving and flowing conventions concerning COVID-19 counteraction, transmission, and absconding, just as dispatching public mindfulness crusades. These relate to using personal protective equipment, such as facemasks, treating suspected cases, distributing test samples and their transportation through an infected medium, and good hand and general body cleanliness (NIH). Additionally, the Government's NIH assists all Pakistani provinces in building unified reconnaissance units (Chandir et al., n.d.).

For testing, Pakistan is considered the NIH's main analytic research facility for suspected cases within the country (Waris et al., n.d.). Due to mass production, Pakistan had enough facemasks to meet the needs of its neighboring countries (S. Ahmed, Jafri, et al., n.d.). Facemasks were hard to come by in nearby Pakistani commercial sectors, which abruptly increased prices. The National Disaster Management Authority asked the administration to stop selling facemasks and other necessary supplies to adapt. Pakistan's drug administration authority has also undertaken measures to combat illegal stockpiles (Atif et al., n.d.). In Pakistan, the female medical staff was accounted for to give maternity-related counsel via the telephone or organize meetings. Medical services laborers likewise utilized telephones to pick up counsel from other colleagues when required (Ahmed et al., n.d.).

PAKISTAN'S POSITION IN THE GLOBAL HEALTH SECURITY INDEX (GHS)

Nuclear, the Economist Intelligence Unit, and the Johns Hopkins Center for Health Security Threat Initiatives collaborated to create the Global Health Security Index (GHS), a thorough level of assessment that evaluates global health security capabilities in 195 nations. The countries with the best preparedness for a pandemic or epidemic were listed in the GHS index. Around 40 points out of 100 are assigned to each nation on average, according to the World. The GHS Index scoring methodology identified significant gaps in the nation's capacity to detect and respond to health-related emergencies. The GHS Index annual reports analysis revealed that no government is ready for pandemics and epidemics. International countries are generally thought to be much less prepared. Many nations worldwide show little evidence of their capacities for health security and their ability to respond to infectious outbreaks in terms of prevention, detection, and response.

According to the GHS index, Pakistan is 195th out of 195 nations. Pakistan has a 35/100 overall rating. Early Detection and Reporting For Epidemics of Potential International Concern received a 41/07 rating. The rapid response to and mitigation of the spread of an epidemic in Pakistan received a 38/100 score, a satisfactory score. Pakistan received 49.7 out of 100 possible points for its commitment to improving its national capacity, funding, and adherence to rules. Pakistan scored 24 points in preventing the release or emergence of pathogens. Pakistan scores 38.7 points out of 40 for its vulnerability to biological threats and overall risk environment (Ghulam & Wei, 2020).

PAKISTAN CONSIDERS RISK MANAGEMENT STRATEGIES TO FIGHT COVID-19

According to a recent study, developing nations like Pakistan suffer from poverty, unstable political systems, terrorism, and infectious diseases because of insufficient medical facilities like diagnostic and research labs. To combat the coronavirus, use some risk management strategies listed below. According to a recent research study, developing nations like Pakistan suffer from poverty, unstable political systems, terrorism, and infectious diseases because of the lack of access to resources like diagnostic and research laboratories. To combat the coronavirus, use some risk management strategies listed below (S. Khan et al., 2020). People wear masks and gloves to protect their hands as they exit their homes, keep their distance, use hand sanitizer, and practice good hygiene. To lessen the likelihood of a pandemic outbreak, people have begun to work from home and take the necessary precautions to avoid getting sick. Pakistan has adopted similar policies (Noreen et al., 2020). The lockdown was implemented along with the definition of the SOPs (Shoaib & Abdullah, 2020). People were asked to remain inside and avoid making unnecessary trips outside. Similarly, it was advised that those who work adhere to the rules and wear PPE to protect against COVID-19 (Noreen et al., 2020).

ISOLATION OR MONITORING STRATEGY

Pakistan would suffer severe economic losses if it attempted to encircle China completely. Implementing certain fundamental levels of isolation for patients and potential cases is advocated to stop the coronavirus from spreading further. Following these recommendations, Pakistan's Government should take some preventative measures and a partial lockdown rather than a total lockdown (Shafi et al., n.d.).

TECHNIQUE FOR ROBUST MEASURES

Previous studies have also indicated that Pakistan's Government needs to take intense action to restrict the flow of potential coronavirus carriers abroad. Because of this, the Pakistani government initially chose not to send the students packing from Wuhan in China's Hubei province, an infected area, to combat nCOV-19. There were no cases of a novel coronavirus from January 26 to February 25, 2020, which was advantageous for Pakistan (Rasul et al., 2021) merely due to the robust measure technique reported in Pakistan.

COVID–19 CASES IN PAKISTAN

The nation's first COVID-19 case was reported in Karachi, Pakistan, on February 26, 2020. On March 13, 2020, the Pakistani government announced a widespread rapid response to combat the coronavirus. This response included closing the borders with neighbors like Iran and Afghanistan, prohibiting public gatherings, and closing all educational institutions nationwide until May 31, 2020 (N. Khan, Naushad, et al., n.d.). There have been 4695 cases as of April 10, 2020, with an 8 percent patient mortality rate and a 92 percent patient recovery rate. The fact that the fatality rate is significantly lower than the recovery rate suggests that Pakistan's actions have been very successful (brief & 2020, n.d.).

THE COVID-19 INSTANCES IN PAKISTAN

Shia Muslim pilgrims who had just visited Iran's holy sites made up the majority of COVID-19 patients. According to reports, there have been more than 2300 reported cases of deaths in Iran as a result of the coronavirus outbreak, up from 1800 cases previously. Before returning home, Pakistani nationals visited Saudi Arabia, Syria, Iraq, the United Kingdom, and the United States. An enormous number of Shia Muslims from Pakistan visit the holy shrine in Iran annually around this time. The coronavirus outbreak happened in Pakistan because most pilgrims returned from the Iran-Taft border (Yasin et al., n.d.). Since the pilgrims are spread across nearly all of Pakistan's

provinces, a potential risk of the virus spreading throughout the nation was anticipated. The Pakistani government initially sealed the 560-mile border between Pakistan and its neighbor Iran. The return of thousands of pilgrims along the border was postponed for a while by the Government of Pakistan. The Pakistani government built a quarantine camp in Baluchistan. Still, because it was so far from urban amenities, it decided not to be held accountable for the emergence of a health and security crisis. The government, therefore, allowed the pilgrims to enter the nation's quarantine centers to save the lives of the pilgrims along highly long stretches of the border.

Pakistan's regional authorities function as independent administrative units following the 18th amendment to the Pakistani Constitution. Therefore, the provincial governments must take severe countermeasures. When the number of potential coronavirus-positive cases had not risen significantly, the local governments initially imposed a lockdown (W. Ali et al., 2020). Due to the lack of adequate financial and medical resources to contain the outbreak and the low per capita income of the majority of the population, the Pakistani government was already mired in an economic crisis. Pakistan's economy has recently been experiencing difficulties due to a precarious situation. The conclusion and current stage will have a very negative impact on Pakistan's economy. The Pakistani government may, in the future, publish high unemployment rate data. Furthermore, there is little agreement among the nation's political parties, which could lead to a political crisis for the Government (Rasheed et al., n.d.)

HISTORICAL FLOW CHART OF VIRAL DISEASES

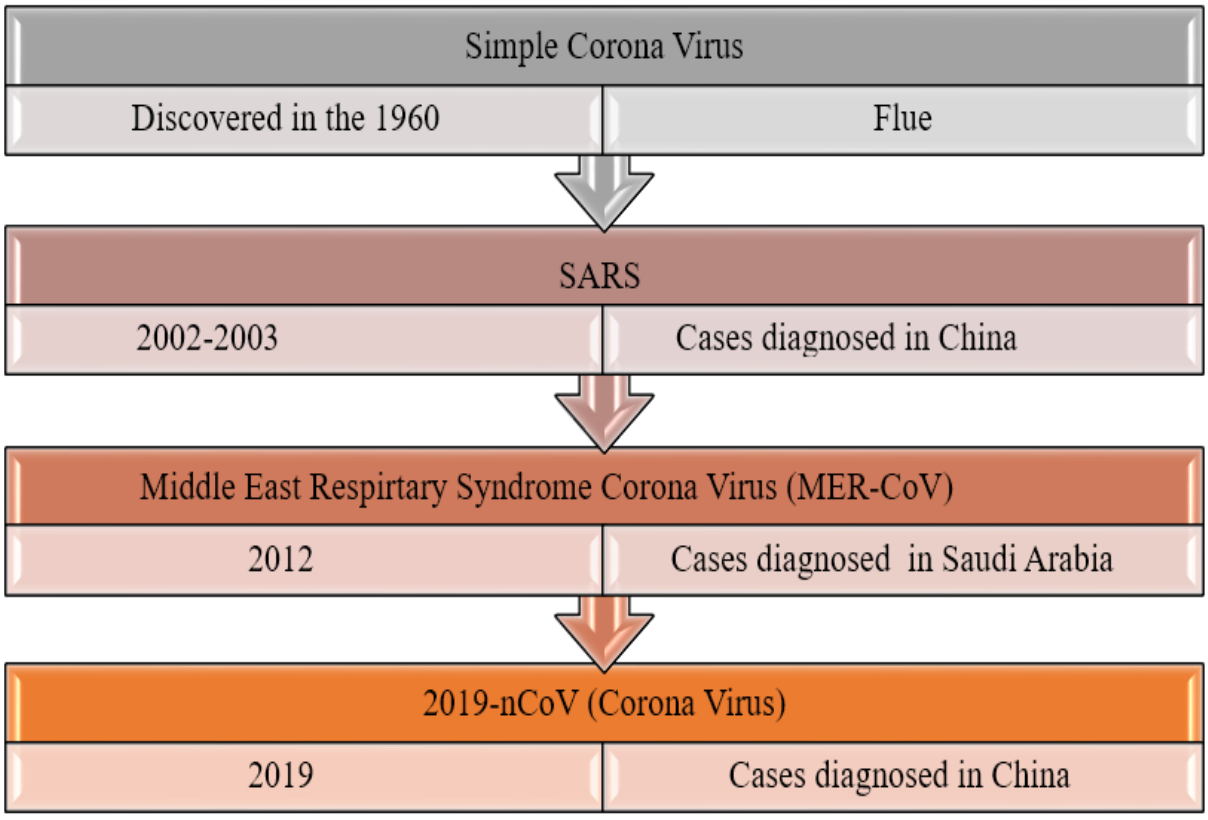


Figure 2. History of Coronavirus Occurrence

Source: built by the researcher using historical data

ACTOR-NETWORK THEORY (ANT) AND MANAGEMENT OF COVID-19 BY PAKISTAN

The conceptual framework of this study is developed in light of the ANT theory. This approach is widely used in social sciences. Risk response is the most fundamental stage in risk management, during which actors settle on meaningful choices for alleviating a danger. However, the dynamic in such circumstances is a complex sociotechnical wonder. Actor-Network Theory isn't a hypothesis in the traditional sense (Latour, 1999). It doesn't justify consistency or give a fixed method of approaching the world (Hitchings, 2003). Actor-Network Theory is continually developing and advancing, which leads it to pin down the significant features. (Latour, 1999) elaborates 'ANT' as "a crude method to observe the actors without imposing on them and a predetermined assessment of their world-building abilities.

Combining human and non-human components into one conceptual framework or network aims to interpret and explain social and technological development (Seppälä et al., n.d.). (van der Duim et al., 2012) Described Actor-Network Theory as a translation tool that allows users to move between, form associations with, and follow relationships between dualisms or positions that appear to be restricted. We'll keep going through changes as our world changes. Such changes could be societal, economic, cultural, cross-sectoral, and sectoral (Williams, 2020). ANT addresses the evolving responses from different parties, such as government actors, stakeholders, and institutions, and their response to a crisis. ANT theory is best fitted for the effective management of COVID-19 in Pakistan for specific reasons, such as in this research, different actors played a vital role in the fight against COVID-19. In a crisis, this theory provides a sense that when there is no viable and scientific approach available, the continual support and coordination among different stakeholders in the network provides a better solution to the problem.

The Actor-Network Theory (ANT) can provide insights into the risk management nexus adopted by Pakistan to combat the novel coronavirus. ANT views the world as a network of actors or agents, both human and non-human, that interact with each other to produce outcomes. In the case of Pakistan's response to the coronavirus, the government has played a crucial role as an actor in the network. It has taken various measures to manage the risks associated with the virus, including lockdowns, social distancing measures, and vaccination drives. However, these measures have been influenced by various other actors, including international organizations like the WHO, civil society groups, and the media. One way to apply ANT to the situation is to analyze the role of non-human actors in the network. For example, the availability of medical supplies and equipment, such as PPE, testing kits, and ventilators, has played a crucial role in managing the virus. The shortage of these supplies in the early days of the pandemic created significant challenges for the government in managing the virus.

For example, the government's response to the virus has been influenced by various stakeholders, including medical professionals, politicians, and religious leaders. The influence of these actors on the government's response has been both positive and negative. For example, some religious leaders initially resisted the government's lockdown measures, which could have contributed to the spread of the virus. In conclusion, applying the Actor-Network Theory to the risk management nexus adopted by Pakistan to combat the novel coronavirus can provide insights into the complex web of actors and factors that have influenced the response to the virus. By examining the role of both human and non-human actors in the network, it is possible to identify areas where improvements can be made to manage better the risks associated with the virus.

THE CONCEPT ANT AND RISK MANAGEMENT OF COVID-19

A socio-philosophical theory called Actor-Network Theory (ANT) aims to understand complex social situations by focusing on relational components known as associations in ANT terminology. According to the ANT perspective, there isn't any predetermined social "stuff" (Latour, 2007a). Instead, every situation results from ongoing associations among actors, which needs to be studied. According to this perspective, actors—both human and non-human—create and participate in networks, so it is only possible by paying attention to these actors (Etzkowitz, 1987; Latour, 2007b) and their connections to comprehend social and scientific phenomena.

Table 1. The Concept ANT and Risk Management of Covid-19

ANT rule	Issues	Applications
Enrolling Actors	Representation in terms of stakeholder legitimacy and power.	In association with NCOC (National Command and Operation Center), NIH, the Army, and provincial governments, Pakistan provided legitimate support to all institutions to fight against COVID-19 (Umer et al., n.d.).
	Capacity to participate	Pakistan provided support to Artificial Intelligence startups, the Army, and NIH to invent specific scientific devices, PPEs, to play a role against COVID-19 (Malik & Rehmat, 2020).
	Long-term results and the process of collaboration's organization.	Due to cooperation between provinces and China, Pakistan's Government's productivity results in less loss in periods of fatality (Chien et al., 2021).
Fact-building	Stakeholder involvement and consensus in the collaboration	Pakistan successfully involved all stakeholders who may oppose the decision to smart lockdowns (Ahmed et al., 2020).
	Need for consensus-based decision-making.	The NIH issued an advisory regarding an outbreak caused by a novel coronavirus following aviation authorities (Jabeen et al., n.d.)
	A diversity of governing and value systems.	Following the 18th amendment to the Pakistani Constitution, the provincial governments have a heterogeneous governance system. When the local government imposed complete lockdowns, the Federal Government of Pakistan, with a stumbling economy, provided and supported all populations across provinces in terms of the Ehsaas Emergency Cash Program with 1200 billion (PKR). It protected their benefits (Network, n.d.).
	Unrealistic expectations	The health system of developing countries like Pakistan is suffering from weakness and threats to the capacity to deal with the crisis (Khalid & Ali, 2020). It should take the appropriate action to avoid potential hazards and weaknesses in the health system before anti-vaccine (Shereen et al., n.d.).

Translations that go around.	Involvement of stakeholders in the collaboration	With administrators' cooperation as critical educational institutions' stakeholders, the government closed all levels of schools and colleges throughout the country (Shereen et al., n.d.). Furthermore, the Pakistan Army involved the general public as a stakeholder in following the lockdown implications imposed by the Government (Aftab et al., 2021).
	Distribution of power among the gathered stakeholders	Stimulating interactions (A. M. Ahmed et al., 2022). Additionally, the Government's NIH assists all Pakistani provinces in building unified reconnaissance units (Maior & 2020, n.d.).
	Need for information sharing and dissemination.	Pakistan framed National Command and Operation Center (NCOC) using the consolidated assets and mastery of standard and military establishments to battle the destructive infection with dynamic help from National Disaster Management Authority (NDMA) by assigning core motive to have the record and information related to Coronavirus (Jabbar et al., n.d.).
	Evolution of the roles of actors	The Government of Pakistan's evolving role, steps, and preventive measures resulted in favorable results (Jabbar et al., n.d.). Pakistan is the best country in Asia regarding the "most elevated number of reactions to social security" during the COVID-19 pandemic (Shah & Ma, 2023).

Source: Generated by the researchers as per the role of government and stakeholders

ENTITIES IN ACTOR-NETWORK THEORY (ANT)

By referring to an action as an actant, we have slightly shifted the emphasis away from the source of the action and toward the act itself. After that, the word network concentrates on the results of these actions. A network of actants is created when two or more are connected (Dankert, 2011). Actors are "entities that do things," which differs significantly from the more traditional sociological definition of actors, such as "Social entities." There is no difference between embodied or disembodied skills or between humans and non-humans, which is crucial for ANT. In the context of the management of COVID-19, the government is treated as an actor who manages all the activity regarding the combat of COVID-19 successfully. All other stakeholders and institutions are treated as an actant in managing COVID-19. The conclusion and discussion section elaborates on the role of the actor and actant.

RESEARCH METHOD

In this study, we closely monitored the daily updates from "GitHub – CSSEGISandData" to extract the reported cases and deaths in Pakistan and China. Articles and newspapers were searched using the terms "COVID-19", "response," "measures," "Pakistan," and "China." Relevant information was extracted from previous research studies and newspapers. The COVID-19 statistics trend line is interpreted. Three sections of the study's research framework, as shown in Figure 2. In the second part, the record of COVID-19, along with the actions taken by the government

of Pakistan and China, is elaborated. The third part is the adoption of COVID-19 prevention and control policies, The recovery rationale, an analysis of the trend line of COVID-19 deaths and recovery cases, and a discussion and conclusion.

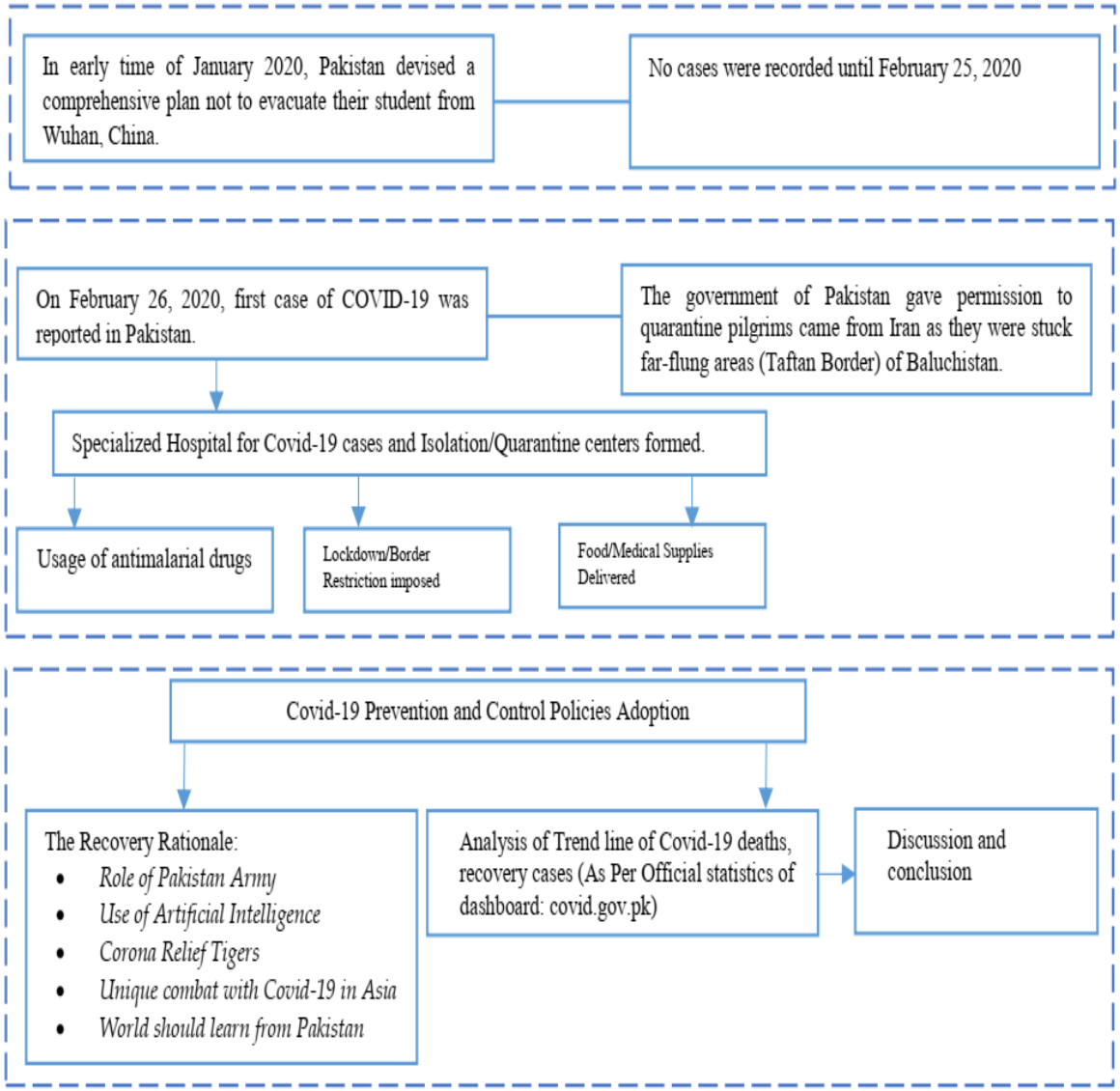


Figure 3. Research Framework

DATA COLLECTION

Data was collected through the COVID-19 website (the dashboard). Concerning COVID-19 case updates, WHO and Pakistan set up a global information base and NIH, respectively. Daily data was gathered from NIH, Pakistan (available at http://covid.gov.pk/stats/pakistan, GitHub - CSSEGISandData/COVID-19). The research based on historical data becomes more meaningful.

DATA COMPILATION

COVID-19 statistics were further recorded in M.S. Excel. Total Cases, Death Rate, VS Recovery Rate were recorded to draw results based on the trend line.

TREND ANALYSIS OF COVID-19 MANAGEMENT

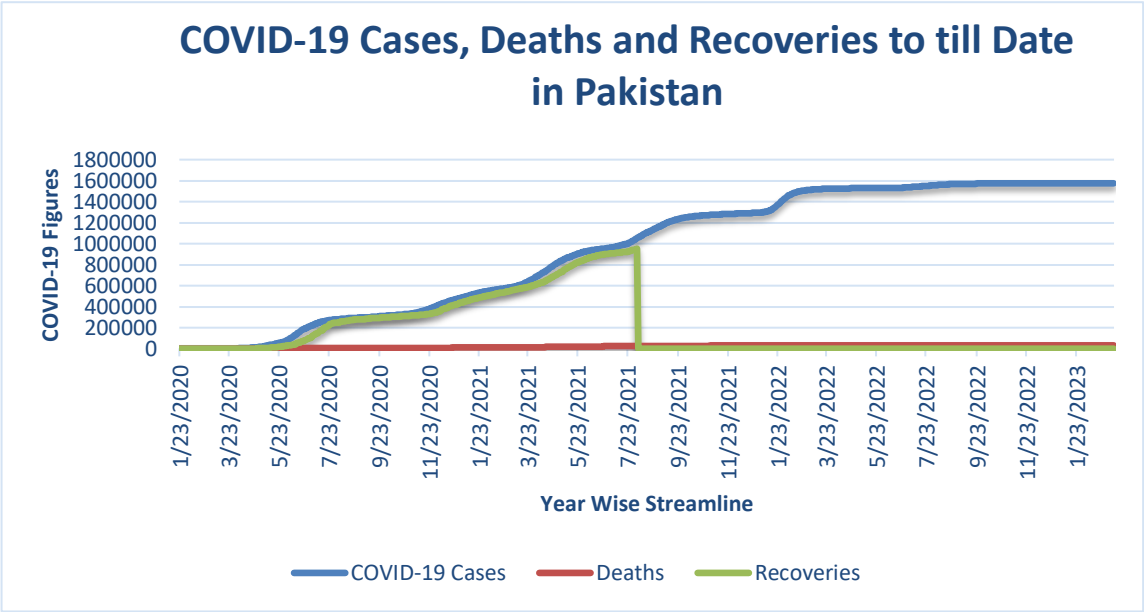
Previously geographical trend analysis was performed by (- et al., 2020) and (Chernysh et al., n.d.) to check the impact of the COVID-19 pandemiC. For the second part, data were subjected to IBM SPSS statistical analysis version 22 for descriptive analysis during the smart lockdowns. Previously a thematic and narrative approach was adopted to analyze and identify the emerging lessons (COVID-19 Epidemic Spread and the Impact on Public Health & Safety Policy: An Analysis of the Adoption of Preventive Measures and Effective Management: Evidence from Pakistan). A trend graph was drawn to check the boom and slowdown of the total cases, death, and recovery rates. Like other nations, Pakistan is currently witnessing a slowdown in daily patients and ends and an increase in recoveries from COVID-19 cases, as shown in Figure 2.

DATA DESCRIPTION

Figure 3 elaborates a daily trend of cases in Pakistan as Total Recoveries in blue, COVID-19 death in red, and total confirmed cases in blue.

RESULTS

Figure 4. Graphical Depiction of COVID-19 in Pakistan



Source: http://covid.gov.pk/stats/pakistan, GitHub - CSSEGISandData/COVID-19: Novel Coronavirus (COVID-19) Cases, provided by JHU CSSE, compiled by the researcher.

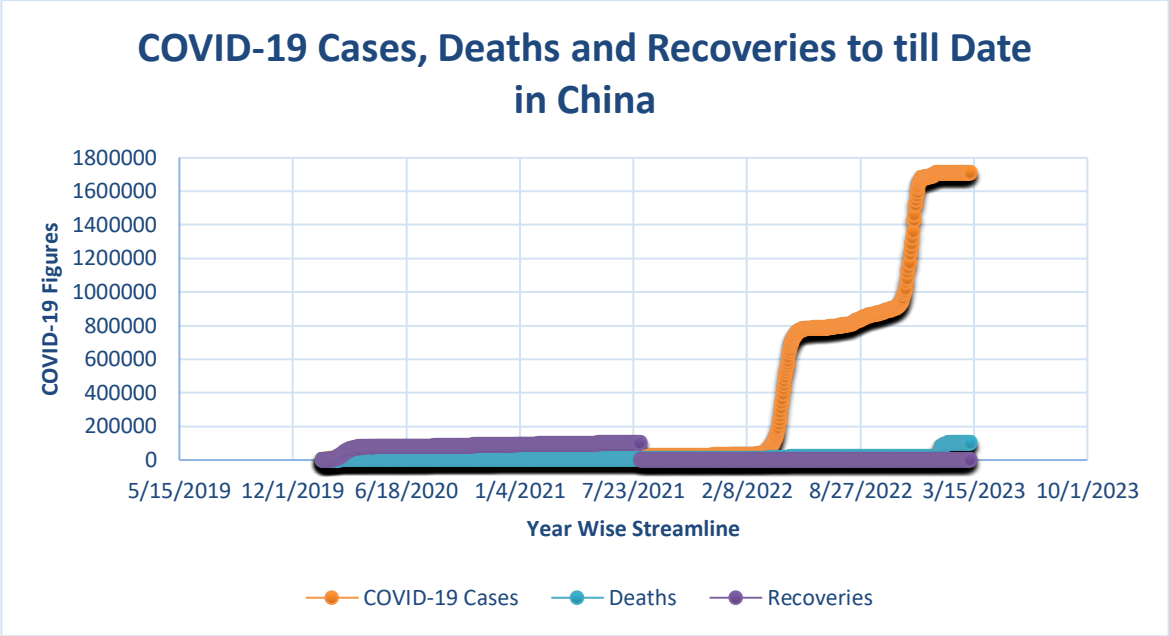
DATA INTERPRETATION AND TIMELINE OF COVID-19 IN PAKISTAN

Figures 4 show a drop-down in all aspects due to radical steps taken by the Government of Pakistan. There is a drop in the death rate and a boom in the recovery rate. Based on the slowdown trend line of cases and the death rate result depicted that due to the firm decision acted upon by the Pakistani government, the situation is under control. Based on these statistics and results, according to a statement by WHO, the world should learn from the management of Pakistan to combat COVID-19. In the last couple of months, there have been '0' death or no double-figure death as recorded per the trend line as of March 16, 2023. This rate is much lower than the death rate at

the world level, exceptionally high in the European district, which is contacting around 7-8%.

All the disastrous projections made in April 2020 were proven wrong. This all happened due to effective management techniques by Pakistan; recent results retrieved from the official dashboard of COVID-19 depicted the situation in another way. The case is now under control. In addition, the WHO stated that world countries should learn from Pakistan to control future pandemics (WHO, 2020). They have concluded that when there is no scientific solution available during the crisis, we can extract the textual information and responses taken by the official (Amailef & Lu, 2011a).

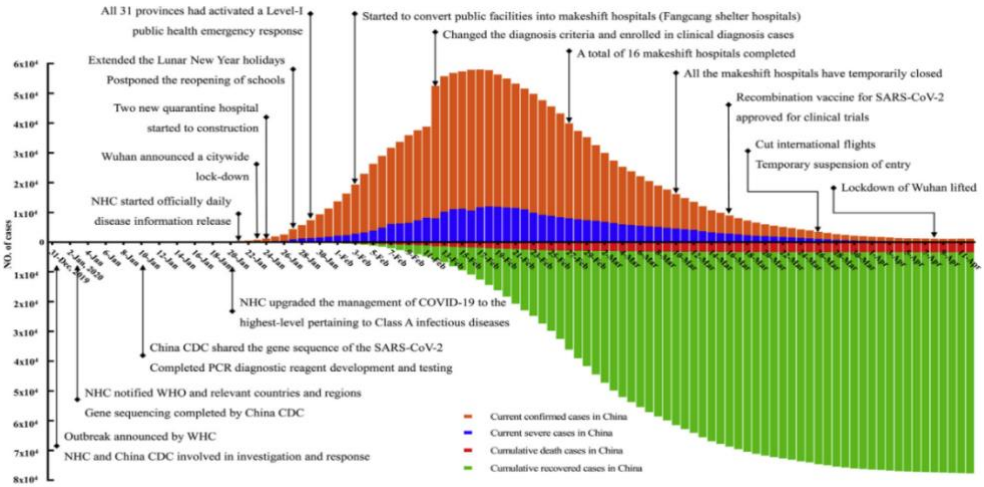
Figure 5. Graphical Depiction of COVID-19 in China



Source: GitHub - CSSEGISandData/COVID-19: Novel Coronavirus (COVID-19) Cases, provided by JHU CSSE, compiled by the researcher.

RESPONSE OF CHINA TO THE COVID-19 PANDEMIC

The Chinese government opposed an independent investigation into the virus's origins even after the World Health Organization agreed to conduct one, despite losing millions of lives, jobs, and other consequences of unspoken degrees (Chen et al., 2020). Due to this situation, it is crucial to examine how China's government responded to the global community's quest for information about the causes of the COVID-19 pandemic.



Source: COVID-19 epidemiology curves and significant intervention measures implemented in China. China CDC, Chinese Center for Disease Control and Prevention.

COMPARATIVE RESPONSE OF CHINA AND PAKISTAN TOWARDS COVID-19

According to Population by Country (2023) - Worldometer (worldometers.info), China is the most populous, and Pakistan is the 5th most populous country globally. We compared the responses to the COVID-19 pandemic situation of Pakistan with China, as both are neighboring countries. The main reason for comparing both countries is that China closed its border from March 2020 to October 2022, but Pakistan never closed its border for international arrivals. This way, as many potential explanatory factors as possible can be held constant when seeking to establish causality (Anckar, 2008). We have investigated the policies and practices in both countries as explanatory factors of the effectiveness of the COVID-19 responses.

COMPARISON OF KEY INDICATORS OF CHINA AND PAKISTAN

Table 2. Comparison of Key Indicators of China and Pakistan

Indicators	China	Pakistan
Population	1412360000	231402117
GDP per capita, PPP (current international $)	19338.23408	5748.005952
Democracy Index	2.21	4.31
Democracy Rank	148	104
Global Freedom Score	6	37
Health Security Index	47.5	17.1
Health Security Rank	52	126
Current Health expenditure (% of GDP)	5.35%	4.91%
Current health expenses per capita (US$)	880.19	39.49
Life Expectancy	78.077	47.8
Physicians (Per 1000 People)	2.2266	1.1179
Hospital Bed (Per 1000 People)	4.31	0.63

The data was retrieved from the World Bank in 2023 (https://data.worldbank.org/indicator), the Economist Intelligence Unit, Democracy Index 2023 (https://www.eiu.com/topic/democracy-index), the Freedom House 2023 (https://freedomhouse.org/countries/freedom-world/scores) and the Global Health Security Index, 2021 (https://www.ghsindex.org)

COMPARISON OF COVID-19 STATISTICS

The number of COVID-19 cases in China and Pakistan is as follows:

Table 3. The number of COVID-19 cases in China and Pakistan

Indicators	China (As of March 09, 2023)	Pakistan (As of March 16, 2023)
Total Positive Cases	1707821	1,578,046
Deaths	101055	30,645
Recovered Cases	-	1,546,352
Total Tests	-	31,511,096

Source: https://github.com/CSSEGISandData/COVID-19

SUMMARY OF COMPARATIVE RESPONSE

China was the first country to report cases of COVID-19 in December 2019. Since then, China has taken strict measures to control the spread of the virus, including implementing lockdowns, testing, and contact tracing. China has used advanced technologies such as Artificial Intelligence (A.I.) and Machine Learning (ML) to develop applications that can be used for contact tracing and medical diagnosis.

As of March 2023, the total number of confirmed COVID-19 cases in China was 1707821, totaling 101055 deaths. Most patients were reported in the early stages of the pandemic, and the number of new cases has remained relatively low since then. Since the occurrence of COVID-19, the China government has adhered to the strategy of "people first, life first," stuck to the combination of strategic stability and measure flexibility, and constantly optimized and adjusted the prevention and control measures for protecting the lives and health of the people to the greatest extent. China's fewer deaths than other countries during COVID-19 is likely due to the country's rapid adoption of digital technology. Large-scale lockdowns and curfews by the Chinese government have caused hospitals, clinics, and medical centers to close, even locally. Some experts believe the actual numbers may be higher than what has been said. China controlled the spread of the virus within its borders and has seen a significant decrease in cases and deaths since the early months of the pandemic. However, the strict measures taken by the government have also been criticized for violating individual rights and freedoms.

The debate is still going on about China's COVID-19 management because China no longer published daily comprehensive figures for COVID-19 cases and deaths, the National Health Commission (NHC) said, ending a practice that began in early 2020. The NHC did not explain its decision to stop releasing daily COVID data. "The Chinese Centre for Disease Control and Prevention (CDC) will publish information about the outbreak for reference and research purposes," the NHC said, without specifying the type or frequency of information to be published. It's worth noting that there have been questions about the accuracy and transparency of COVID-19 statistics reported by the Chinese government (Al Jazeera Media Network, 2022). China reopened borders and lifted travel restrictions effective from January 8, 2023. Almost all of the population of China received COVID-19 vaccination. There was a soar in COVID-19-positive cases in December 2022, when China opened for international travel, but after a couple of weeks, there was a decline in the positive cases. China has no major catastrophic situation because its border was closed from March 2020 to October 2022.

On the other hand, Pakistan, which has a 231402117 population with GDP per capita, PPP (current international $), i.e., 5748.005952, cannot completely shut down the economic activities instead to partial or smart lockdown. Gradually it achieved optimum herd immunity level, and now according to WHO, Pakistan is amongst the best country in the world whose COVID-19 management can be exemplified. Pakistan reported its first case of COVID-19 in February 2020, and since then, the country has faced several waves of the virus. The government has implemented various measures to control the spread of the virus, including lockdowns, testing, and vaccination drives. Pakistan reported its first case of COVID-19 in February 2020, and since then, the country has faced several waves of the virus. The government has implemented various measures to control the spread of the virus, including lockdowns, testing, and vaccination drives. The response of Pakistan has also faced challenges, such as a shortage of medical equipment, a lack of testing capacity, and

inadequate contact tracing.

Additionally, the enforcement of lockdowns has been inconsistent, and public compliance with preventive measures has been low in some areas. As a result, the country has seen a slower decline in cases and deaths than other countries implementing stricter standards. Pakistan had twice as many cases as China. In China, the pandemic peaked in February, and the curve fattened in January 2023. The first cases in Pakistan were confirmed on February 27, 2020, but from the beginning of April when the government implemented a strict lockdown. The number of cases markedly increased. The situation in Pakistan appears to be getting worse.

Moreover, based on daily deaths, China has controlled the patient-death ratio, while in Pakistan, this measure is still increasing. Table 1 shows a statistical comparison between the two countries regarding real GDP per capita, Health Security Index Rank, Current Health expenditure (% of GDP), Current health expenses per capita (US$), Life Expectancy, Physicians (Per 1000 People), and Hospital Bed (Per 1000 People) also shows that with the help of efficient and effective government system implementation and COVID-19 combatant policies, China has improved (Ullah et al., 2021).

THE RECOVERY RATIONALES OF PAKISTAN

EARLY RESPONSE FOR PAKISTAN STUDENTS

Similar to the newly discovered coronavirus outbreak in Wuhan. The Pakistani government did not evacuate its 500 students from Wuhan, Hubei Province, China, in late January due to the possibility of a coronavirus carrier. On February 26, 2020, the situation changed when the Pakistani government allowed pilgrims to be stranded in inhospitable, remote areas along the border. Then it reported its first case when some patients traveled from Iran and carried the coronavirus (Alah et al., n.d.).

PRESCRIPTION MEDICATION FOR MALARIA

The Pakistani government and other provinces cooperated in such a way that the recovery rate increased daily as new cases were reported in Pakistan from various regions. Dr. Asad Aslam, the CEO of Mayo Hospital Lahore and a member of the Corona Experts Advisory Group Punjab, explained in recent media reports and interviews that "Antimalarial medications combined with a variety of other medications demonstrated successful recovery outcomes for coronavirus patients in the various hospitals throughout the Punjab province." Recent developments show that the U. S drug regulators have also approved the restricted use of the antimalarial drugs chloroquine and hydroxychloroquine in the treatment of coronavirus patients. According to Dr. Asad Aslam's official statistics, "These medications have successfully treated eight coronavirus-infected patients over fifteen days. The doctor went on to say in a brief statement, "Nearly all hospitals in Pakistan will use these medications as a result of their successful results after repeated usage of these medicines in China." According to the Punjab provincial government spokesman, almost 50,000 medications can be stored there (Godman et al., 2020; Javed et al., n.d.)

IMPOSED RESTRICTIONS

Federal Minister of Planning and Development Asad Umar claimed that "the lockdown and other restrictions being imposed resulted in wide control of the mass spread of the novel coronavirus." Furthermore, maintaining the restrictions would produce more fruitful results. In

addition, compared to Western nations where the number of cases and fatality rate are much higher, there is no evidence that the coronavirus outbreak has worsened in the government due to these preventative measures (Qureshi et al., n.d.; Sarwar et al., n.d.)

PAKISTAN'S INITIAL RESPONSE

GOVERNMENT'S DECISION TO PLACE THE COUNTRY UNDER LOCKDOWN

Coronavirus first reported case in Karachi, Sindh. Thus, the provincial government implemented a lockdown in the province of Sindh. The government requested military assistance to impose a complete lockdown in Sindh's cities. Due to Pakistan's faltering economy, the federal government aimed to highlight public health advancements, strengthen the economy, and prevent further decline. To avoid widespread poverty and hunger on March 24, 2020, the federal government imposed a virtual state of lockdown while allowing people to purchase additional food items and medications from stores. In addition, Pakistan's Government extended the lockdown until April 14, 2020, to combat COVID-19 on April 1, 2020, after reviewing the situation (I. Ali et al., 2020).

SUSPENSION OF EDUCATIONAL AND BORDER

On March 16, 2020, the Pakistani government decided to close the borders with Iran and Afghanistan for two weeks due to the virus. All public and private educational institution levels will be closed until May 31. The government further stated, with the help of school officials, that "the closure would be treated as summer vacation and, if the coronavirus problem were resolved in the interim, educational institutions would reopen in June" (M. Imran et al., 2022a).

SUSPENSION OF THE IMMIGRATION SYSTEM

Some Pakistanis travel to Iran, a neighboring nation, for business. While Tehran was devoting its resources to combating the coronavirus, the pilgrims began to return to Pakistan via land and air routes. The Pakistani government decided to stop flight operations from Iran at that time. Additionally, airport security screening of passengers began. At Taftan, Baluchistan, a quarantine facility was built with the most basic amenities to house the pilgrims. The NIH of Pakistan issued an advisory on an outbreak caused by a novel coronavirus on January 28, 2020, following aviation authorities (Maqsood et al., n.d.).

ROLE OF PAKISTAN ARMY

The National Security Committee, the main body for civil-military coordination, issued its initial statement on March 13, 2020. A delegation also went to Beijing, China, to look at extra test kits and other necessary medical supplies to treat and prevent the virus's potential spread. Military representative Major Gen. Babar Iftikhar said Monday that under government directions, the military chief had requested the arrangement of every accessible troop and clinical assets to help forestall the spread of the fatal infection (Hao et al., n.d.; Nawaz et al., n.d.). Following military orders, the Pakistani government deployed troops on March 23, 2020, to enforce a lockdown on its 220 million residents to stop the potential spread of a novel coronavirus outbreak. The Government of Pakistan's interior ministry has stationed troops in Punjab, Sindh, Khyber Pakhtunkhwa, and Baluchistan. Later, military personnel was stationed in the areas along the line of control, including Gilgit Baltistan and the Kashmir region administered by Pakistan. According to a press release from the Pakistani military's media office, the medical staff will begin its coronavirus-fighting efforts

alongside the Army's soldiers (M. Imran et al., 2022b). After being called under Article 245 to prevent the coronavirus from spreading across the country, Pakistani Army personnel ensure enforcement measures are in place (Mumtaz et al., n.d.).

- Three days for workers in the pay range of 11 to 14.
- Employees with pay range 8 to 10 - two days.
- Persons on Pay Scales 1–7 – One day.

MEDICAL AID FROM ARMY

In a statement, a military representative named Major General Babar Iftikhar said, " Under the Government's instructions, the Chief of the Army Staff gave directions of the deployment of the troops as well as medical staff to combat the coronavirus outbreak. The Army will be in charge of overseeing every aspect of the disciplines and public participation. In addition to centralized facilities at the Armed Forces Institute of Pathology (AFIP), COVID-19 testing facilities have been established in most military hospitals nationwide. The Pakistani Army also established a patient help desk to manage patients and potentially infected individuals. The Pakistani Army is actively working and helping the federal and provincial governments combat the novel coronavirus outbreak. The Chief of Army Staff was also instructed to take the most preventative measures possible to help and support the civil administration for the safety and well-being of the Pakistani people (Noreen et al., n.d. Maroof et al., 2021).

ROLE OF SCIENTISTS

The National Command Authority (NCA), Engineers, and Strategic Plans Division (SPD) all participated in the fight against the coronavirus by contributing their salaries to the COVID-19 Relief Fund, according to a press release from ISPR on March 31, 2020. Armed forces scientists are assisting in the production of sanitizers, and troops are being dispatched to the quarantined areas. Army has completed its virus-fighting crisis and risk management plan.

QUARANTINE CENTRES

NDMA claims that as of March 4, 2020, most three- and four-star hotels were turned into coronavirus quarantine facilities. These facilities are all outfitted with the tools and measurements required. According to a letter from Pakistan's National Disaster Management Authority to the federal government, all the provinces of Pakistan are required to follow these directives. In the letter, NDMA also mentioned that all levels of administration had followed WHO recommendations and taken preventative measures against novel coronaviruses. A single room was assigned to a single coronavirus patient at the three and four-star hotels (Huo et al., n.d.).

PAKISTAN'S LARGEST QUARANTINE FACILITY

To stop the spread of a novel coronavirus, Pakistan's Punjab government opened the nation's largest quarantine facility on March 4, 2020. According to statements from Pakistani government officials, quarantine centers in Multan will serve about 6,000 patients. In response, the Corps Commander of the Army in Lahore stated that military personnel would work with the Punjabi

Government to stop the outbreak and offer support (Emmanuel et al., n.d.). A 1,000-bed quarantine facility was inaugurated by the government on March 22, 2020, in Wazirabad. The project involving the public-private partnership resulted in this noteworthy achievement. A private NGO utilized the Muslim Hands International (MHI) educational complex's space. At once, 1,000 suspected coronavirus patients would be housed in this quarantine facility. MHI also intended to feed the quarantine center and donate 5 million Pakistani rupees (Ghulam & Wei, 2020).

QUARANTINE CENTERS IN THE RAILWAY COACHES

The Quarantine Center was established by Pakistan Railway in train coaches on March 30, 2020. The quarantine facility was constructed using six coaches. Fifty patients can be housed at a time in the quarantine facility. According to the railways minister, the country is experiencing a coronavirus outbreak.

FOOD AND MEDICAL SUPPLIES

To aid the Government of Pakistan, the Ministry of Food Security and Research developed a plan that it presented to the National Food Security. A timely supply of food and rations for the populace must be guaranteed by all of Pakistan's provincial governments, who also demonstrate readiness for food security plans. Pakistan's government has released PKR 50 billion in this regard. During his visit to the Afghan refugee village in Kohat, the Minister of the State and Frontier Region distributed food rations to 1,000 refugee families. In Baluchistan, Khyber Pakhtunkhwa, and Punjab, the UNHCR provided medical supplies and sanitation products (sanitary items, soap, and disinfectants) to the health facilities to help refugees and host communities (Ghulam & Wei, 2020).

A PORTABLE VENTILATOR

A government-established committee tested the ventilator designs and models that many businesses have submitted, and after they pass those tests, the committee will approve the ventilators. Another quick invention made by a Pakistani startup using Artificial Intelligence was a ventilator that was presented to the Pakistan Engineering Council (PEC) and Pakistan Disaster Management Authority (PDMA). The Pakistani government has moved swiftly to address the nation's ventilator shortage by bringing together all relevant public and private businesses and manufacturers of technology products on a single platform. The Pakistani startup for artificial intelligence, "Poulta," also created a ventilator quickly and presented it to the PEC and PDMA. He asserted that there is currently a global shortage of ventilators and that Pakistan might be unable to quickly obtain them from other countries. When ordered from abroad, such ventilators cost between $10,000 and $12,000, but they can be made for only $2200 (Ghulam & Wei, 2020).

THE PRIME MINISTER'S CORONA RELIEF FORCE

The Prime Minister of Pakistan introduced Corona Relief Tigers on March 31, 2020. This entirely voluntary force would help the government deal with emergencies. According to a statement made by the ministry, anyone at the community level can sign up to volunteer through the Prime Minister's Office by filling out an online form. People interested in joining the force must fill out the required form with their name, age, contact information, and union council. Each union council member will distribute food and rations to deserving individuals, such as low-wage earners (Inouye, n.d.). The deputy commissioners of each Pakistani district will supervise and work with these registered volunteers. The task force will be in charge of providing the necessary food items

to hungry people. Union councils will also closely monitor potential patients of this task force (Briefings & 2020, n.d.).

THE DECLINE IN THE CASES

Health authorities and clinical specialists accept that a few environmental factors and preventive activities by the Government of Pakistan, for example, an intelligent lockdown reduced the force of the infection. For instance, a few technological factors and strong youth immunity against the infectious virus may be the most logically sound reasons for Pakistan's surprisingly lower COVID-19 casualty rate compared to developed countries (Kumar, Sulaiman, Hashmi, & 2022). According to Dr. Faisal Sultan, an infectious disease expert and the Prime Minister's exceptional right hand for public health administrations, "The government of Pakistan organized and rational technique and information-driven dynamic alongside contact following and brilliant lockdowns" helped to control the wide spread of coronavirus (Abdullah et al., n.d.).

STRONG IMMUNITY AMONG YOUNG PEOPLE

The large young population of Pakistan has been proposed as one explanation for why adolescent was generally less affected by the infection. The director of the Karachi-based National Institute of Blood Diseases, Dr. Tahir Shamsi, asserted the following: "Youth, especially those under the age of 23, who represent a sizeable portion of Pakistan's population, had unintentionally evolved antibodies against the viral infection with the mass network spread of the COVID-19 in Pakistan. According to Dr. Tariq Rafi, a robust and resistant framework is an additional consideration. Another significant reason for Pakistan's low COVID-19 death rate, according to him, "could be the likelihood that a weak strain of infection stayed dynamic here. Comparatively to 69 percent in Canada, 93 percent in France, and 127 percent in Italy, Pakistan has a COVID-19 death rate of about 21% (Din et al., 2021).

STRATEGY THAT IS COORDINATED, CENTRALIZED, AND COHERENT

After a month of chaos, Pakistan established the (NCOC) in April, using civil and military institutions' combined resources and expertise to fight the destructive infection with active assistance from the (NDMA). (Affairs & 2022, n.d.). Authorities claim that the Track, Trace, and Quarantine (TTQ) system, which follows contacts of positive cases and isolates those tainted, has been more successful than a complete closure (Bhutta et al., n.d.). The focused, logical, evidence-based, and information-driven methodology led to effective infection control and flexible coordination between the areas (Bilawal Khaskheli et al., 2023).

AGE DEMOGRAPHICS OF PAKISTAN

The fact that Pakistan has the option to control the pandemic may be partly due to the country's young average age of 22 and the coronavirus's propensity to affect older people with unanticipated health problems disproportionately. Italy, where the average age is 46.05, has reported more than 35,000 fatalities, while Pakistan's official death toll is only around 6,300. A smoothing bend is even more intriguing when considering how COVID-19 has affected India, a comparative segment with an average age of 26 and crowded urban communities. The most severely affected countries by the COVID-19 pandemic typically have a population between the ages of 35 and 45, so Pakistan's average age of 22 may impact the survivors' situation (Ghulam & Wei,

2020).

CASH RELIEF PACKAGE

Pakistan's Ehsaas Emergency Cash Program is praised as "one of the best" in the Asia Pacific (Akhtar et al., n.d.). The government approved a relief package worth approximately 1200 billion Pakistani rupees (PKR) to combat current and potential coronavirus cases. The Economic Coordination Committee (ECC) explained that this financial package would relieve various areas (S. Ahmed, Ajisola, et al., n.d.). Pakistan was reportedly the Asian nation with the "most elevated number of reactions to social security" during the COVID-19 pandemic, according to the International Policy Centre for Inclusive Growth (IPC-IG) (Ghulam & Wei, 2020).

CONCLUSION AND DISCUSSION

The Pakistani government has done everything possible to reduce the number of coronavirus cases as much as possible up until this point. On the other hand, preventing a potential outbreak attack would call for a well-coordinated approach at all levels, including genuine directed decisions, total readiness, and implementation and evaluation of endless choices. Given that 98 percent of cases recovered and the death rate was only 21%, it was determined that ending any potential outbreaks in the future would be wise. Additionally, lockdowns and other preventative measures implemented by the provincial governments led to decreased COVID-19 cases in the nation. The fact that only 4% of Pakistan's population is over 60 indicates less risk of a COVID-19 outbreak leading to a large-scale death toll. Pakistan's youth-dominated population is viewed as a competitive advantage. With no effective antiviral treatment accessible yet, the Government of Pakistan took sustainable steps to combat coronavirus, as these sustainable radical steps did not harm anything. Instead, they resulted in productive results in controlling the mass spread of coronavirus. This was a result of the Pakistani government taking preventative measures and practical actions before the pandemic outbreak.

Following the World Health Organization's announcement, the Pakistani government released a public readiness and reaction plan for COVID-19 to outline Pakistan's pandemic readiness under the Global Health Security Agenda (WHO, 2020). This arrangement included guidelines / SOPs for international flight specialists, experts at various purpose sections, and health authorities (NHS, 2020). Better understanding and usage of social separation and early recognition of sickness restricted illness transmission among the population. Another conceivable factor is that 64% of the nation's population is under 30 (Hevia et al., 2020). This age group of People in Pakistan is at exceptionally very low risk for COVID-19 because of a more grounded, safe framework that may fight pathogens even more efficiently (Verity et al., 2019). This research interpreted the early responses taken by Pakistan with references and conclusions. We cannot say what will happen as the COVID-19 wave continues.

However, according to WHO and NIH, Pakistan survived a lot in comparison to other countries of the world. According to GHS Index Score, Pakistan is on the 105th number. Still, per the responses and early measures taken by the Government of Pakistan, we can conclude that Pakistan is prosperous in combating the coronavirus. Our research has shown that Pakistan is exceptional worldwide for responding much more quickly. According to ANT theory, the evolving response from different authorities and institutions has been recorded and interpreted based on better results in COVID-19 cases and recoveries. This is a contribution from this study. Therefore, it is

suggested to revise the score of Pakistan as it saved from a massive coronavirus fatality and mortality loss. Moreover, the investigation of (Amailef & Lu, 2011b) concluded that when there is no scientific solution available during a crisis, we can extract the textual information and responses taken by the official, and then we can reach a conclusion. Hence, this research is carried out to record the early reaction of Pakistan to combat COVID-19.

Chloroquine and hydroxychloroquine, two antimalarial medications, are used to treat patients by the medical staff. The results are very fruitful. Pakistani medical professionals are also developing different cures, such as injecting plasma from healed patients into patients. According to the International Policy Centre for Inclusive Growth (IPC-IG), Pakistan is considered the best country in Asia that gave its People "Social Protection." In addition, the WHO chief also stated that world countries should learn from Pakistan in its fight against COVID-19 and future pandemics. From all the radical sustainable steps taken by the Government of Pakistan, we can conclude that Pakistan will soon be able to declare that the new COVID-19 outbreak cases have been contained. These management techniques also provide a base for sustainable practices. Other countries around the globe can also apply strategies adopted by Pakistan to combat future pandemics.

Our results and conclusions are not in line with the projections and study of (M. Ali, Imran, Dynamics, & 2020 2020), which anticipated that the case-related fatalities that can be normal by December 2020 are, individually, 2.5, 2, and 1.5 million. This study emphasized implementing policies and programs centered on enhanced testing, contact tracing, quarantine, and social segregation, as well as interpretations of sustainable steps taken by the Government of Pakistan. Our research results adapted the ANT theory as the role of the actor (Government) and actants (stakeholders and institutions) evolves during a crisis. Therefore, we can conclude that all the actor and actants play their vital role as per pieces of evidence that the Government of Pakistan survived the intense high hit of COVID-19.

It's worth noting that Pakistan still faces challenges in eradicating COVID-19, and battles have not ended yet. However, the progress made so far is significant. The WHO's recognition of Pakistan's efforts is a testament to the hard work of healthcare workers, volunteers, and community leaders nationwide. Pakistan's healthcare system was already under immense strain before the pandemic, and the virus only added to the burden. There were not enough hospital beds, ventilators, or medical staff to cope with the influx of patients. The healthcare system was overwhelmed, and many patients were turned away, leading to a rise in fatalities. The vaccine rollout in Pakistan has been slow, with limited vaccine supplies and distribution challenges. The government has struggled to provide enough doses to vaccinate the population, and vaccine hesitancy has also been an issue. Based on the lessons learned from tackling SARS, the COVID-19 containment measures were stricter and more organized and were initiated earlier and on a larger scale than those used with SARS.

Although China has made significant progress, as can be seen in its response to COVID-19 compared to SARS, some exposed weaknesses suggest that further efforts should be made to improve the capacity of the disease prevention and control systems. First, the CDC's staffing, equipment, and financial support should be ensured. Second, the CDC's integration with medical institutions regarding disease prevention and treatment should be strengthened. Third, the information-sharing mechanism between regions and departments should be improved.

RECOMMENDATIONS

Pakistan is lucky enough to record a gigantic decay. However, specialists caution individuals to embrace the "new typical" and follow key precautionary measures until an antibody is here. The solid commitment of specialists and medical caretakers, quick actions by the administration to help the medical services framework, and fast activities taken by the authorities to guarantee well-being rules have helped Pakistan almost win the battle against COVID-19. Yet, specialists state the fight is "not finished at this point." The danger of a subsequent wave looms if individuals become "excessively loose" and quit observing the three brilliant principles: wearing masks, constant hand washing, and keeping up physical separation.

LIMITATIONS

This study has some restrictions. To combat COVID-19, it first presents the findings from cases and Pakistan's experiences. In this way, the discoveries apply to the contemplated region; as an outcome, a more detailed examination is essential to add the extension and the proposed model's generalizability (Urquhart, Lehmann, & Myers, 2010). Second, we know that different analysts may have concocted an alternate conceptualization. To alleviate this constraint and the potential inclination hidden in our information examination, we got information from the authentic site of the legislature of Pakistan. Future researchers may attempt to get information by going truly (quarterly & 1993, n.d.). We don't guarantee that the classifications and connections proposed in the current investigation of COVID-19 cases in Pakistan are thorough. Instead, they present an underlying assemblage of information about an applicable and new part of creating and appropriating sustainable practices to the battle with COVID-19. Third, we recognize the extent of our examination as an expected impediment. Specifically, there has been research on different parts of COVID-19, which cannot be disregarded, and explicitly, the impact of institutional powers on the reception of supportable practices towards COVID-19, which we did not consider in our examination to date. There is very little global standard for COVID-19 statistical data collection at medical facilities because every country, even within the country, every state, province, and individual hospital, has its unique documentation process. So we can elaborate that there is the challenge of data reliability. There is also the issue of geographical testing worldwide; some developed countries have extensive COVID-19 testing systems.

On the contrary, developing nations have scarce systems of testing. Moreover, the study data and statistics are still going on. Therefore, we can give interpretations as per available statistics.

FUTURE RESEARCH

Since our examination depends on one contextual analysis of Pakistan's COVID-19 cases trend line, we will continue to gather extra information from different nations and angles, just as after some time. As a result, we will be able to improve and expand our fundamental model and produce findings that are more broadly applicable. We also suggest primary exploration routes for the future. First, we urge individual scientists to lead further investigations on appropriating manageable practices to continue to more formal hypothetical models. We have endeavored to give an underlying model of how methods are adjusted to reflect gainful outcomes in the battle against COVID-19, based on which future examination can improve our comprehension of how maintainable practice's structure, diffuse, or sway nations and the more extensive society.

In particular, we will explore in more subtleties how successful administration of pandemics

adds to the turn of events and execution of supportability rehearses. Second, we contend there is also to draw from the existing writing. For the most part, captivating with an existent beginning assemblage of information can assist with continuing to more formal hypothetical models (quarterly & 1993, n.d.). The subject of manageability traverses different order territories; consequently, financial aspects, humanism, brain research, planning, designing, or other viewpoints will probably further develop our insight about how new the executives of COVID-19 practices can be built up that contribute decidedly to the rising worldwide difficulties. Future studies can use this study as a case of best management and compare it with other countries' early measures and efficient management of COVID-19.

-, D. R., at, S. Jayakumar. T. T. of C.-19, & 2020, undefined. (2020). The trend of COVID-19 at Bengaluru: prediction to continue the better epidemic management. *Papers.Ssrn.Com*, *74*(8). https://doi.org/10.1111/ijcp.13528

Abdullah, M., Ali, N., Aslam, A., … M. J.-I. journal of, & 2022, undefined. (n.d.). Factors affecting the mode choice behavior before and during COVID-19 pandemic in Pakistan. *Elsevier*. Retrieved 26 February 2023, from https://www.sciencedirect.com/science/article/pii/S204604302100054X

Affairs, A. Q.-P., & 2022, undefined. (n.d.). The Politics of Pakistan's COVID-19 Response: A State-in-Society Approach. *Ingentaconnect.Com*. Retrieved 26 February 2023, from https://www.ingentaconnect.com/contentone/paaf/paaf/2022/00000095/00000004/art00003

Aftab, R., Naveed, M., & Hanif, S. (2021). An analysis of Covid-19 implications for SMEs in Pakistan. *Journal of Chinese Economic and Foreign Trade Studies*, *14*(1), 74–88. https://doi.org/10.1108/JCEFTS-08-2020-0054/FULL/HTML

Ahmed, A. M., Rasool, S., Prentice, C., & Ahmad, M. H. (2022). Beliefs about the factors that motivate prosocial sentiments among people in the privileged class of Pakistan during the COVID-19 pandemic. *Journal of Social Issues*, *78*(3), 717–736. https://doi.org/10.1111/JOSI.12506

Ahmed, S., Ajisola, M., Azeem, K., … P. B.-B. global, & 2020, undefined. (n.d.). to COVID-19 on access to healthcare for non-COVID-19 health issues in slum communities of Bangladesh, Kenya, Nigeria and Pakistan: results of pre-COVID …. *Gh.Bmj.Com*. Retrieved 26 February 2023, from https://gh.bmj.com/content/5/8/e003042.abstract

Ahmed, S., Jafri, L., Majid, H., Khan, A., … F. G.-A. of medicine and, & 2020, undefined. (n.d.). Challenges amid COVID-19 times-Review of the changing practices in a clinical chemistry laboratory from a developing country. *Elsevier*. Retrieved 25 February 2023, from https://www.sciencedirect.com/science/article/pii/S2049080120301400

Akhtar, H., Afridi, M., Akhtar, S., … H. A.-J. public health, & 2021, undefined. (n.d.). Pakistan's response to COVID-19: overcoming national and international hypes to fight the pandemic. *Publichealth.Jmir.Org*. Retrieved 26 February 2023, from https://publichealth.jmir.org/2021/5/e28517/

Al Jazeera Media Network. (2022, December 25). *China to stop publishing daily COVID figures of cases, deaths*.

Alah, M., Abdeen, S., Health, V. K.-J. of I. and P., & 2020, undefined. (n.d.). The first few cases and fatalities of Corona Virus Disease 2019 (COVID-19) in the Eastern Mediterranean Region of the World Health Organization: A rapid. *Elsevier*. Retrieved 25 February 2023, from https://www.sciencedirect.com/science/article/pii/S1876034120305190

Ali, I., Sadique, S., & Ali, S. (2020). COVID-19 Significantly Affects Maternal Health: A Rapid-Response Investigation from Pakistan. *Frontiers in Global Women's Health*, *1*. https://doi.org/10.3389/FGWH.2020.591809/FULL

Ali, M., Imran, M., Dynamics, A. K.-J. of B., & 2020, undefined. (2020). Analysis and Prediction of the COVID-19 outbreak in Pakistan. *Taylor & Francis*, *14*(1), 730–747.

https://doi.org/10.1080/17513758.2020.1814883

Ali, W., Ali, S., Khan, M., & Ghulam, W. (2020). *Financial satisfaction of street vendors in Azad Kashmir: Moderating role of Customer relationship management*. https://www.academia.edu/download/63156982/530-april202020200501-16427-8ciqt2.pdf

Alradhawi, M., Shubber, N., … J. S.-I. journal of, & 2020, undefined. (n.d.). Effects of the COVID-19 pandemic on mental well-being amongst individuals in society-A letter to the editor on "The socio-economic implications of the. *Ncbi.Nlm.Nih.Gov*. Retrieved 14 March 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7198428/

Amailef, K., & Lu, J. (2011a). A mobile-based emergency response system for intelligent m-government services. *Journal of Enterprise Information Management*, *24*(4), 338–359. https://doi.org/10.1108/17410391111148585/FULL/HTML

Amailef, K., & Lu, J. (2011b). A mobile-based emergency response system for intelligent m-government services. *Journal of Enterprise Information Management*, *24*(4), 338–359. https://doi.org/10.1108/17410391111148585/FULL/HTML

Anckar, C. (2008). On the applicability of the most similar systems design and the most different systems design in comparative research. *International Journal of Social Research Methodology*, *11*(5), 389–401. https://doi.org/10.1080/13645570701401552

Asghar, N., Batool, M., … F. F.-R. of E., & 2020, undefined. (n.d.). COVID-19 pandemic and Pakistan economy: a preliminary survey. *Reads.Spcrd.Org*. Retrieved 14 March 2023, from http://reads.spcrd.org/index.php/reads/article/view/222

Atif, M., Malik, I., Mushtaq, I., open, S. A.-B., & 2019, undefined. (n.d.). Medicines shortages in Pakistan: a qualitative study to explore current situation, reasons and possible solutions to overcome the barriers. *Bmjopen.Bmj.Com*. Retrieved 25 February 2023, from https://bmjopen.bmj.com/content/9/9/e027028.abstract

Banerjee, D., psychiatry, M. R.-I. journal of social, & 2020, undefined. (2020). Social isolation in Covid-19: The impact of loneliness. *Journals.Sagepub.Com*, *66*(6), 525–527. https://doi.org/10.1177/0020764020922269

Begović, M. (2022). Effects of COVID-19 on society and sport a national response. *Managing Sport and Leisure*, *27*(3), 241–246. https://doi.org/10.1080/23750472.2020.1779115

Benatar, S., & Daneman, D. (2020). Disconnections between medical education and medical practice: A neglected dilemma. *Global Public Health*, *15*(9), 1292–1307. https://doi.org/10.1080/17441692.2020.1756376

Bhutta, Z., Siddiqi, S., Hafeez, A., Islam, M., & Sultan, F. (n.d.). Beyond the numbers: understanding the global diversity of COVID-19 epidemiology and response. *Bmj.Com*. Retrieved 26 February 2023, from https://www.bmj.com/sites/default/files/attachments/bmj-article/pre-pub-history/author_response_12.4.21_0.pdf

Bilawal Khaskheli, M., Wang, S., Hussain, R. Y., Jahanzeb Butt, M., Yan, X. S., & Majid, S. (2023). Global law, policy, and governance for effective prevention and control of COVID-19: A

comparative analysis of the law and policy of Pakistan, China, and Russia. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/FPUBH.2022.1035536/PDF

brief, M. A.-D. in, & 2020, undefined. (n.d.). Using the kalman filter with Arima for the COVID-19 pandemic dataset of Pakistan. *Elsevier*. Retrieved 25 February 2023, from https://www.sciencedirect.com/science/article/pii/S2352340920307484

Briefings, O. A.-E. E., & 2020, undefined. (n.d.). Pakistan will have to rely more on IMF. *Emerald.Com*. Retrieved 26 February 2023, from https://www.emerald.com/insight/content/doi/10.1108/OXAN-DB251748/full/html

Brouder, P., Teoh, S., Salazar, N. B., Mostafanezhad, M., Pung, J. M., Lapointe, D., Higgins Desbiolles, F., Haywood, M., Hall, C. M., & Clausen, H. B. (2020). Reflections and discussions: tourism matters in the new normal post COVID-19. *Tourism Geographies*, *22*(3), 735–746. https://doi.org/10.1080/14616688.2020.1770325

Cai, Y., and, T. C.-T. R. P. E. L., & 2020, undefined. (n.d.). A United Nations' Sustainable Development Goals perspective for sustainable textile and apparel supply chain management. *Elsevier*. Retrieved 25 February 2023, from https://www.sciencedirect.com/science/article/pii/S136655452030661X

Chandir, S., Siddiqi, D., Mehmood, M., Vaccine, H. S.-, & 2020, undefined. (n.d.). Impact of COVID-19 pandemic response on uptake of routine immunizations in Sindh, Pakistan: an analysis of provincial electronic immunization registry data. *Elsevier*. Retrieved 25 February 2023, from https://www.sciencedirect.com/science/article/pii/S0264410X20310501

Chen, S., Brahma, S., Mackay, J., Cao, C., & Aliakbarian, B. (2020). The role of smart packaging system in food supply chain. *Journal of Food Science*, *85*(3), 517–525. https://doi.org/10.1111/1750-3841.15046

Chernysh, Y., Sustainability, H. R.-, & 2020, undefined. (n.d.). International collaboration in the field of environmental protection: trend analysis and COVID-19 implications. *Mdpi.Com*. https://doi.org/10.3390/su122410384

Chien, F. S., Sadiq, M., Kamran, H. W., Nawaz, M. A., Hussain, M. S., & Raza, M. (2021). Co-movement of energy prices and stock market return: environmental wavelet nexus of COVID-19 pandemic from the USA, Europe, and China. *Environmental Science and Pollution Research*, *28*(25), 32359–32373. https://doi.org/10.1007/S11356-021-12938-2

Cinelli, M., Quattrociocchi, W., Galeazzi, A., reports, C. V.-S., & 2020, undefined. (n.d.). The COVID-19 social media infodemic. *Springer*. Retrieved 14 March 2023, from https://link.springer.com/content/pdf/10.1038/s41598-020-73510-5.pdf

Coetzee, B. J., & Kagee, A. (2020). Structural barriers to adhering to health behaviours in the context of the COVID-19 crisis: Considerations for low- and middle-income countries. *Global Public Health*, *15*(8), 1093–1102. https://doi.org/10.1080/17441692.2020.1779331

Dankert, R. (2011). *Balanceren tussen uitvoering en bewuste afwijking van beleid: De implementatie van strategisch voorraadbeleid door woningcorporaties*. https://books.google.com/books?hl=en&lr=&id=DTOVSGCyzQQC&oi=fnd&pg=PP13&dq

=Dankert,+R.+(2011)&ots=grnUh7RAUx&sig=dsj6Nfp_tK2GhbeSk1p2oP0p5Hg

Davies, K. (2021). Festivals Post Covid-19. *Leisure Sciences*, *43*(1–2), 184–189. https://doi.org/10.1080/01490400.2020.1774000

Development, B. S.-P. H. C. R. &, & 2021, undefined. (n.d.). Strengthening health system building blocks: configuring post-COVID-19 scenario in Pakistan. *Cambridge.Org*. https://doi.org/10.1017/S1463423621000128

Din, M., Ali, H., Khan, M., Waris, A., Ullah, S., Kashif, M., Rahman, S., & Ali, M. (2021). Impact of COVID-19 on polio vaccination in Pakistan: a concise overview. *Reviews in Medical Virology*, *31*(4). https://doi.org/10.1002/RMV.2190

Driggin, E., Madhavan, M. V., Bikdeli, B., Chuich, T., Laracy, J., Biondi-Zoccai, G., Brown, T. S., Der Nigoghossian, C., Zidar, D. A., Haythe, J., Brodie, D., Beckman, J. A., Kirtane, A. J., Stone, G. W., Krumholz, H. M., & Parikh, S. A. (2020). Cardiovascular Considerations for Patients, Health Care Workers, and Health Systems During the COVID-19 Pandemic. *Journal of the American College of Cardiology*, *75*(18), 2352–2371. https://doi.org/10.1016/J.JACC.2020.03.031

Emmanuel, F., Hassan, A., … A. A.-C. J. of M., & 2023, undefined. (n.d.). Pakistan's COVID-19 Prevention and Control Response Using the World Health Organization's Guidelines for Epidemic Response Interventions. *Cureus.Com*. Retrieved 26 February 2023, from https://www.cureus.com/articles/122922-pakistans-covid-19-prevention-and-control-response-using-the-world-health-organizations-guidelines-for-epidemic-response-interventions.pdf

Etzkowitz, H. (1987). The Process of Science: Science in Action . How to Follow Scientists and Engineers through Society. Bruno Latour. Harvard University Press, Cambridge, MA, 1987. viii, 274 pp., illus. $25. . *Science*, *238*(4827), 695–696. https://doi.org/10.1126/SCIENCE.238.4827.695

Ezenwa, B. N., Fajolu, I. B., Akinajo, O. R., Makwe, C. C., Oluwole, A. A., Akase, I. E., Afolabi, B. B., & Ezeaka, V. C. (2020). Management of covid-19: a practical guideline for maternal and newborn health care providers in Sub-Saharan Africa. *Journal of Maternal-Fetal and Neonatal Medicine*, 1–7. https://doi.org/10.1080/14767058.2020.1763948

Feng, S., Shen, C., Xia, N., Song, W., … M. F.-T. L. R., & 2020, undefined. (n.d.). Rational use of face masks in the COVID-19 pandemic. *Thelancet.Com*. Retrieved 25 February 2023, from https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30134-X/fulltext?mod=article_inline

Freedman, L. (2020). Strategy for a Pandemic: The UK and COVID-19. *Survival*, *62*(3), 25–76. https://doi.org/10.1080/00396338.2020.1763610

Ghulam, W., & Wei, J. (2020). *Risk Management and Early Measures Taken by Pakistan to Combat with Novel Corona Virus (COVID-2019) in the Light of Global Health Security Index (GHS)*. https://www.preprints.org/manuscript/202008.0730

Godman, B., Haque, M., Islam, S., Iqbal, S., Urmi, U. L., Kamal, Z. M., Shuvo, S. A., Rahman, A., Kamal, M., Haque, M., Jahan, I., Islam, M. Z., Hossain, M. M., Munzur-E-Murshid, Kumar, S., Charan, J., Bhatt, R., Dutta, S., Abhayanand, J. P., … Sefah, I. (2020). Rapid Assessment of

Price Instability and Paucity of Medicines and Protection for COVID-19 Across Asia: Findings and Public Health Implications for the Future. *Frontiers in Public Health*, *8*. https://doi.org/10.3389/FPUBH.2020.585832/FULL

Haktanir, A., Seki, T., & Dilmaç, B. (2022). Adaptation and evaluation of Turkish version of the fear of COVID-19 Scale. *Death Studies*, *46*(3), 719–727. https://doi.org/10.1080/07481187.2020.1773026

Hao, W., Shah, S., Nawazb, A., … M. B.-R. A., & 2020, undefined. (n.d.). COVID-19 epidemic spread and the impact on public health & safety policy: an analysis of the adoption of preventive measures and effective management. *Academia.Edu*. Retrieved 26 February 2023, from https://www.academia.edu/download/92981384/20201005082626pmSSCI-220.pdf

Hevia, C., Series, A. N.-U. L. C.-19 P. D., & 2020, undefined. (2020). A conceptual framework for analyzing the economic impact of COVID-19 and its policy implications. *Undp.Org*. https://www.undp.org/sites/g/files/zskgke326/files/migration/latinamerica/UNDP-RBLAC-CD19-PDS-Number1-EN.pdf

Hitchings, R. (2003). People, plants and performance: On actor network theory and the material pleasures of the private garden. *Social and Cultural Geography*, *4*(1), 99–114. https://doi.org/10.1080/1464936032000049333

Huo, C., Hameed, J., Nawaz, A., … S. S.-J. of K. S., & 2021, undefined. (n.d.). Scientific risk performance analysis and development of disaster management framework: a case study of developing Asian countries. *Elsevier*. Retrieved 26 February 2023, from https://www.sciencedirect.com/science/article/pii/S1018364721000094

Hussain, A., Yadav, S., Hadda, V., … T. S.-E. review of, & 2020, undefined. (n.d.). Covid-19: a comprehensive review of a formidable foe and the road ahead. *Taylor & Francis*. Retrieved 14 March 2023, from https://www.tandfonline.com/doi/abs/10.1080/17476348.2020.1782198

Imran, M., Ahmad, B., Maqbool, F., Ahmad, A., Malik, A., Aziz, S., Rasheed, F., & Akhter, T. S. (2022a). Preventive Measures and Active Response against COVID-19 Taken by All Four Provinces, Two Independent Territories, and the Federal State of Islamic Republic of Pakistan, Islamabad. *Social Work in Public Health*, *37*(4), 381–396. https://doi.org/10.1080/19371918.2021.2011524

Imran, M., Ahmad, B., Maqbool, F., Ahmad, A., Malik, A., Aziz, S., Rasheed, F., & Akhter, T. S. (2022b). Preventive Measures and Active Response against COVID-19 Taken by All Four Provinces, Two Independent Territories, and the Federal State of Islamic Republic of Pakistan, Islamabad. *Social Work in Public Health*, *37*(4), 381–396. https://doi.org/10.1080/19371918.2021.2011524

Imran, N., Zeshan, M., & Pervaiz, Z. (2020). Mental health considerations for children & adolescents in covid-19 pandemic. *Pakistan Journal of Medical Sciences*, *36*(COVID19-S4), S67–S72. https://doi.org/10.12669/PJMS.36.COVID19-S4.2759

Inouye, I. (n.d.). POLICY GUIDANCE FOR PAKISTAN'S OSCILLATING RESPONSE TO COVID-19. *JSTOR*. Retrieved 26 February 2023, from https://www.jstor.org/stable/pdf/resrep25703.pdf

Ioannou, I., Review, G. S.-H. B., & 2019, undefined. (2019). Yes, sustainability can be a strategy. *Clsbe.Lisboa.Ucp.Pt*. https://clsbe.lisboa.ucp.pt/sites/default/files/hbr_-_yes_sustainability_can_be_a_strategy.pdf

Jabbar, R., Studies, M. M.-J. J. of D. R., & 2021, undefined. (n.d.). Managing health disasters and Civil-Military Cooperation: A case of COVID-19 in Pakistan. *Scielo.Org.Za*. Retrieved 25 February 2023, from http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1996-14212021000100021

Jabeen, A., Ansari, J., Ikram, A., … S. A.-G., & 2020, undefined. (n.d.). Comparison of actions taken by Pakistan, United Arab Emirates and Vietnam for COVID-19 prevention and control. *Jglobalbiosecurity.Com*. Retrieved 25 February 2023, from https://www.jglobalbiosecurity.com/articles/79/

Javed, A., Mohandas, E., medical, A. D. S.-P. journal of, & 2020, undefined. (n.d.). The interface of psychiatry and COVID-19: Challenges for management of psychiatric patients. *Ncbi.Nlm.Nih.Gov*. Retrieved 26 February 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7372677/

Khalid, A., & Ali, S. (2020). COVID-19 and its Challenges for the Healthcare System in Pakistan. *Asian Bioethics Review*, *12*(4), 551–564. https://doi.org/10.1007/S41649-020-00139-X

Khan, N., Fahad, S., … S. F.-A. at S., & 2020, undefined. (n.d.). Quarantine role in the control of corona virus in the world and its impact on the world economy. *Papers.Ssrn.Com*. Retrieved 25 February 2023, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3556940

Khan, N., Naushad, M., Akbar, A., Faisal, S., & Fahad, S. (2020). Critical Review of COVID-2019 in Pakistan and Its Impact on Pakistan Economy. *SSRN Electronic Journal*. https://doi.org/10.2139/SSRN.3629718

Khan, N., Naushad, M., Fahad, S., … S. F.-J. of H., & 2020, undefined. (n.d.). Covid-2019 and world economy. *Papers.Ssrn.Com*. Retrieved 25 February 2023, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3566632

Khan, S., Siddique, R., … A. A.-J. of H., & 2020, undefined. (2020). Novel coronavirus, poor quarantine, and the risk of pandemic. *Journalofhospitalinfection.Com*. https://doi.org/10.1016/j.jhin.2020.01.019

Kumar, N., Sulaiman, S., Hashmi, F., one, A. Q.-P., & 2022, undefined. (n.d.). Survey data of public in Sindh Pakistan regarding willingness to accept COVID-19 vaccination. *Journals.Plos.Org*. Retrieved 26 February 2023, from https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0270900

Lakshmi Priyadarsini, S., & Suresh, M. (2020). Factors influencing the epidemiological characteristics of pandemic COVID 19: A TISM approach. *International Journal of Healthcare Management*, *13*(2), 89–98. https://doi.org/10.1080/20479700.2020.1755804

Latour, B. (1999). On Recalling Ant. *The Sociological Review*, *47*(1_suppl), 15–25. https://doi.org/10.1111/J.1467-954X.1999.TB03480.X

Latour, B. (2007a). *Reassembling the social: An introduction to actor-network-theory*. https://books.google.com/books?hl=en&lr=&id=BgJREAAAQBAJ&oi=fnd&pg=PR7&dq=Reassembling+the+Social:+An+Introduction+to+Actor-Network-Theory.-Oxford:+Clarendon&ots=Z6kz-CtMWa&sig=ESQwatxXXx8Q2inNL0ozu3wymw8

Latour, B. (2007b). *Reassembling the social: An introduction to actor-network-theory*. https://books.google.com/books?hl=en&lr=&id=BgJREAAAQBAJ&oi=fnd&pg=PR7&dq=Reassembling+the+Social:+An+Introduction+to+Actor-Network-Theory.-Oxford:+Clarendon&ots=Z6kz-CvJTb&sig=TUEPKBJPJiadfUnmLS90oifRYr0

Leong, A. Z., Lim, J. X., Tan, C. H., Teo, K., Nga, V. D. W., Lwin, S., Chou, N., & Yeo, T. T. (2021). COVID-19 response measures–a Singapore Neurosurgical Academic Medical Centre experience segregated team model to maintain tertiary level neurosurgical care during the COVID-19 outbreak. *British Journal of Neurosurgery*, *35*(6), 719–724. https://doi.org/10.1080/02688697.2020.1758629

Lum, T., Shi, C., Wong, G., & Wong, K. (2020). COVID-19 and Long-Term Care Policy for Older People in Hong Kong. *Journal of Aging and Social Policy*, *32*(4–5), 373–379. https://doi.org/10.1080/08959420.2020.1773192

Luo, Y., Liu, W., Yue, X., Sustainability, M. A. R.-, & 2020, undefined. (n.d.). Sustainable emergency management based on intelligent information processing. *Mdpi.Com*. https://doi.org/10.3390/su12031081

Maior, M. C.-A., & 2020, undefined. (n.d.). Pakistan 2020: The PTI government amidst COVID-19 pandemic. *Search.Proquest.Com*. Retrieved 25 February 2023, from https://search.proquest.com/openview/466b533d22b8b3f22bbaeafd0b13a40e/1?pq-origsite=gscholar&cbl=5193676

Malik, S., & Rehmat, A. (2020). *Pandemic, Economy and Response Mechanism: An overview*. https://www.think-asia.org/handle/11540/12247

Mamun, M., Brain, I. U.-, behavior, undefined, immunity, and, & 2020, undefined. (n.d.). COVID-19 suicides in Pakistan, dying off not COVID-19 fear but poverty?–The forthcoming economic challenges for a developing country. *Elsevier*. Retrieved 13 March 2023, from https://www.sciencedirect.com/science/article/pii/S0889159120308618

Management, M. M.-J. of R. and F., & 2020, undefined. (n.d.). Prevention is better than the cure: Risk management of COVID-19. *Mdpi.Com*. Retrieved 25 February 2023, from https://www.mdpi.com/655422

Maqsood, A., Abbas, J., Rehman, G., in, R. M.-C. R., & 2021, undefined. (n.d.). The paradigm shift for educational system continuance in the advent of COVID-19 pandemic: mental health challenges and reflections. *Elsevier*. Retrieved 26 February 2023, from https://www.sciencedirect.com/science/article/pii/S2666518220300115

Mehta, V. (2020). The new proxemics: COVID-19, social distancing, and sociable space. *Journal of Urban Design*, 669–674. https://doi.org/10.1080/13574809.2020.1785283

Meo, S., Klonoff, D., Sci, J. A.-E. R. M. P., & 2020, undefined. (n.d.). Efficacy of chloroquine and hydroxychloroquine in the treatment of COVID-19. *Pesquisa.Bvsalud.Org*. Retrieved 20 March 2023, from https://pesquisa.bvsalud.org/global-literature-on-novel-coronavirus-

2019-ncov/resource/fr/covidwho-202585

Miyawaki, A., & Tsugawa, Y. (2022). Health and Public Health Implications of COVID-19 in Asian Countries. *Asian Economic Policy Review*, *17*(1), 18–36. https://doi.org/10.1111/AEPR.12358

Moeen, M., Haider, Z., Shikoh, S., Rizwan, N., & Davies, S. (2021a). *COVID-19: Estimating impact on the economy and poverty in Pakistan: Using SAM Multiplier Model*. https://books.google.com/books?hl=en&lr=&id=hvEWEAAAQBAJ&oi=fnd&pg=PA4&dq=Moeen,+M.+S.,+Haider,+Z.,+Shikoh,+S.+H.,+Rizwan,+N.,+Davies,+S.,+%26+Rana,+A.+W.+(2021).+COVID%3F19:+Estimating+impact+on+the+economy+and+poverty+in+Pakistan:+Using+SAM+Multiplier++Model.+Intl+Food+Policy+Res+Inst.&ots=8Lo6XYjXOb&sig=Dz6UqXM2MLgQnqPUR-Vs0pozx7U

Moeen, M., Haider, Z., Shikoh, S., Rizwan, N., & Davies, S. (2021b). *COVID-19: Estimating impact on the economy and poverty in Pakistan: Using SAM Multiplier Model*. https://books.google.com/books?hl=en&lr=&id=hvEWEAAAQBAJ&oi=fnd&pg=PA4&dq=Estimating+impact+on+the+economy++and+poverty+in+Pakistan:+Using+SAM+Multiplier+Model.&ots=8Lo6XYj_P4&sig=8Bs8bIcqBSNLLk9_XbR5MLU168U

Mucci, F., Mucci, N., Neuropsychiatry, F. D.-C., & 2020, undefined. (n.d.). Lockdown and isolation: psychological aspects of COVID-19 pandemic in the general population. *Ncbi.Nlm.Nih.Gov*. Retrieved 14 March 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8629090/

Mumtaz, S., Science, S. G.-L. and, & 2021, undefined. (n.d.). Third wave of COVID-19 Epidemic in Pakistan. *13.67.75.196*. Retrieved 26 February 2023, from http://13.67.75.196/index.php/life-and-science/article/view/198

Muñoz-Pascual, L., Curado, C., Sustainability, J. G.-, & 2019, undefined. (2019). The triple bottom line on sustainable product innovation performance in SMEs: A mixed methods approach. *Mdpi.Com*. https://doi.org/10.3390/su11061689

Naeem, M., Mashwani, W., Abiad, M., Journal, H. S.-… E., & 2023, undefined. (n.d.). Soft computing techniques for forecasting of COVID-19 in Pakistan. *Elsevier*. Retrieved 14 March 2023, from https://www.sciencedirect.com/science/article/pii/S1110016822004860

Nawaz, A., Su, X., Barkat, M., Asghar, S., … A. A.-F. in public, & 2020, undefined. (n.d.). spread and its management through governance and leadership response influencing the arising challenges around COVID-19 in Pakistan—a lesson learnt …. *Frontiersin.Org*. Retrieved 26 February 2023, from https://www.frontiersin.org/articles/10.3389/fpubh.2020.573431/full

Network, A. R.-A. D. R. (n.d.). Pandemic Crisis and Democratic Governance in Pakistan. *Adrnresearch.Org*. Retrieved 25 February 2023, from http://adrnresearch.org/publications/list.php?at=download&down=IKJ%2Bec3RiQ7kSYMvRQbBliCK2p0wySCk91G0OiesN62ruQbhBnexGxcIIO6h%2FYUnCnUHvjYUXLLORT%2BAMd%2BDYYoKlsEEE7Wotd1yf%2BtsPPcVLL0zJSlh4s3%2BrHv6oDYQwQcGVP7VASLHWNF77GzydZWtBQQQjypJrQaCWZgZQclX%2FrDLIkPEpalSSALpPAcyxIoJ4XgkFP8h4f8m24tz33pEtC96HkMjelCoo0HYBd922Ef8NG7JgxlAzw5NiyBtzDASyimL%2F41mpxo

zkf7%2FRmv0zCf1Mq4euzd7e0ioxaTXHMSIJ8lYnj4Vh4yj%2BLZn%2BIGyioqGJfJrntB7XtuKg9%2F5Sxw5ZTJWrmXmdYhqphmRJrXhL3RAuqT2J9mS37I%2BE7PKkoZ968rmDISUM3dN1u9WOI4XOSKPlGUrQNIhNNU%3D#page=181

Noreen, N., Dil, S., Niazi, S., Naveed, I., … N. K.-G., & 2020, undefined. (n.d.-a). COVID 19 pandemic & Pakistan; limitations and gaps. *Jglobalbiosecurity.Com*. Retrieved 14 March 2023, from https://www.jglobalbiosecurity.com/articles/63/

Noreen, N., Dil, S., Niazi, S., Naveed, I., … N. K.-G., & 2020, undefined. (n.d.-b). COVID 19 pandemic & Pakistan; limitations and gaps. *Jglobalbiosecurity.Com*. Retrieved 26 February 2023, from https://www.jglobalbiosecurity.com/articles/63/

Noreen, N., Dil, S., Niazi, S. U. K., Naveed, I., Khan, N. U., Khan, F. K., Tabbasum, S., & Kumar, D. (2020). COVID 19 Pandemic & Pakistan; Limitations and Gaps. *Global Biosecurity*, *1*(4). https://doi.org/10.31646/GBIO.63

Noreen, N., Rehman, S. A. U., Naveed, I., Niazi, S. U. K., & Furqan, I. B. (2021). Pakistan's COVID-19 Outbreak Preparedness and Response: A Situational Analysis. *Health Security*, *19*(6), 605–615. https://doi.org/10.1089/HS.2021.0006

Organization, W. H. (2020). *Coronavirus disease 2019 (COVID-19): situation report, 72*. https://apps.who.int/iris/bitstream/handle/10665/331685/nCoVsitrep01Apr2020-eng.pdf

Quarterly, G. J.-B. and R. I., & 2020, undefined. (n.d.). China's novel coronavirus pneumonia battle: Responses, results, and reflections. *Academia.Edu*. Retrieved 14 March 2023, from https://www.academia.edu/download/65671286/7_GONG_JIANHUA_ING.pdf

quarterly, W. O.-M., & 1993, undefined. (n.d.). CASE tools as organizational change: Investigating incremental and radical changes in systems development. *JSTOR*. Retrieved 26 February 2023, from https://www.jstor.org/stable/249774

Qureshi, W., Saud, M., Brief, Q. M.-D. in, & 2020, undefined. (n.d.). Dataset on the fear, preventive behaviour and anxiety disorder during the COVID-19 pandemic in Khyber Pakhtunkhwa, Pakistan. *Elsevier*. Retrieved 26 February 2023, from https://www.sciencedirect.com/science/article/pii/S2352340920314608

Radwan, E., Public, A. R.-E. J. of E. and, & 2020, undefined. (n.d.). The spread of the pandemic of social media panic during the COVID-19 outbreak. *Ejeph.Com*. Retrieved 14 March 2023, from https://www.ejeph.com/article/the-spread-of-the-pandemic-of-social-media-panic-during-the-covid-19-outbreak-8277

Ramesh, N., Siddaiah, A., & Joseph, B. (2020). Tackling corona virus disease 2019 (COVID 19) in workplaces. *Indian Journal of Occupational and Environmental Medicine*, *24*(1), 16–18. https://doi.org/10.4103/IJOEM.IJOEM_49_20

Rasheed, R., Rizwan, A., Javed, H., … F. S.-… S. and P., & 2021, undefined. (n.d.). Socio-economic and environmental impacts of COVID-19 pandemic in Pakistan—an integrated analysis. *Springer*. Retrieved 25 February 2023, from https://link.springer.com/article/10.1007/s11356-020-12070-7

Rasul, G., Nepal, A. K., Hussain, A., Maharjan, A., Joshi, S., Lama, A., Gurung, P., Ahmad, F., Mishra,

A., & Sharma, E. (2021). Socio-Economic Implications of COVID-19 Pandemic in South Asia: Emerging Risks and Growing Challenges. *Frontiers in Sociology*, *6*. https://doi.org/10.3389/FSOC.2021.629693/FULL

Raza, A., Matloob, S., Abdul Rahim, N. F., Abdul Halim, H., Khattak, A., Ahmed, N. H., Nayab, D. E., Hakeem, A., & Zubair, M. (2020). Factors Impeding Health-Care Professionals to Effectively Treat Coronavirus Disease 2019 Patients in Pakistan: A Qualitative Investigation. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/FPSYG.2020.572450/FULL

Riaz, B., Rafai, W., Ussaid, A., … A. M.-F. H., & 2021, undefined. (n.d.). The psychological impact of COVID-19 on healthcare workers in Pakistan. *Ncbi.Nlm.Nih.Gov*. Retrieved 14 March 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8285135/

Rume, T., Heliyon, S. I.-, & 2020, undefined. (n.d.). Environmental effects of COVID-19 pandemic and potential strategies of sustainability. *Elsevier*. Retrieved 24 March 2023, from https://www.sciencedirect.com/science/article/pii/S2405844020318089

Sadhu, S., Agrawal, R., Pyare, R., Pavesio, C., Zierhut, M., Khatri, A., Smith, J. R., de Smet, M. D., & Biswas, J. (2020). COVID-19: Limiting the Risks for Eye Care Professionals. *Ocular Immunology and Inflammation*, *28*(5), 714–720. https://doi.org/10.1080/09273948.2020.1755442

Sagane, K., Ishihama, Y., of, H. S.-I. journal, & 2008, undefined. (n.d.). Lgi1 and Lgi4 bind to ADAM22, ADAM23 and ADAM11. *Ncbi.Nlm.Nih.Gov*. Retrieved 14 March 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2575350/

Saqlain, M., Munir, M. M., Ahmed, A., Tahir, A. H., & Kamran, S. (2020). Is Pakistan prepared to tackle the coronavirus epidemic? *Drugs and Therapy Perspectives*, *36*(5), 213–214. https://doi.org/10.1007/S40267-020-00721-1

Sarwar, S., Waheed, R., Sarwar, S., Environment, A. K.-S. of the T., & 2020, undefined. (n.d.). COVID-19 challenges to Pakistan: Is GIS analysis useful to draw solutions? *Elsevier*. Retrieved 26 February 2023, from https://www.sciencedirect.com/science/article/pii/S0048969720326061

Seppälä, A., Verronen, P., … M. C.-G., & 2007, undefined. (n.d.). Arctic and Antarctic polar winter NOx and energetic particle precipitation in 2002–2006. *Wiley Online Library*. Retrieved 25 February 2023, from https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2007GL029733

Shafi, M., Liu, J., Globalization, W. R.-R. in, & 2020, undefined. (n.d.). Impact of COVID-19 pandemic on micro, small, and medium-sized Enterprises operating in Pakistan. *Elsevier*. Retrieved 25 February 2023, from https://www.sciencedirect.com/science/article/pii/S2590051X20300071

Shah, R., & Ma, X. (2023). An inquiry into the Pakistani statecraft in tackling COVID-19. *Asian Journal of Comparative Politics*, 205789112311574. https://doi.org/10.1177/20578911231157447

Shakespeare-Finch, J., Bowen-Salter, H., Cashin, M., Badawi, A., Wells, R., Rosenbaum, S., & Steel, Z. (2020a). COVID-19: An Australian Perspective. *Journal of Loss and Trauma*, *25*(8), 662–

672. https://doi.org/10.1080/15325024.2020.1780748

Shakespeare-Finch, J., Bowen-Salter, H., Cashin, M., Badawi, A., Wells, R., Rosenbaum, S., & Steel, Z. (2020b). COVID-19: An Australian Perspective. *Journal of Loss and Trauma*, *25*(8), 662–672. https://doi.org/10.1080/15325024.2020.1780748

Shammi, M., Bodrud-Doza, M., Islam, A. R. M. T., & Rahman, M. M. (2021). Strategic assessment of COVID-19 pandemic in Bangladesh: comparative lockdown scenario analysis, public perception, and management for sustainability. *Environment, Development and Sustainability*, *23*(4), 6148–6191. https://doi.org/10.1007/S10668-020-00867-Y

Sharfuddin, S. (2020). The world after Covid-19. *Round Table*, *109*(3), 247–257. https://doi.org/10.1080/00358533.2020.1760498

Shereen, M., Khan, S., Kazmi, A., … N. B.-J. of advanced, & 2020, undefined. (n.d.). COVID-19 infection: Emergence, transmission, and characteristics of human coronaviruses. *Elsevier*. Retrieved 25 February 2023, from https://www.sciencedirect.com/science/article/pii/S2090123220300540

Shoaib, M., & Abdullah, F. (2020). Risk Reduction of COVID-19 Pandemic in Pakistan. *Social Work in Public Health*, *35*(7), 557–568. https://doi.org/10.1080/19371918.2020.1806172

Stefanini, G. G., Azzolini, E., & Condorelli, G. (2020). Critical Organizational Issues for Cardiologists in the COVID-19 Outbreak: A Frontline Experience From Milan, Italy. *Circulation*, *141*(20), 1597–1599. https://doi.org/10.1161/CIRCULATIONAHA.120.047070

Suleman, M., Lee, H. W., Zaidi, S. S. Z., Alam, M. M., Nisar, N., Aamir, U. B., Sharif, S., Shaukat, S., Khurshid, A., Angez, M., Umair, M., Mujtaba, G., & Faryal, R. (2017). 'Preliminary Seroepidemiological survey of dengue infections in Pakistan, 2009-2014'. *Infectious Diseases of Poverty*, *6*(1). https://doi.org/10.1186/S40249-017-0258-6

Ullah, A., Pinglu, C., Ullah, S., Abbas, H. S. M., & Khan, S. (2021). The Role of E-Governance in Combating COVID-19 and Promoting Sustainable Development: A Comparative Study of China and Pakistan. *Chinese Political Science Review*, *6*(1), 86–118. https://doi.org/10.1007/S41111-020-00167-W

Umer, H., arXiv:2006.02987, M. K. preprint, & 2020, undefined. (n.d.). Evaluating the effectiveness of regional lockdown policies in the containment of Covid-19: Evidence from Pakistan. *Arxiv.Org*. Retrieved 25 February 2023, from https://arxiv.org/abs/2006.02987

van der Duim, R., Ren, C., & Jóhannesson, G. T. (2012). Actor-network theory and tourism: Ordering, materiality and multiplicity. *Actor-Network Theory and Tourism: Ordering, Materiality and Multiplicity*, 1–181. https://doi.org/10.4324/9780203122976

Wang, C., Wang, D., Abbas, J., Duan, K., & Mubeen, R. (2021). Global Financial Crisis, Smart Lockdown Strategies, and the COVID-19 Spillover Impacts: A Global Perspective Implications From Southeast Asia. *Frontiers in Psychiatry*, *12*. https://doi.org/10.3389/FPSYT.2021.643783/FULL

Waris, A., Atta, U., Ali, M., Asmat, A., new, A. B.-N. microbes and, & 2020, undefined. (n.d.). COVID-19 outbreak: current scenario of Pakistan. *Elsevier*. Retrieved 25 February 2023, from https://www.sciencedirect.com/science/article/pii/S2052297520300330

WHO. (2020, September 7). *WHO Director-General's opening remarks at the media briefing on COVID-19 - 7 September 2020*. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---7-september-2020

Williams, I. (2020). *Contemporary applications of actor network theory*. https://books.google.com/books?hl=en&lr=&id=k3T_DwAAQBAJ&oi=fnd&pg=PR8&dq=Contemporary+Applications+of+Actor+Network+Theory&ots=in1KZM6Q1P&sig=zY6cLYHAo4CxqsABEISsa9Tedt4

Wit, E. de, Doremalen, N. van, … D. F.-N. reviews, & 2016, undefined. (n.d.). SARS and MERS: recent insights into emerging coronaviruses. *Nature.Com*. Retrieved 25 February 2023, from https://www.nature.com/articles/nrmicro.2016.81

Wu, K., Darcet, D., Wang, Q., & Sornette, D. (2020). Generalized logistic growth modeling of the COVID-19 outbreak: comparing the dynamics in the 29 provinces in China and in the rest of the world. *Nonlinear Dynamics*, *101*(3), 1561–1581. https://doi.org/10.1007/S11071-020-05862-6

Yasin, R., Jauhar, J., Rahim, N., … S. N.-… J. of R., & 2020, undefined. (n.d.). COVID-19 and Religious Tourism: an overview of impacts and implications. *Researchgate.Net*. Retrieved 25 February 2023, from https://www.researchgate.net/profile/Mohammad-Bataineh-3/publication/346008298_COVID-19_and_Religious_Tourism_an_overview_of_impacts_and_implications/links/5fc7865845851568d13256b0/COVID-19-and-Religious-Tourism-an-overview-of-impacts-and-implications.pdf

Yıldırım, M., Geçer, E., & Akgül, Ö. (2021). The impacts of vulnerability, perceived risk, and fear on preventive behaviours against COVID-19. *Psychology, Health and Medicine*, *26*(1), 35–43. https://doi.org/10.1080/13548506.2020.1776891