

Infectious diseases in Afghanistan: Strategies for health system improvement

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Abstract

Background and Aim: Afghanistan is grappling with a severe health crisis marked by a high prevalence of infectious diseases, particularly tuberculosis, malaria, HIV, and the added strain of the COVID-19 pandemic. The nation's healthcare system, already fragile, faces formidable challenges. Socioeconomic constraints, including limited resources and financial barriers, hinder healthcare accessibility, leading to delayed or inadequate care. Environmental factors, such as poor sanitation and crowded living conditions, exacerbate the transmission of diseases, especially waterborne illnesses. Governance issues, encompassing transparency, corruption, and political instability, disrupt healthcare efficiency and resource allocation. Addressing these multifaceted issues is vital to enhance Afghanistan's healthcare system and overall well-being. The withdrawal of international support has exacerbated these challenges. The primary research goal is to deeply understand Afghanistan's health system, focusing on the major disease burdens: Tuberculosis, Malaria, AIDS, COVID-19, Measles, Hepatitis, and Cholera. The study aims to assess the feasibility and effectiveness of current approaches, presenting a comprehensive view of challenges and opportunities within the Afghan healthcare system. The research concludes by highlighting policy implications, practical implementation, and offering recommendations for future endeavors.

Methodology: This paper provides a thorough analysis of the literature concerning infectious diseases in Afghanistan and the enhancement of the healthcare system in the nation. A systematic exploration of the literature was conducted through PubMed and Google Scholar databases. The search terms used encompassed "Tuberculosis" OR "TB," "Malaria," "acquired immunodeficiency syndrome" OR "AIDS," "Human immunodeficiency virus" OR "HIV," "COVID-19," "Measles," "Hepatitis virus," "Cholera," "Health system improvement," and "Afghanistan." Additionally, external sources like UNICEF, CDC, and WHO were referenced.

Results: In conclusion, while improving access to vital medicines and vaccines is crucial for enhancing health outcomes in Afghanistan, significant challenges must be addressed to ensure the effectiveness and sustainability of such strategies. The Afghan health system's fragile governance, corruption, logistical complexities, and

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failure to address broader social and economic factors pose significant risks and obstacles to the implementation of proposed health strategies. Therefore, the strategies discussed in this analysis align with key Sustainable Development Goals, particularly SDG 3, and their successful implementation will have implications not only for the health and well-being of Afghanistan but also for global health.

Conclusion: Hence, by adopting a comprehensive approach with complementary interventions as discussed, we can address issues in the Afghan health system and reduce transmissible diseases' burden, thereby building a better world for all.

KEYWORDS

Afghanistan, health system improvement, infectious diseases

1 | INTRODUCTION

Afghanistan, a culturally diverse, landlocked nation situated in the heart of south-central Asia, boasts a population of approximately more than 34 million as of the 2023 estimate. It ranks among the top 40 most populous countries in both South Asia and the world. Spanning across an expansive area of 652,860 square kilometers (252,071 square miles), its size is roughly comparable to that of the US state of Texas and more than twice that of the United Kingdom. Afghanistan's varied geography encompasses irrigated lands, fertile river valleys, deep gorges, deserts, high plateaus, and snow-clad mountains.¹ The healthcare system in Afghanistan grapples with a substantial burden stemming from a high incidence of infectious diseases, including tuberculosis (TB), malaria, HIV, and hepatitis B and C. All of the infectious illnesses described above greatly stress the health system, making it less capable of providing adequate resources and services to the public. The private sector provides the majority of high-quality services, with governmental hospitals providing relatively little. Since the bulk of the population lives in poverty, it is often difficult for them to afford such high-quality services.² This puts the most vulnerable people at risk, such as pregnant women and children.

Following decades of political instability, prolonged warfare, and various other challenges have pushed Afghanistan into a dire humanitarian crisis of immense proportions. Within a mere 4 months of the Taliban's takeover, a significant portion of the Afghan population is grappling with the harsh reality of starvation, with over 3.3 million children facing the devastating consequences of not having access to basic food resources.³ Tragically, this dire situation is resulting in dozens of deaths among these vulnerable young ones every week. The crisis exacerbates with restrictions on humanitarian aid, lack of vital food supplies, and inadequate medical care, especially for children leading to alarming rates of child malnutrition in Afghanistan. Similarly, women are also prone to developing risk of various health diseases, particularly TB. It has been stated that TB affects women more than males for various reasons, including stigma, culture, a lack of knowledge, and a lack of access to healthcare.⁴ Since the Taliban's takeover, there has been a decline in women's rights.⁵ Hence, women continue to encounter barriers to reproductive healthcare and food

security, with education prohibition has recently been one of the primary sources of concern. The lack of data on women's health suggests a notably worse situation, necessitating collaboration between the international community and Taliban authorities to ensure women's access to healthcare and education.

Despite the latest update in September 2022, the emission data for fossil CO₂ during the period 1970–2021 reveals that Afghanistan's carbon dioxide emissions are less than 1 percent, while China, on the other hand, is the world's largest contributor to carbon dioxide emissions, accounting for over 30%.⁶ Subsequently, experiences extreme climate changes that directly leads to fatalities, injuries, and mental health issues due to severe storms, floods, and extreme heatwaves. Moreover, climate change's long-term indirect consequences encompass respiratory issues, cardiovascular diseases, malnutrition, and diarrheal illnesses. Particularly, altered climate conditions can influence the distribution and survival of foodborne pathogens, leading to contamination and foodborne illnesses. Additionally, increased atmospheric carbon dioxide can adversely affect the nutritional value of staple crops, worsening malnutrition. Further, disasters like the 2022 earthquake have caused internal displacements, creating overcrowded camps with poor sanitation and hygiene, escalating the risk of disease transmission. Subsequently, Afghanistan encounters specific challenges with infectious diseases like viral hepatitis, HIV, cholera, and measles. In the Kabul slums, displaced people from various regions of the country have built crowded camps which has poor sanitation and hygiene.⁷ These camps may provide a significant risk for disease transmission to the general population. The current government has not been able to deal with the issue of these displaced populations because of their incompetence. Meanwhile, the social determinants in Afghanistan have been profoundly affected, potentially jeopardizing the well-being of its people, such as severe poverty, which hampers access to adequate healthcare, may result in compromised health outcomes. The prohibition on girls' education and women's employment in nongovernmental organizations (NGOs) can have far-reaching negative consequences for the healthcare system, particularly in terms of the scarcity of healthcare professionals needed to address infectious diseases and provide essential services.

Conceivably, at this critical juncture, conducting an overview of the health system will be imperative for comprehending the challenges associated with it and formulating strategies to strengthen it. In doing so, identifying the areas that still need improvement will play a pivotal role in surmounting the existing obstacles and ensuring sustainable advancements in the Afghan health system. The purpose of this research study is to examine the prevalence of infectious illnesses in Afghanistan, exploring their historical context, challenges, and ongoing efforts for eradication. The recognition of nation's foundational resilience lies in its healthcare infrastructure, it is essential to establish a connection between the burden of infectious diseases and the capabilities of the health system. Hence, conducting a thorough assessment of the health system is equally crucial to provide timely recommendations. Additionally, the study will incorporate a well-defined framework to furnish policymakers with concrete suggestions for effective implementation and practical application.

2 | METHODOLOGY

This paper presents a comprehensive examination of the literature on infectious diseases in Afghanistan and health system improvement in the country. A systematic literature search was performed using the PubMed and Google Scholar databases. The search terms employed included "Tuberculosis" OR "TB," "Malaria," "acquired immunodeficiency syndrome" OR "AIDS," "Human immunodeficiency virus" OR "HIV," "COVID-19," "Measles," "Hepatitis virus," "Cholera," "Health system improvement," and "Afghanistan." External sources such as UNICEF, CDC, and WHO were also consulted. The methodology utilized in this paper followed a systematic process for article selection, primarily focusing on peer-reviewed literature addressing the epidemiology of the included infectious diseases. A set of predefined inclusion criteria was established, encompassing original research studies, systematic reviews, case studies, and reports from various organizations, all of which were published in the English language. On the other hand, the exclusion criteria were applied, which included components with merely an abstract, correspondence, letters, editorials, and sources that appeared in languages other than English. To ensure a comprehensive literature review, a meticulous hand-search of relevant papers was conducted, followed by a critical evaluation of their alignment with the research objectives. To maintain accuracy and minimize discrepancies, MYE and AS cross-checked the identified literature and in case of any discrepancy referred to MGH. Only those papers that met the predefined criteria were included in the final selection. Furthermore, to enhance the validity of this paper, relevant systematic reviews retrieved through hand-searching references of included articles, were referred to to gather comprehensive insights and synthesize existing knowledge on the burden of infectious diseases in Afghanistan and the country's health system. These systematic reviews provided a comprehensive overview of the available evidence and helped inform the qualitative analysis and discussion of their research

findings. This rigorous process was implemented to uphold the paper's rigor and ensure the quality of the findings.

3 | OVERVIEW OF HEALTH SYSTEM IN AFGHANISTAN

The health system in Afghanistan is confronted with significant challenges that impede its effectiveness and ability to provide adequate care. Besides, limited access to healthcare services, a shortage of trained healthcare professionals, weak surveillance systems, inadequate infrastructure, and insufficient financing are among the major obstacles. The prolonged conflict and political instability further exacerbate these issues, hampering efforts to improve access to quality care and essential health services.⁸ The reliance on foreign funds for the operation of a substantial portion of the healthcare system has also been disrupted by the fall back of the U.S and its allies, leaving a critical gap in financing. Consequently, there remains an urgent need to address the underlying causes and ensure equitable access to quality healthcare for all Afghan citizens. Despite these challenges, there have been notable advancements in the Afghan health system over the past two decades.^{9,10} Expansion of vaccination programs and improvements in maternal and child health indicators demonstrate the potential for progress in the future. Collaborations between the health system and nongovernmental organizations (NGOs) have enabled the provision of family planning programs, benefiting women across the country. Additionally, strategic planning initiatives have led to enhancements in the overall quality of life. The health system has also worked towards strengthening its capacity by training community healthcare workers and expanding outreach efforts to extend healthcare services to remote areas.

Notably, before the Taliban takeover of Afghanistan in 2021, in 2002, in the midst of two decades of conflict and the subsequent collapse of public health facilities, the Afghan government restructured its health care system, especially primary care. The Basic Health Services Program (BPHS) was created in 2003 to provide a package of essential basic health services. Community service services by group health workers in health posts, health subcenters (SHCs), grassroots health centers (BHCs), mobile health teams (MHTs), ambulatory care by general health centers (CHCs), and inpatient services by district hospitals (DHs) are the six types of standard health facilities in Afghanistan that provide BPHS.¹¹ The standard inputs in various healthcare institutions, such as employee levels and expertise, fluctuates, which have an impact on the efficiency of service delivery by affecting both inputs and outputs. However, despite the perception that primary healthcare in the nation is reliant on donors, a significant share of overall health expenditure is actually covered directly by families. Following the implementation of BPHS, primary care coverage has significantly increased.⁹ Through the increase of primary healthcare Services BPHS has made healthcare accessible to more people. Conversely, financial bottlenecks are growing, and improving healthcare efficiency is becoming

increasingly important to address them. As the new government established in Afghanistan, the previous NGOs that funded BPHS has stopped their activities, hence there remains a big gap of BHPS delivery in the country.

Secondly, Afghanistan's healthcare system is structured in; private, public, and government NGOs partnerships. The NGOs provide the most primary healthcare services. These organizations are funded by multilateral or bilateral donors. There may be performance disparities in the way services are delivered given the large variety of implementers offering the core package of healthcare services. Throughout the years, Afghanistan's health system has encountered considerable challenges, including restricted access to health care, a shortage of trained healthcare staff, weak infrastructure, and insufficient funding. Additionally, prolonged violence and political insecurity have also hampered efforts in expanding access to excellent treatment and basic health services. Nevertheless, throughout Afghanistan's health care system has gradually improved over the past 17 years, expanding health care throughout the country. The Afghanistan's National Health Policy (2015–2020) comprises Governance, institutional development, public health, health services, and human resources are the five policy areas that constitute health system strengthening.¹² The structural hierarchy of the Afghanistan's healthcare system is illustrated in Figure 1.¹³

In spite of, a large component of the healthcare system relied on foreign funds to operate, the US and its allies' exit had a significant effect on healthcare finance, especially the "Sehatmandi" package program which delivers vital health services all around the country. Besides, the lack of healthcare workers has posed a huge challenge on the healthcare system,¹⁰ with only around two doctors for 10,000 people, there is a severe shortage of the healthcare workers.¹⁴ Recently, there have been ban on girls' education in universities, which also

affect the future of those girls studying medical. Moving forward, the ban on women working in NGOs have also raised tension globally in the UN and other international platforms, given that females make vital components of NGOs work and implementation.

4 | MOST COMMON INFECTIOUS DISEASES IN AFGHANISTAN

4.1 | Tuberculosis

Tuberculosis (TB) is a serious respiratory ailment caused by a specific type of bacterium that attacks the lungs primarily. It is highly contagious and can be transmitted through coughing or sneezing, especially in crowded settings. The individuals with impaired immune systems, such as HIV/AIDS patients, are more susceptible to TB. While the lungs are the primary target, the disease can also spread to other organs. Common symptoms include coughing, fatigue, and low-grade fever. The effective treatment requires completing a full course of medication, as failure to do so can lead to drug-resistant TB, a more dangerous form of the disease that is resistant to antibiotics.

In Afghanistan, TB is a significant public health concern. Notably, with an estimated 13,000 death tolls, the nation has one of the highest TB incidence rates in the WHO Eastern Mediterranean Region, annually attributed to the disease. In 2016 alone, over 65,000 cases and 11,000 deaths were reported. In 2018, Afghanistan had 48,420 tuberculosis cases, with 70,000 expected to occur. According to Afghanistan's National Tuberculosis Program (NTP), more than 48,420 tuberculosis cases were detected and registered in 2019. Furthermore, in the middle of the COVID-19 epidemic in 2020, Afghanistan's Ministry of Public Health reported 50,000 new TB

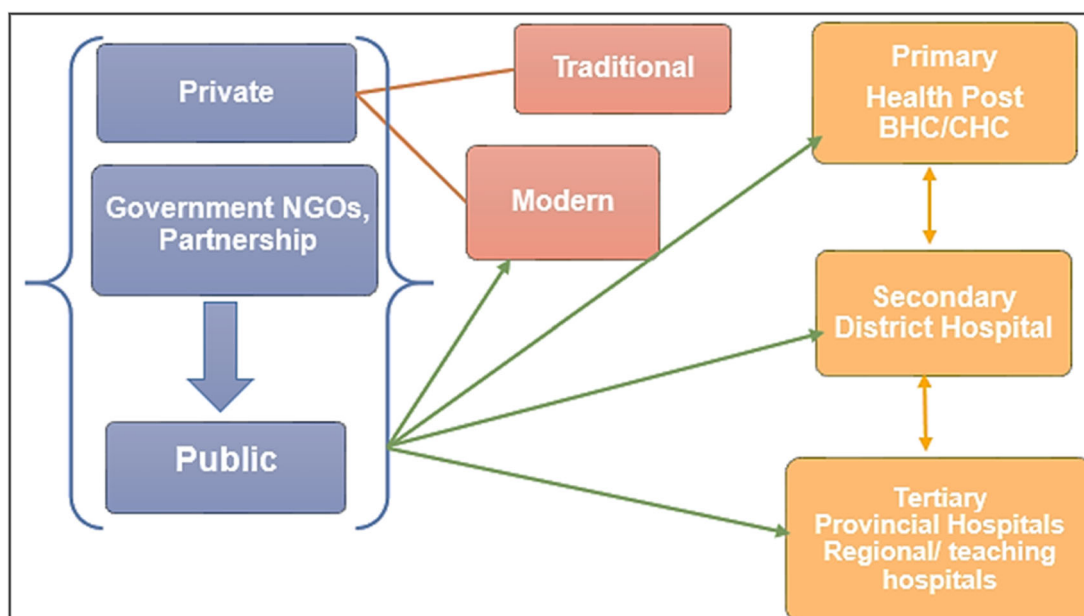


FIGURE 1 The structural hierarchy of the Afghan healthcare system.

cases and 10,000 death tolls. These figures are likely to be underestimated due to limited data availability and inadequate literature. Further, even the World Health Organization (WHO) estimates suggests a significant under-reporting, with an estimated 73,000 individuals affected by TB in Afghanistan in 2020.⁴ The burden of TB is particularly prominent in rural areas where access to healthcare services is limited, requiring individuals to travel long distances to seek medical assistance. However, even when successfully reaching the healthcare facilities, there is a scarcity of TB medications and diagnostic resources. Additionally, Tuberculosis (TB) remains the leading cause of disability-adjusted life years (DALYs) in this country, with over 1000 DALYs per 100,000 individuals.¹⁵ Beyond its health implications, TB is also associated with substantial social stigma, exacerbating the challenges faced by affected individuals and their communities.

Notably, another growing concern in Afghanistan is the upregulating burden of drug-resistant TB due to treatment delay or discontinuation. Considerably, because once TB becomes drug-resistant, treatment becomes more complex and mortality rates rise. Further, limited healthcare resources may contribute to misdiagnoses of TB with other diseases, as observed during the pandemic. This highlights the need for improved diagnostic capabilities and adequate resources to accurately identify and manage TB cases. There are several factors that contribute to the ongoing burden of TB on Afghanistan's health system. Insufficient healthcare facilities, coupled with the diversion of resources towards the COVID-19 response, have hindered access to TB services. The country also faces challenges related to the weak TB surveillance system, including limited diagnostic facilities and the misdiagnosis of TB with other infections, necessitating comprehensive training for healthcare professionals. To address these issues, advanced TB diagnostics and a well-coordinated reporting system are required to ensure accurate case registration and effective disease monitoring.

The burden of TB in Afghanistan is exacerbated by several factors, including stigma, lack of education, and limited healthcare access. The illiteracy rate of the country contributes to low TB awareness, with women facing particular barriers to healthcare.⁵ The economic and social factors like poverty, limited employment, and political instability further contribute to healthcare disparities. Therefore, effective TB control requires a multi-faceted approach, including strengthening healthcare infrastructure, improving diagnostic access, enhancing surveillance, combating stigma, and addressing socioeconomic determinants. Hence, by expanding healthcare facilities, especially in rural areas, and ensuring widespread availability of TB medications and diagnostics is crucial. Further the prioritization of training programs for healthcare workers to improve diagnosis and management will also help tackle this pressing public health issue.

4.2 | Malaria

Malaria is a grave and potentially fatal illness caused by the transmission of parasites through the bites of infected mosquitoes.

The disease manifests with a range of symptoms, including high fevers, shaking chills, and flu-like manifestations. The malarial parasites come in four different forms that affect humans, namely *Plasmodium falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*. Of these, *P. falciparum* poses the greatest risk of severe infections, which, if left untreated, can result in fatalities. However, despite its potential lethality, malaria-related illnesses and deaths can typically be averted through timely administration of anti-malarial drugs.¹⁶ Furthermore, employing preventive measures such as insecticide spraying or the use of insecticide-treated nets can effectively reduce the transmission of the disease.

Malaria represents an additional infectious ailment that places Afghanistan's healthcare system is facing severe pressure. Within the country, the major contributors to malaria incidence are *P. falciparum* and *P. vivax*. Afghanistan, grappling with a healthcare system in disarray and enduring internal conflicts, has consistently battled with endemic malaria. Alarming figures reveal that the country recorded more than 150,000 malaria cases in 2019. Moreover, Afghanistan stands at the third position globally for the Eastern Mediterranean area has the largest illness burden, resulting in more than one-tenth of all cases.^{17,18}

Malaria transmission in Afghanistan follows a seasonal pattern, spanning from June to November, influenced by regional factors such as population density, behavior, ecological conditions, climate, agriculture, access to health services to detect and treat malaria. As a result, areas situated at lower altitudes where rice cultivation and cattle farming are prevalent experience a higher prevalence of malaria. These regions provide favorable conditions for disease vectors, which exhibit a preference for animals. According to Figure 2, among the provinces bordering Pakistan, namely Nangarhar, Laghman, Kunar, Nooristan, Khost, and Paktika, the majority of malaria cases are concentrated. Notably, in 2019, Nangarhar province alone accounted for over 45% of reported.¹⁸⁻²⁰

It is worth mentioning that a recent malaria outbreak in The World Health Organization (WHO) provided anti-malarial medicine to the Alishang district of Laghman province, a crucial location with high widespread disease.¹⁷ Although the distribution of this aid reached eight healthcare facilities in the region, additional intervention is imperative to address the existing gaps within a healthcare not only are malaria outbreaks a strain on the health care system, also is the increasing incidence of other illnesses such as dengue, watery diarrhea, and measles.¹⁷

Multiple challenges are interconnected with malaria, including escalated political instability and longstanding conflicts, which have contributed to the spread of malaria among displaced populations. Moreover, the limited availability of epidemiological data and an insufficient surveillance system pose obstacles to effectively reducing the incidence of these diseases. Furthermore, Human immunodeficiency virus (HIV), the prototype of acquired immunodeficiency syndrome (AIDS), is a virus that attacks and destroys the immune system. Additionally, inadequate water sanitation and overcrowding exacerbate the endemic of malaria in the country. Lastly, pervasive poverty adds a significant strain to the nation's efforts to combat the disease.

Lowland areas of Afghanistan

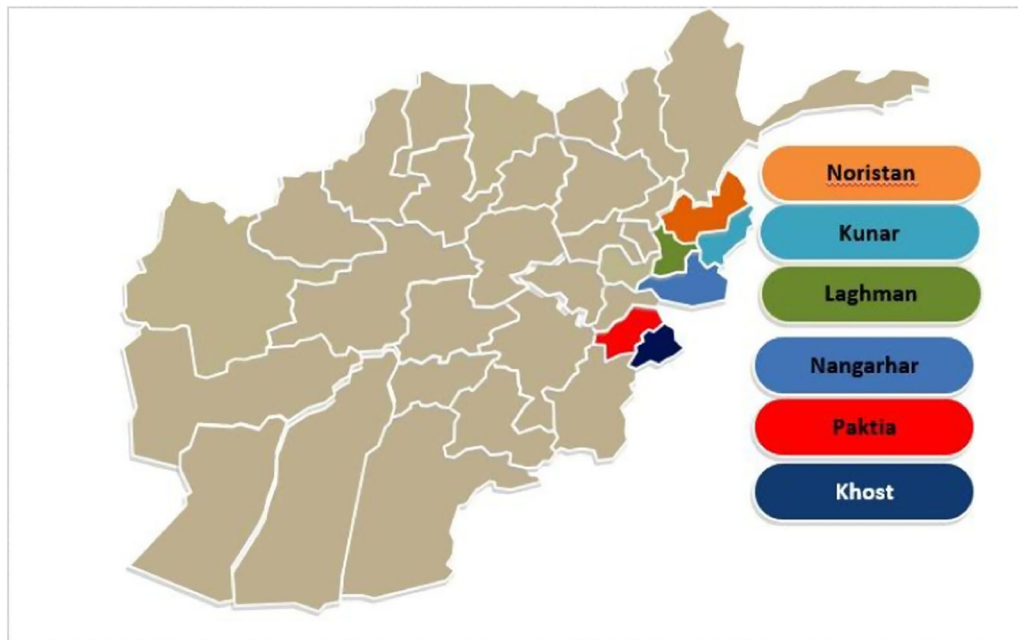


FIGURE 2 The lowland areas of Afghanistan, bordering Pakistan with concentrated cases of Malaria.

4.3 | Human immunodeficiency virus (HIV)

Human immunodeficiency virus (HIV), the precursor to acquired immunodeficiency syndrome (AIDS), is a viral assailant that targets and simplifies the immune system of suffering individuals, creating them more vulnerable to future infections and disorders. It spreads through various routes, encompassing sexual contact, needle sharing, and exposure to contaminated blood. HIV continues to pose a significant public health apprehension, with an estimated 650,000 individuals succumbing to HIV-related causes in 2021.²¹ Since HIV symptoms are nonspecific and similar to the flu indications, such as a sore throat, fever, muscle pain, and skin rash, many infected people are unaware of their illness until it is advanced. Although no definitive cure for HIV has yet been found, antiretroviral therapy (ART) has proven to be highly effective in fighting against the virus. This approach revolves around suppressing the patients' viral load, that is, the amount of HIV in the body, to reduce the risk of HIV transmission and prevent its progression to more severe stages such as AIDS.²²

HIV was initially documented in Afghanistan in 1989.²³ Although the official registered cases of HIV stand at 2923 as of 2019, UNAIDS estimates indicate a much higher number of approximately 11,000 persons are infected with HIV.^{23,24} The country faces the significant challenge of illiteracy, which has profound consequences on people's lives and lifestyles. While the overall incidence of HIV in Afghanistan is low, the country is considered extremely dangerous, particularly among certain demographics. A community-based survey shown higher HIV prevalence among drug users (4.4%), sex workers (0.3%), and prisoners (0.7%). In spite of, Afghanistan's status as the world's greatest producer of

opium, it's no surprise that the vast majority of HIV diagnoses are linked to injecting drug users.²³ This situation underscores the urgent need for awareness and support in promoting sterile needle practices to avert a potential epidemic.

Afghanistan's healthcare system has faced significant depletion of resources due to enduring civil crises, political turbulence, and the added burden of the COVID-19 pandemic. Despite these challenges, Afghanistan has implemented a successful "test-and-treat" strategy for HIV since its introduction in 2017.^{23,24} Remarkably, 95% of diagnosed HIV cases have been linked to care, with almost nine-tenth receiving antiretroviral therapy (ART). This approach has contributed to controlling HIV within the region.²³ However, it is crucial to note that this strategy primarily addresses known and diagnosed HIV cases. Given the country's HIV stigma and taboo, as well as the redirection of resources into COVID-19 treatment and support, a significant number of individuals remain undiagnosed. This shows a crucial gap in HIV surveillance and elimination efforts. The combination of undiagnosed HIV and COVID-19 infection increases the risk of severe disease, highlighting the necessity of risk mitigation measures and quick treatment for people at risk.

A significant portion of Afghanistan's population, particularly those under 25 years old, faces a difficult and complicated condition marked by instability, destitution, and growing insecurity report.²⁵ This unfavorable backdrop, coupled with limited access to quality education, renders them more susceptible to indulging in high-risk behaviors such as drug injection and sexual liaisons with several partners.²² The desperate need for monetary assistance to cover basic needs has forced some women into prostitution, making them more vulnerable to HIV/AIDS.²⁶ Furthermore, Afghanistan has a

large refugee population, and Afghan refugees seeking asylum in neighboring countries are also exposed to drug use behaviors learned in host countries, particularly Iran and Pakistan.^{23,27} The lack of wide-ranging HIV prevention techniques to successfully limit the spread of HIV, along with the healthcare system's resource restrictions, including the unavailability of antiretroviral medications, limited consultations, and diagnostic tests, contribute to a lack of appropriate preventive, diagnostic, and treatment services. Additionally, the prejudice that is associated with HIV/AIDS among both the general population and health care workers exacerbates afflicted people's well-being.²⁴ Most HIV and AIDS patients' social status suffers as well, raising their challenges with society. Furthermore, the expense of HIV/AIDS medicines, which is projected to vary between \$1800 and \$4500 USD each month during a person's lifetime, is a considerable financial burden for Afghanistan's middle-class people, who make an average yearly pay of \$18,505 USD.^{26,28} The general population's and important demographics' low level of HIV literacy, along with cultural obstacles to information distribution and preventive activities, exacerbates the current issues. Furthermore, the COVID-19 epidemic has undermined Afghanistan's already frail healthcare system, with just a few doctors per 10,000 people accessible, according to the World Health Organization (WHO).^{29,30} Further, the routine check-ups and immunizations have been postponed due to COVID-19 limitations, leading in an increase in infections and an increased risk of disease development.

Following, the recognition of the critical importance of HIV prevention, the authorities in Afghanistan have prioritized the implementation of disease control strategies. Currently, a comprehensive approach is employed to provide HIV prevention services to at-risk individuals, including the distribution of condoms to both men and women engaging in high-risk behaviors. These services are made available in 12 regions throughout the country.^{24,25} Additionally, HIV care and antiretroviral medication, as well as voluntary consultation and screening centers (ART), are offered at five designated sites in Kabul, Herat, Mazar, Nangarhar, and Khost.²⁵ The fight against HIV in Afghanistan has received significant financial investment, with an estimated \$ 14,392,000 USD allocated since 2012.^{30,31} Despite the challenging circumstances, 10 national and international non-governmental organizations, supported by The World Bank and the Global Fund have both been active in the fight against HIV. The United Nations Development Programme was critical in converting the 2021 Political Declaration on HIV and the Global AIDS Strategy into tangible steps, while advocating for a unified approach that ensures no one is left behind.^{23,24} Furthermore, the National Solidarity Program for the period from 2016 to 2020, the goal has been to promote gender equality and rights, therefore eliminating stigma and prejudice.^{26,30} This initiative has established supportive legal frameworks that promote effective HIV prevention and increase access to essential services.

On the other hand, it is imperative to embrace comprehensive approaches that encompass various strategies to effectively prevent the spread of HIV. These strategies should include targeted marketing campaigns conducted through drop-in centers, as well as

communication efforts involving social education and counseling on HIV.^{24,31} Similarly, justly imperative is the provision of essential sterile needles, syringes, and condoms are examples of behavior change tools, along with the availability switch therapies like as methadone or buprenorphine, which are especially developed to target high-risk demographics including as inmates and sex workers.^{21,30} Essentially, the efforts should prioritize outreach programs promote HIV screening and therapy, initiative for human rights protection, and use mass media channels to increase awareness and encourage changes in social practices.^{25,28} Following, special attention should be directed towards venues frequented by young people, such as educational institutions, sports facilities, and mosques, where information may be efficiently disseminated through leaflets, seminars, and community gatherings.³² To enhance the continuum of care, improve service links and accessibility across the diagnostic as well as treatment spectrum, enhance evidence-based preventative measures including opiate substitution therapy in accordance with current guidelines, and guarantee effective HIV care and control throughout the nation, active monitoring and robust evaluation of data quality are essential in identifying new cases and facilitating appropriate intervention.^{12,23,28}

Alarmingly, accurate data on HIV prevalence in Afghanistan remains scarce. As of mid-2012, the official reports indicate that only 1250 cases of HIV have been recorded.^{22,33} However, estimations from UNAIDS and WHO propose that the true number of Afghans living with HIV might fall within a broader range of 2000–3000 individuals.^{22,33,34} The HIV epidemic in Afghanistan is still in its early stages, predominantly affecting populations at greater risk, specifically intravenous drug users (IDUs) and partners.³⁵ The emerging epidemic in the country is likely driven by a mix of injectable drug usage and hazardous forced liaisons. The studies conducted in Kabul unveiled concerning findings regarding HIV prevalence among injecting drug users (IDUs), indicating a significant percentage of them being HIV positive.^{27,35–37} Disconcertingly, almost one-third of the IDUs acknowledged using contaminated injecting equipment, putting themselves at risk of HIV transmission. Moreover, a notable proportion of male drug users were found to be involved in additional high-risk behaviors, including engaging in sexual activities with men or boys and purchasing sex. What's even more concerning is the fact that only approximately half of the IDUs demonstrated awareness of the high risk associated with using unclean syringes and the importance of consistent condom use in preventing HIV infection.³⁸

Despite a relatively Afghanistan's general population has a low HIV prevalence, drug users, sex workers, and other groups known to engage in behaviors that are hazardous, and prisoners, face a disproportionately high incidence of the disease. The prevailing challenges of poverty and limited financial resources have hampered the country's ability to adequately address the HIV burden. Hence, without prompt and effective interventions, there is a significant risk of HIV progressing to AIDS, with irreversible consequences. Therefore, it is crucial to adopt a comprehensive and collaborative approach, encompassing both individual and global efforts, to effectively mitigate the spread and advancement of HIV in Afghanistan.

4.4 | Cholera

Cholera is a severe diarrheal illness caused by an infection of the intestinal with the *Vibrio cholera* bacterium. The transmission of this disease occurs through unsanitary water sources and consumption of contaminated food. While some individuals infected with cholera may experience mild or no symptoms, in certain cases, it can progress to a severe and life-threatening condition. It has been observed that approximately 1 in 10 cholera patients will develop severe symptoms, including profuse watery diarrhea, vomiting, irritability, and leg cramps.³⁹ Moreover, individuals with severe cholera cases face a significant risk of profound dehydration, which can potentially lead to kidney failure. Importantly, if not properly managed, the condition can progress to alarming symptoms, unconsciousness, and even death. This underscores the importance for caregivers of cholera patients to prioritize strict hygiene practices, particularly frequent handwashing after any contact with potentially contaminated materials. However, it should be noted that although cholera patients usually do not carry the disease bacteria after recovery, they remain susceptible to reinfection if exposed again. Therefore, effective prevention of cholera's spread requires ensuring access to clean water, implementing basic sanitation practices, and minimizing the risks associated with this highly infectious disease.

In 2022, Afghanistan experienced an alarming upsurge in cases of Acute Watery Diarrhea (AWD) and cholera, with a massive outbreak unfolding throughout the region.⁴⁰ Notably, in May alone, more than 500,000 cases were officially registered, and approximately 10% of these cases presented with dehydration, indicating the severity of the situation.⁴⁰ The Afghan population, already grappling with a multitude of challenges, is particularly susceptible to such health emergencies, given the widespread malnutrition resulting from prolonged drought and the economic strains inflicted resulting the Taliban's takeover in August 2021.³ The AWD cholera outbreak in Afghanistan has had a widespread impact, affecting all regions of the country. However, the severity and intensity of the outbreak have exhibited variations at the provincial and district levels. While some areas have followed the average trends observed over the past 3 years, others have witnessed a significant surge, surpassing previous records.⁴¹ This spatial disparity within the country underscores the complex dynamics of the outbreak and necessitates targeted interventions and resources to effectively combat its spread. The situation is further exacerbated by the potential for cross-border transmission, particularly with neighboring Pakistan.³⁹ Particularly, the significant cultural and trade connections between the two countries, the volume of traffic and movement of people upheaves the concerns about the further dissemination of the disease. This underscores the need for heightened surveillance and collaboration between Afghanistan and its neighboring countries to contain the outbreak and prevent its escalation.

In this context, the World Health Organization (WHO) has assumed a pivotal role in spearheading the response to Acute Watery Diarrhea (AWD), orchestrating a collaborative effort that brings together the Health and Water, Sanitation, and Hygiene (WASH)

clusters.⁴² This concerted approach ensures the swift sharing of critical alerts and outbreak data, laying the foundation requires a coordinated multisector response. At the same time, the Ministry of Health initiated its reaction system, reconvening the National Task Force for AWD and mobilizing subnational committees at the Provincial Health Director level in affected areas or those deemed to be at high risk.⁴⁰ Despite these concerted efforts, several challenges loom on the horizon, impeding the effective response to the AWD outbreak. These challenges encompass the extensive geographical scope of the outbreak, competing priorities faced by the WHO, and the complex and demanding Afghan context in which these endeavors take place.

The inadequate surveillance system poses a significant hurdle in Afghanistan, which can compromise the accuracy of case reporting and timely access to essential services. The effectiveness of surveillance lies in its ability to ensure the availability of investigation kits, proper implementation of rapid diagnostic testing (RDT), adherence to laboratory confirmation protocols, efficient management of data volume, and prompt response the regional national monitoring response network warning messages and follow-up information.^{40,41} Improving these surveillance mechanisms is crucial to effectively address the healthcare challenges in the country.

The escalating cases of acute watery diarrhea (AWD) and cholera in Afghanistan are a cause for great concern. As of June 18, 2022, the reported number of AWD cases reached a concerning total of 9336, as shown in Figure 3, resulting in 15 deaths.⁴³ Furthermore, the recent earthquake in 2022 exacerbated the burden of AWD among internally displaced communities, intensifying the challenges faced by the healthcare system.⁴⁴ Moreover, the severe shortage of healthcare personnel and limited availability of essential supplies in Paktika and Khost provinces have further impeded the timely management of AWD cases, exacerbating the situation on the ground.

4.5 | Measles

Measles is a highly infectious single-stranded RNA virus of the Morbillivirus genus within the Paramyxoviridae family that causes an acute respiratory infection. Its clinical manifestation often begins with a prodrome of fever, cough, and malaise. Subsequently, a distinct rash-like manifestation ensues, typically appearing around 14 days after exposure.⁴⁵ The rash exhibits a characteristic progression, starting from the head and extending down to the trunk and lower extremities. It should be noted, that those with immunocompromised may not always display the typical rash. The transmission dynamics of measles contribute to its reputation as the humanity's most contagious infectious illnesses. Close contact with an infected individual can lead to infection in as many as 9 out of 10 susceptible individuals.⁴⁵ The disease spreads predominantly through direct contact with infected droplets or through airborne transmission. The virus can be spread into the environment when an infected person breathes, coughs, or sneezes. Notably, the measles virus is capable of surviving in the air for up to 2 h following the departure of an

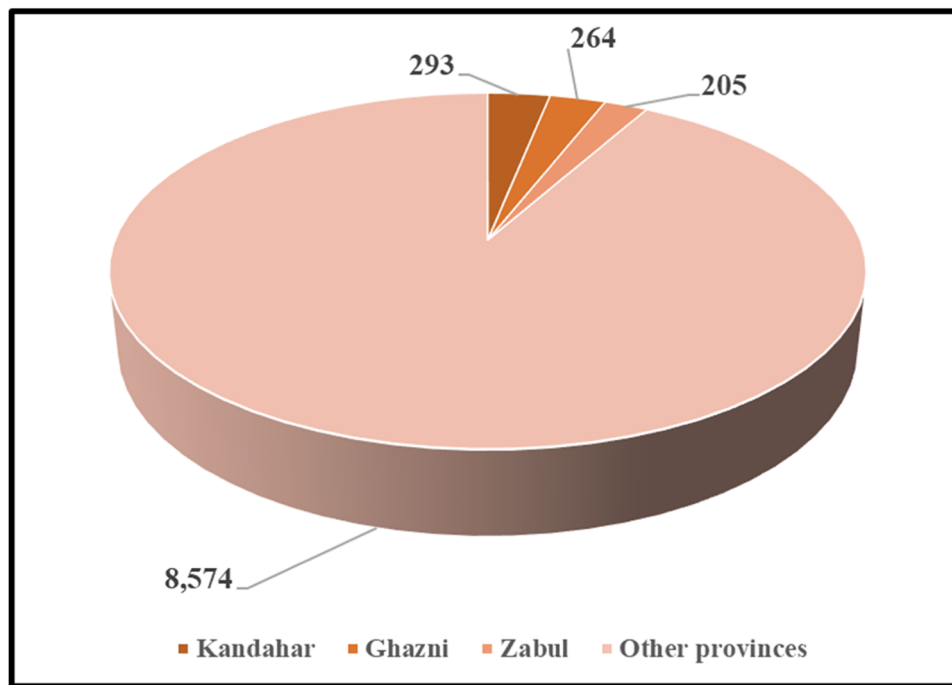


FIGURE 3 The distribution of 9336 reported number of cases of AWD among provinces of Afghanistan, as of June 18, 2022.

infected individual, increasing the risk of exposure. In the context of disease management and prevention, understanding the contagious nature of measles is of utmost importance. Measures such as prompt diagnosis, isolation of infected individuals, and immunization strategies play vital roles in mitigating the spread of this highly infectious viral sickness.⁴⁵

Measles remains an endemic disease in Afghanistan, with suspected cases reported in nearly all provinces on an annual basis. After experiencing periods of reduced transmission in 2019 and 2020, the country has witnessed a concerning upswing since the end of July 2021, there has been a weekly notification of probable measles cases. This trend has been particularly pronounced in the last 4 weeks of January 2022, marking the biggest weekly toll. Notably, the number of cases increased by 18% and deaths increased by 40% between week 4, 2022 (from January 24) and week 5, 2022 (commencing January 31).^{46,47} According to reports, from January 1, 2021, to January 29, 2022, in Afghanistan, 35,319 probable measles cases were reported. Among these, nine-tenth (3221 cases) were confirmed through laboratory testing using the IgM-ELISA method was used in seven reference laboratories, one of which was national and six of which were regional. The vast majority of probable measles cases (91%) included children under the age of 5.^{41,43,48} During the same period, there were 156 reported measles-related deaths among the confirmed cases, resulting in a case fatality rate (CFR) of 4.8%. It is worth noting that over 97% of these fatalities were recorded in children under the age of 5.⁴⁸ While the current death toll remains low, the fast increase of cases anticipates a spike in reported mortality in the coming weeks.

The provinces that have been significantly impacted by the outbreak, witnessing Balkh, Ghazni, Helmand, Kandahar, Kabul, Paktika, and Paktya have the largest number of verified and suspected cases. To illustrate the severity of the situation, Figure 4 presents the measles notification rate per million population, encompassing both confirmed and suspected cases.

Measles poses a significant concern not only within Afghanistan but has also been observed among Afghan refugees. A notable incident occurred on September 4 when the Agency for Disease Control and Prevention (CDC) acquired information of a possible measles diagnosis in an Afghan evacuee at Fort McCoy, Wisconsin.⁴⁷ In collaboration with state and local health departments, the CDC played a pivotal role by providing technical guidance to the Department of Homeland Security (DHS), Department of Defense (DoD), and Department of State (DoS).^{44,47} The guidelines intended to improve measles monitoring, undertake thorough case examinations and tracking of contacts, and initiate a massive measles vaccination campaign across military sites in the United States and abroad. During the period spanning from August 29 (the commencement of Operation Allies Welcome) to November 26, a total of 47 confirmed cases of measles, accounting for 0.065% of the 72,299 evacuees, were reported.⁴⁷ The success of vaccination efforts, both domestically and in overseas locations, played a critical role in mitigating the importation of measles into the United States. Through a comprehensive measles, mumps, and rubella (MMR) vaccine coverage estimated at 96% among the evacuee population, the transmission of measles was effectively limited within military bases and prevented from spreading into U.S. communities.^{45,47} These concerted vaccination initiatives not only safeguarded the health of

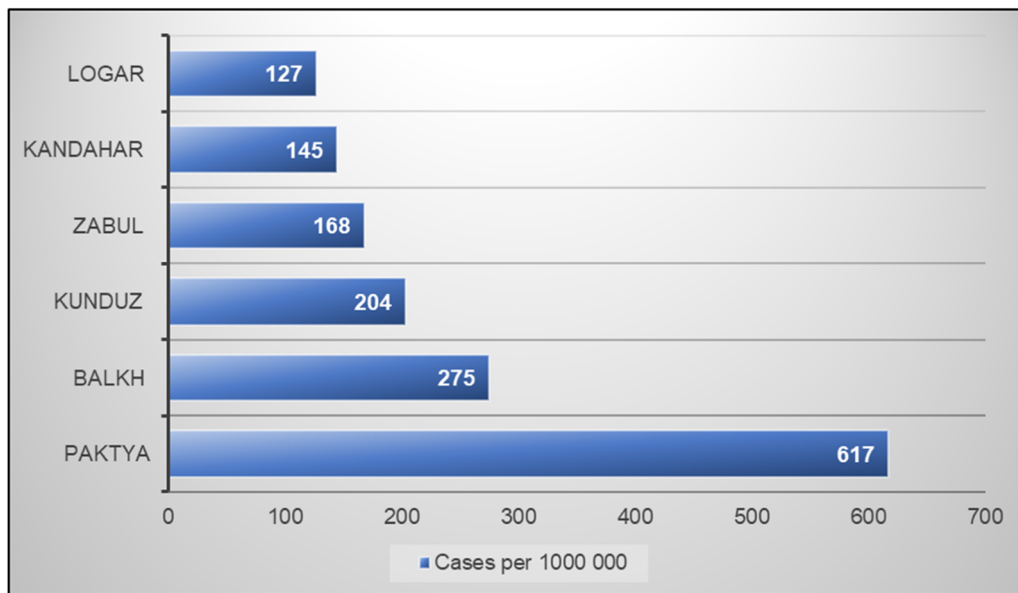


FIGURE 4 The most affected provinces, with the highest number of reported cases.

the evacuees but also helped contain the potential spread of measles. Thus by, accomplishing a high vaccination coverage rate, the risk of measles importations was significantly reduced, contributing to the protection of military personnel and the broader population. The collaborative efforts of various government agencies, health departments, and the CDC were instrumental in curbing the impact of measles in the context of the Afghan evacuee population.

4.6 | Hepatitis A, B, C

Hepatitis refers to the inflammation of the liver, which can impair its proper functioning. While various factors like excessive alcohol consumption, certain medications, toxins, and specific medical conditions can induce hepatitis, it is commonly caused by viral infections. The primary Hepatitis viruses include hepatitis A (HAV), hepatitis B (HBV), and hepatitis C (HCV).⁴⁹ Among these, Hepatitis C is an infection of the liver caused by a virus called hepatitis C that can appear as either a moderate, short-term disease or a severe, long-term condition. The term “acute” is used to describe a new hepatitis C infection, while “chronic” denotes a persistent infection.⁵⁰ On the other hand, hepatitis B is a preventable infection for which vaccines are available. It is chiefly transmitted through bodily fluids, including perinatal transmission from an infected mother during childbirth or exposure to body fluids, blood, or contaminated medical instruments during early childhood. During childhood, children are exposed to bodily fluids, blood, or infected medical tools. Hepatitis B can also be spread by the use of intranasal and injectable drugs, as well as infected tattooing and body piercing instruments.⁴⁹ Meanwhile, the hepatitis A virus (HAV) causes a vaccine-preventable liver illness. HAV is found in infected people's faces and blood, and the disease is highly contagious. The

transmission of the virus can occur through close contact with an infected person or consuming contaminated food or drinks, even in tiny amounts. The symptoms of HAV includes, like fatigue, nausea, abdominal pain, and jaundice can last for around 2 months. However, most individuals with hepatitis A do not experience prolonged illness. Hence, vaccination is thus the most effective method of preventing hepatitis A.^{49,51}

According to the World Health Organization's data from 2019, a staggering 296 million individuals worldwide are currently afflicted with hepatitis B, while hepatitis C affects approximately 58 million people.^{49,51} Disturbingly, 1.5 million people become infected with chronic hepatitis B for the first time, and a similar number experienced the onset of chronic hepatitis C.^{51,52} It is evident that both hepatitis B and hepatitis C have the potential to result in lifelong infections, significantly impacting affected individuals. On the other hand, although hepatitis A does not lead to chronic infection, it can cause severe illness, liver damage, and even mortality. In Afghanistan, the scarcity of reliable data on viral hepatitis poses a significant challenge. As summarized in Figure 5, an investigation into the number of viral hepatitis cases discovered at Kabul Infectious Disease Hospital in 2019 and 2020 was 3945 and 2706 respectively.^{14,49} and 2020.^{14,52} Among the various types of viral hepatitis, it was reported that hepatitis B (HBV) is the most prevalent in Afghanistan. HBV transmission occurs through Drug usage via intravenous (IV), vertical transfer from parents to children, the sharing of needles and cosmetic equipment in establishments like barbershops, beauty salons, and tattoo parlors, as well as the use of contaminated dental and surgical instruments.^{36,49} Additionally, unemployment emerged as a distinct risk indicator for hepatitis C (HCV) among youngsters who use intravenous drugs, and an alarming 90% of commercial prostitutes stated that poverty was the driving force behind their engagement in the illicit sexual activity.^{50,52} Furthermore, Afghan refugees in close

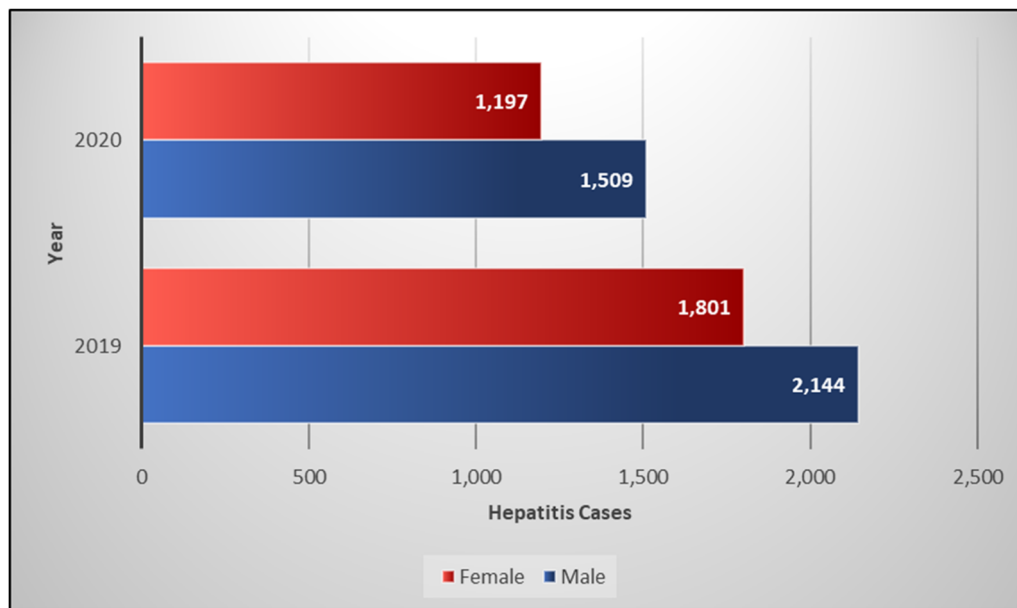


FIGURE 5 Distribution of total recorded cases, as per an investigation into viral hepatitis cases conducted at Kabul Infectious Disease Hospital in 2019 and 2020.

neighbors such as Pakistan and Iran, estimated to be around 8 million individuals, exhibit a high prevalence of HBV and HCV.⁵² Consequently, when they return to Afghanistan, they inadvertently transmit these infections to fellow Afghans, exacerbating the public health burden.

4.7 | COVID-19

The emergence of the COVID-19 pandemic in Afghanistan took place in February 2020, swiftly spreading across the nation and unleashing a devastating impact. The virus unleashed a wave of significant mortality, inundating the already strained healthcare system. Presently, the number of confirmed cases stands at an alarming level, with the actual count likely to be even higher, given the prevailing scarcity of testing and reporting resources.¹⁴ It is evident that COVID-19 has permeated all provinces within Afghanistan, leaving no region untouched by its reach. Despite the commencement of COVID-19 vaccination efforts in the country, vaccine hesitancy has emerged as a formidable challenge.^{8,53} A study conducted in 2021, focusing on Kabul, the capital city of Afghanistan, revealed that a significant proportion of the population, approximately 37%, expressed hesitancy towards receiving the vaccine.⁵⁴ Notably, various reasons have been cited as contributing factors to this hesitancy, including concerns over the vaccine's quality, a belief in possessing sufficient natural immunity to combat COVID-19, and apprehensions regarding its safety.

The tracking and surveillance of the aforementioned diseases have been severely hampered by Afghanistan's fragile healthcare infrastructure and the deficient surveillance system in place. Inadequate investments in healthcare infrastructure have resulted

in a scarcity of laboratory and diagnostic services throughout the country. Furthermore, a lack of training for healthcare professionals and laboratorians in proper disease diagnosis, coupled with the absence of a centralized and digitized reporting system, has further impeded effective disease tracking and surveillance efforts.

5 | DISCUSSION

The impact of infectious diseases on the Afghan population extends beyond the realm of health, encompassing significant socioeconomic consequences. The prevailing poverty that afflicts the majority of the country's inhabitants exacerbates the burden imposed by these infectious diseases, impeding their ability to seek essential healthcare services.^{55,56} The prevalence of these diseases inflicts a heavy economic strain, making it arduous for Afghan individuals and families to afford the necessary medical care. This predicament leaves them with no choice but to rely on the public healthcare system, despite its inadequate quality and limited resources.^{14,30}

5.1 | Strategies for health system improvement

One of the effective strategies to bolster the healthcare system's capacity is to give thorough training to community healthcare personnel. This approach becomes indispensable in Afghanistan, where there is a scarcity of healthcare professionals. Thus, harnessing the potential of community healthcare workers is crucial, as they have proven their effectiveness in delivering healthcare services in remote areas that are severely challenged by limited access to physicians. To achieve desired outcomes and fulfill sustainable

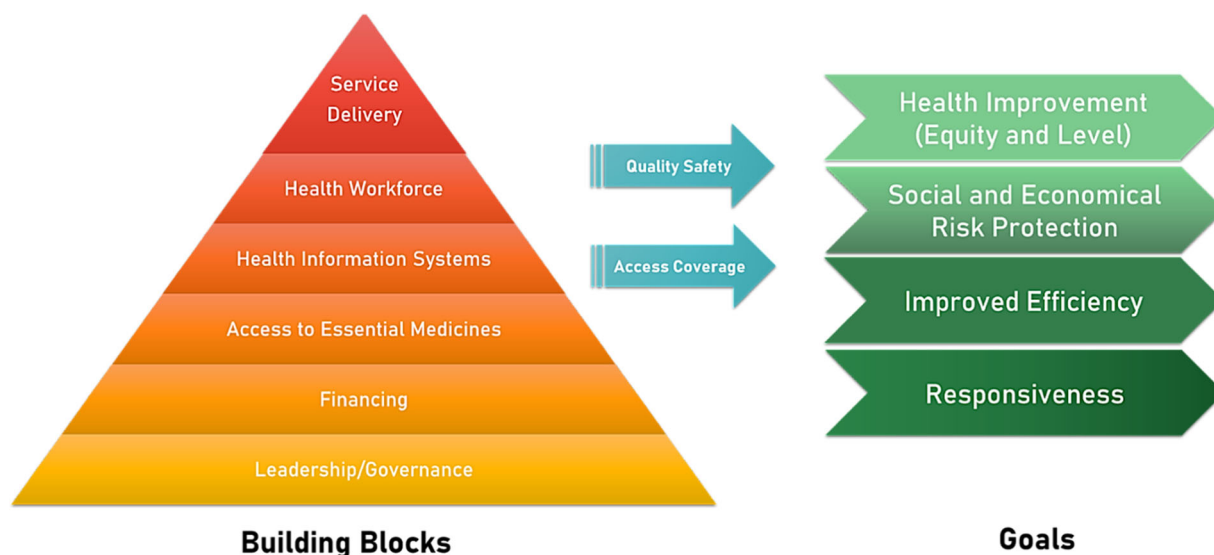


FIGURE 6 The six fundamental building blocks of WHO framework and subsequent outcomes.

development goals in Afghanistan, a critical aspect involves improving health system governance and management. This can be accomplished by adopting the World Health Organization's (WHO) framework, which comprises six fundamental building blocks as illustrated in Figure 6.⁵⁷ Thus, by implementing these building blocks, Afghanistan can substantially enhance health system governance. The service delivery, health workforce, health information systems, access to key medications, finance, and leadership/governance are the six building elements.⁵⁸ Therefore, allocating resources to each of these building blocks is vital to fortify the health system, enabling it to withstand the strains imposed by the ongoing health crisis and the challenges posed by the pandemic.

6 | CRITICAL ANALYSIS OF STRATEGIES

Enhancing access of vital medicines and vaccines is a pivotal aspect of improving health outcomes in Afghanistan. This strategy aims to address the pressing need for quality health services. However, the proposed strategy of establishing a drug procurement and distribution system is subject to substantial challenges. The fragile governance and prevalence of corruption within the Afghan health system pose significant risks that could undermine the effectiveness and long-term sustainability of this approach. Addressing these governance and corruption issues must be a priority to ensure the success of the strategy. Additionally, the distribution of essential medicines and vaccines in remote and conflict-affected areas presents logistical hurdles that could impede the strategy's reach and effectiveness. Moreover, the strategy fails to address the underlying social and economic factors, such as poverty and inadequate sanitation that contribute to the burden of infectious diseases. While improving access to essential medicines and vaccines is crucial, it

is imperative to incorporate complementary strategies and interventions to tackle the broader determinants of health in Afghanistan.

Moreover, cultural and community involvement are also considered crucial for improving access to healthcare services. For instance, female patients prefer to be seen by a female physician rather than a male. This raises concerns regarding the lack of availability of female healthcare workers in the country. However, it also presents an opportunity for the country to work towards educating women and girls to bridge the gap of female healthcare workers. This also fosters trust and reliability in the healthcare system. Additionally, female community healthcare workers should be trained to provide basic healthcare services in the remote areas of the country where women have limited autonomy to travel to the urban areas for seeking healthcare.

The strategies discussed in this paper for enhancing the health system in Afghanistan align with several United Nations Sustainable Development Goals (SDGs).⁵⁹ For example, improving access to essential medicines and vaccines directly contributes to SDG 3, which focuses on promoting health and well-being for people of all ages. Similarly, strengthening disease surveillance and response aligns with SDG 3, particularly the target of eradicating communicable diseases. Furthermore, bolstering the health workforce and improving their working conditions also supports SDG 3 by enhancing the availability and quality of healthcare services. Additionally, strengthening health system governance and management aligns with SDG 17, which emphasizes the importance of forging partnerships for sustainable development.

Furthermore, the recommendations and implications discussed in this paper have implications for globalization. The substantial burden of infectious diseases in Afghanistan not only affects the health and well-being of the population but also carries potential consequences for the global community. Infectious diseases transcend borders and

can swiftly spread to other countries. Hence, addressing the challenges faced by Afghanistan's health system and reducing the burden of infectious diseases are critical for promoting global health and well-being.

Despite the body of evidence presented, this review paper has one major limitation; it is not a systematic review. This introduces the possibility of selection bias. However, this review paper serves as a steppingstone for further research on this topic. A systematic review and meta-analysis would offer more detailed information about infectious diseases in Afghanistan.

7 | CONCLUSION

In conclusion, while improving access to vital medicines and vaccines is crucial for enhancing health outcomes in Afghanistan, significant challenges must be addressed to ensure the effectiveness and sustainability of such strategies. The Afghan health system's fragile governance, corruption, logistical complexities, and failure to address broader social and economic factors pose significant risks and obstacles to the implementation of proposed health strategies. Therefore, the strategies discussed in this analysis align with key Sustainable Development Goals, particularly SDG 3, and their successful implementation will have implications not only for the health and well-being of Afghanistan but also for global health. Hence, by adopting a comprehensive approach with complementary interventions as discussed, we can address issues in the Afghan health system and reduce transmissible diseases' burden, thereby building a better world for all.

AUTHOR CONTRIBUTIONS

Mohammad Yasir Essar: Conceptualization; Writing—original draft; Writing—review & editing. **Amna Siddiqui:** Writing—review & editing. **Michael G. Head:** Writing—review & editing.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article.

TRANSPARENCY STATEMENT

The lead author Mohammad Yasir Essar affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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