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REVIEWS

Examining Bangladesh's responses to COVID-19 in light of Vietnam: Lessons learned

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Abstract

This review aimed to examine the extent of Bangladesh's COVID-19 preparedness and control measures up to 20 January 2021, and to draw some lessons for informing the current and future pandemic responses in Bangladesh in light of Vietnam's responses, which had successfully controlled the pandemic. We performed a content analysis of data to identify similarities and critical discrepancies in epidemiological features and COVID-19 responses between the two countries. Findings indicated that Vietnam reported lower COVID-19 incidence (15 cases per million) and death rate (0.4 cases per million) than Bangladesh, with 3,129 cases per million and a death rate of 46 cases per million. Vietnam reported only 35 deaths, with 22 older individuals (>60 years) compared with 7,950 deaths in Bangladesh, with the highest death rate in older people (45%). An integrated approach combined with widespread contact tracing, better health investment, vaccine development, and strong political commitment enabled Vietnam to control the disease and mitigate its impacts. In contrast, Bangladesh seemed to adopt inadequate and untimely measures in the same domains, potentially contributing to relatively high COVID-19 infections and death rates. To control COVID-19 or inform responses to future pandemics, Bangladesh and similar countries can learn eight lessons from Vietnam. Such transferable responses could prepare health systems and populations for an appropriate global response to the next potential pandemic.

Keywords: COVID-19; Bangladesh; Vietnam; control measures; lessons learned

Introduction

Like most countries globally, Bangladesh has been hit hard by the COVID-19 pandemic (1, 2), and the pandemic has not yet ended (3, 4). The World Health Organisation's (WHO) (5) statistics showed upward trends in COVID-19 confirmed cases during November (6), with 11,080 cases on 2 November to 15,260 cases on 30 November 2020. However, a sharp decrease in confirmed COVID-19 cases was observed since 7 December 2020, from 13,299 cases on 7 December 2020 to 702 cases on 20 January 2021 (5). This trend suggests that the COVID-19 pandemic continues in Bangladesh, with a decreasing incidence rate. However, experts argue that a lack of data (7), limited testing (8) and weak monitoring (9) masked accurate infection rates of coronavirus. This situation underscores the importance of undertaking a robust response to end the COVID-19 pandemic in Bangladesh.

There is growing evidence of the COVID-19 pandemic in Bangladesh. Most research investigated the impact of coronavirus-related quarantine and lockdown measures on socioeconomic conditions (10) and psychological health among Bangladeshi populations (11, 12), including adults (13), quarantined populations (14), children (15), and students (16). However, limited literature has examined Bangladesh's recent COVID-19 preparedness, control measures, and ways to strengthen the COVID-19 responses in the context of limited resources. Therefore, the current study aims to fill the knowledge gap by critically examining the extent of Bangladesh's COVID-19 preparedness and control measures in light of Vietnam's responses and drawing some lessons for informing the current and future pandemic responses in Bangladesh.

We compared Bangladesh's responses to the COVID-19 pandemic with those of Vietnam. There were three main reasons for choosing Vietnam's response to COVID-19 for comparing Bangladesh's responses to the pandemic. First, both countries are densely populated and share economic and educational ties with China, where the outbreak first occurred in December 2019. Second, like Bangladesh, Vietnam is designated as a

lower-middle-income country (17). Third, Vietnam has been recognised as a model for a low-cost response to the COVID-19 pandemic by the WHO (18, 19). Understanding how Bangladesh tackled the disease in light of Vietnam's cost-effective responses is crucial because it may yield lessons for policymakers in Bangladesh and comparable countries to control the current and future epidemics using a constantly growing evidence base. Vietnam's approach may also inform cost-effective interventions for controlling the existing and future pandemics in Bangladesh and similar settings.

Materials and Methods

To examine the extent of Bangladesh's COVID-19 preparedness and control measures in light of Vietnam's responses, and to draw some lessons for informing the current and future responses to the pandemic in Bangladesh, we conducted a rapid review of literature because this style of review allowed us to fulfil the needs and nature of evidence base required within the shortest timeline (20, 21). Furthermore, a rapid review may help policymakers and healthcare professionals make evidence-based decisions (22).

Search strategy, data sources, and selection criteria

This review draws on published studies, grey literature and authentic press reports related to the COVID-19 pandemic in Bangladesh and Vietnam. We also searched and reviewed newspaper articles to assess Bangladesh's response to the COVID-19 pandemic in light of Vietnam's response because the COVID-19 crisis is ongoing, and newspapers publish updated information about the pandemic. Furthermore, we used information from several sources (e.g., the Institute of Epidemiology Disease Control and Research [IEDCR], Vietnam's Ministry of Health, WHO, UNICEF, World Bank and Worldometer) to review Bangladesh's responses to the COVID-19 pandemic in light of Vietnam. Literature searches were conducted between 1 November 2020 and 20 January 2021 using electronic data sources including Medline, Google Scholar and Google. This short period was chosen in order to limit the search to more recent literature.

To identify relevant literature, we used a range of search terms in the titles and/or abstracts of the articles, including 'COVID-19', 'novel coronavirus', 'SARS-CoV-2', 'epidemic', 'pandemic', 'outbreak', 'Bangladesh', 'Vietnam', 'epidemiological features', 'preparedness', 'non-pharmaceutical measures', 'health campaigns', 'protective behaviours', 'testing kits', 'contact tracing', 'health expenditure', 'vaccine', 'political commitment', 'leadership', 'challenges, 'limitations', 'control measures', 'lessons', recommendations and 'policy implications'. A search of references cited in related studies was also performed to identify additional research on the COVID-19 pandemic in Bangladesh and Vietnam. Non-peer-reviewed sources (e.g. newspaper articles, opinions, editorials and webpages) were also checked using the search terms. Attempts were made to determine whether the review was feasible and appropriate and the sources were authentic. The first, second and fourth authors accessed the relevant sources. Then, all authors checked and validated the information about the COVID-19 pandemic in Vietnam and Bangladesh by searching other online sources. A relevant source was included if: (a) it discussed challenges, preparedness, control measures, lessons, policy implications, and recommendations related to the COVID-19 pandemic in Vietnam and Bangladesh; and (b) it was available in the English language.

Data extraction, management and analysis

While reviewing relevant literature, we extracted information about the COVID-19 pandemic in Bangladesh and Vietnam, including study titles, country, target population, challenges, and the different preparedness and control measures in both countries. The first, second and fourth authors extracted information from the relevant literature, and all co-authors checked and reviewed it. We manually performed a content analysis of all the data, summarised and analysed to identify the similarities and critical discrepancies between the two countries, especially in the areas of challenges, preparedness and control measures related to the COVID-19 pandemic. This analytic approach was applied by other researchers (23-25).

Results

Two major themes emerged from the literature we reviewed. As discussed below, these were about epidemiological and jurisdiction-specific features and varied responses to the COVID-19 pandemic in Vietnam and Bangladesh.

Key epidemiological features of COVID-19 and jurisdiction-specific features

There were some similarities and differences in the key epidemiological features of COVID-19 and jurisdiction-specific features in Bangladesh and Vietnam. Both countries were vulnerable to the COVID-19 pandemic (26, 27). On 8 March 2020, IEDCR reported the first three confirmed cases of COVID-19 in Bangladesh (26). Of these three cases aged between 20 and 50, two people returned from Italy, and the third person came into contact with a returnee (30, 31). As of 20 January 2021, Bangladesh identified 529,687 confirmed novel coronavirus cases (32). Although the first two confirmed cases of the novel coronavirus in Vietnam were a Chinese father and his son and were identified on 23 January 2020 (33, 34), the country reported a lower number of COVID-19 cases (27), with only 1,544 COVID-*19* cases reported from 23 January 2020 to 20 January 2021 (32). Both countries experienced the first wave of the novel coronavirus (3, 25) with a substantial difference in case

fatality rates. However, the number daily of infected cases were higher in Bangladesh compared to Vietnam (32, 35) (Table 1). As of 18 January 2021, the overall positivity rate was 15.3% in Bangladesh, which was sharply higher than that of Vietnam (0.1%) (36). Furthermore, in Bangladesh, a total of 7,950 individuals died from COVID-19 until 20 January 2021 (37). Due to weaker immune systems and comorbidities, the highest death rate was found in older people (>60 years), accounting for nearly 45% of the total deaths in the country (38). However, during the same period, Vietnam reported only 35 deaths (39), with 22 older individuals (>60 years) (40). Such epidemiological features in these two countries suggest that Vietnam tackled the COVID-19 pandemic successfully compared to Bangladesh.

Table 1. Comparison of key epidemiological features of COVID-19 and jurisdiction-specific features in Bangladesh and Vietnam

General overview	**Vietnam**	**Bangladesh**
Total population – 2020 estimate	**97,786,433 (41)**	**165,527,807**
Population density	314 people per km²	1265 people per km²
COVID-19 epidemiological characteristics up to 1 January 2021		
First case identified	23 January 2020 (33)	8 March 2020 (8)
Total cases	1,497	517,920
Total confirmed cases per million population	15	3,129
Total deaths from COVID-19	35	7,670
Total deaths from COVID-19 per million population	0.4	46
Case fatality risk (CFR)	1 (%)	1.93 (%)
Total tests performed for COVID-19	1,431,631	3,286,885
Total tests per million population	14,640	19,857
Total test positivity rate	0.1 (%)	15.3 (%)
Recovery rate	80% (41)	57.67% (26)

Sources: (32, 35, 36, 42)

Varied responses to COVID-19 pandemic contributing to different outcomes

There were differences in responses of Vietnam and Bangladesh to COVID-19 due to different timing of detecting and reporting COVID-19 cases, infrastructure for managing the pandemic, planning for contact tracing, and control measures (29). The sub-themes of the varied COVID-19 responses are discussed below:

Non-pharmaceutical measures and citizens' behaviours

There were fundamental differences in citizens' behaviours and non-pharmaceutical measures for the pandemic in Vietnam and Bangladesh. The Vietnamese Department of Information and Communication adopted a strict policy of charging fines for spreading COVID-19 misinformation on social media (44). Furthermore, a licensing system for the trading and distribution of facemasks and hand sanitisers was imposed, and strict policies like hefty fines (US$13) (45) were initiated for traders to stop high prices and fake products (19). The Vietnamese government made the mandatory use of facemasks on public transport and public places since 21 February and mid-March 2020, respectively (45, 46). Its citizens trusted the government (46) and adhered to public health orders (e.g., stay-at-home) (47). They practised self-protective behaviours such as using facemasks, maintaining social distancing and practising cough etiquettes by covering coughs and sneezes with disposable tissues or clean clothes (27). The Vietnamese authority understood that it might be difficult to control the coronavirus disease without engaging general population in the COVID-19 campaigns (48). Hence, at the beginning of the pandemic, the country launched a successful campaign and sent nearly 6 billion text messages (e.g. 'joining hands to push back COVID-19'; 'every citizen, let's support the fight against COVID-19'; 'stay strong Vietnam in fighting against COVID-19') to mobile phone users to promote awareness about COVID-19 (34, 49). Furthermore, in April 2020, social distancing campaigns were executed across the country (44). Additionally, the country made an appealing music video for distributing clear messages about the significance of handwashing (50). As a part of the intensive public communication, television, radios, journals, websites and social media circulated many articles, news, pictures and flyers on COVID-19 information (51). In order to ensure medical and protective equipment for healthcare workers, the Vietnamese government organised a fundraising campaign and collected over USD 2.1 million by 5 April of 2020 (52). Such measures and citizens' behaviours potentially contributed to reducing infection rates in the country.

By contrast, in Bangladesh, due to inadequate monitoring and regulation of the production and trade of non-pharmaceutical equipment, counterfeit facemasks and hand sanitisers were commonly available in the market (53). Bangladesh made mandatory use of facemasks in late May 2020 (54), much later than Vietnam did. The country undertook delayed public campaigns about the transmission, prevention and effects of the disease (29). It appeared that due to delayed campaigns, rumours were widespread, which led to misunderstanding and limited awareness of the disease (55). Moreover, many citizens did not wear facemasks consistently in public places such as in public transport, factories, slums, offices, markets and shops (56, 57), potentially due to social-structural reasons. These include the improper and slow implementation of the Communicable Diseases (Prevention, Control and Eradication) Act 2018 for creating awareness (58), poor awareness (55), financial constraints, limited availability of facemasks (59), not following the government's stay-at-home orders, not maintaining quarantine and isolation measures (60), and appalling situations of the quarantine facilities (61). Again, many people displayed negative attitudes towards wearing facemasks, possibly due to heat stress, shortness of breath and discomfort (59). Furthermore, the country lacked successful public health campaigns to increase awareness among the people (26). Most people were unable to anticipate the impacts of COVID-19 (62) and did not behave sensibly and responsibly at personal and community levels (63). Bangladesh's public health campaigns for creating awareness about COVID-19 transmission and prevention often conveyed mixed messages to the general public, which created confusion and misunderstandings (26). For instance, many affected and infected individuals seemed to have misunderstood the meaning of the word 'quarantine' and were reluctant to maintain quarantine and isolation (7). More importantly, while the Bangladeshi government initiated limited fundraising campaigns, its allocated funds for COVID-19 prevention were also embezzled to a large extent (26). Such delayed public health measures and inappropriate citizens' behaviours potentially contributed to escalating the country's COVID-19 pandemic.

Developing testing kits and testing capacity

Effective testing kits and testing capacity are key to controlling an emerging infectious disease like COVID-19 (6) because they can help a country adopt measures (64). There was a notable difference in innovating testing kits and enhancing testing capacity between the two countries. Vietnam's remarkable success in controlling COVID-19 may be partly attributed to its increasing capacity to enhance innovative research, leading to developing COVID-19 testing kits early (47). The country identified the first case on 23 January 2020 (33). In late January 2020, the Vietnamese Ministry of Science and Technology held a meeting with virologists to encourage diagnostic tests development. By early February 2020, government-funded institutions in Vietnam had developed more than four COVID-19 testing kits, which were later certified by the Ministry of Defence and the National Institute of Hygiene and Epidemiology. Consequently, two private companies, including Viet A and Thai Duong, produced the testing kits (25). Although Vietnam had fewer confirmed COVID-19 cases, the government increased the testing capacity. The

government established 110 laboratories to conduct real-time polymerase chain reaction (PCR) tests for identifying the novel coronavirus, with a capacity of more than 25,000 tests each day (47). This assisted the country in halting the community transmission of COVID-19.

In Bangladesh, IEDCR under the Ministry of Health and Family Welfare (MHFW) is responsible for conducting research into controlling epidemiological and infectious diseases such as COVID-19 (64). However, compared to Vietnam, Bangladesh and its research institutes conducted limited research into innovating testing kits and had inadequate testing capacity (8). Some Bangladeshi scientists had a slow start to develop a testing kit for detecting the coronavirus in less than 15 minutes by the end of March (26, 65). The testing kit, developed by scientists of the Bangladesh Gonoshasthaya- RNA Biotech Limited, was similar to one developed in January by the Chinese scientists. The test, known as 'dot blot test', is designed to detect the specific antibody in the blood, which is created by the white blood cells in response to the coronavirus (65). However, the scientists' efforts to develop a cost-effective testing kit received neither adequate support from the Governmental and non-governmental organisations (64, 66), nor approval from the Directorate General of Health Service (DGHS), due to bureaucratic red tape (29). Other than the Bangladesh Gonoshasthaya-RNA Biotech Limited's initiative, there were no mentionable initiatives by any governmental and non-governmental organisations and Bangladeshi universities to conduct research into developing testing kits in Bangladesh.

Regarding testing capacity, Bangladesh established inadequate diagnostic laboratories (67), with only 60 testing centres to provide services for more than 165 million people (64). Compared to Vietnam, the country performed a lower number of testing for identifying coronavirus, with a maximum of 15 000 tests per day for its entire population **(**68**).** The country levied a higher testing fee than Vietnam and other similar south Asian countries (62). Government hospitals charged from $2.4 to $5.9 for a sample collected from home, while private hospitals charged $37.75 per test (1). The higher testing fee was unaffordable to poor populations (1) and possibly demotivated individuals with moderate income to visit healthcare centres for COVID-19 testing (6, 62). The decrease of daily test numbers meant that many potential COVID-19 cases could not be detected (68). This potentially allowed the coronavirus to spread rapidly among individuals and sustain in the community, thus increasing the burden of COVID-19 (69). The relatively inadequate research and testing of coronavirus may also undermine Bangladesh's evidenced-decisions to undertake interventions for reducing the spread of the pandemic (64).

Contact tracing

Contact tracing is a well-recognised way to manage an infectious disease and slow the spread of infections (70). The higher the contact tracing, the better a country can control the virus. Evidence suggests that Vietnam identified as many cases as possible by using people's movement, Facebook or Instagram posts and mobile-phone location data (71). The Vietnamese government used its previous experience of tackling Severe Acute Respiratory Syndrome (SARS) and the Avian Flu (44). It promptly initiated five contact tracing stages to detect potentially infected individuals (72). When an infected person was identified, he/she was isolated and kept in a healthcare facility straightway. He/she needed to complete a questionnaire by providing details of all individuals he/she had contacted recently. All contacted individuals had to undertake testing and stay in government-run quarantine facilities (e.g., universities and military dormitories) (45). Individuals who had close contacts with infected persons were isolated in dedicated quarantine facilities. Individuals who contacted close contacts had to self-isolate at home (47). Thus, infected persons and close contacts were traced and kept under various prevention stages (72). Besides, the government made it mandatory to install Ncovi health notification software to receive information about infected individuals (25).

Unlike Vietnam, in Bangladesh, contact tracing was primarily centralised and conducted in Dhaka and at district and sub-district levels to some extent (67). The government of Bangladesh initiated a manual strategy for tracing infected individuals at the beginning of the pandemic. The DGHS coordinated with the WHO, upgraded contact tracing and introduced 'Go Data' (a software) to collect field data, trace infected persons and visualise disease transmission (73). On 5 June 2020, the government also launched a contact tracing mobile app named 'Corona tracer BD' to identify infected individuals using Bluetooth signals (74). However, as of 31 December 2020, less than 5% of the total population downloaded the mobile app (62). The limited download was potentially due to several factors, including fear of violation of privacy issues (62) and an inadequate number of smartphone users (18.5%) of the total population (75). Therefore, after few months of launching, most individuals thwarted the mobile application because it could not track infected persons and notify others reliably and accurately (76). Therefore, contact tracing in the country could not control the COVID-19 pandemic, as it did in Vietnam.

Health investment

Our study found that Vietnam's response to COVID-19 was characterised by its relatively high investment in its healthcare system and social health insurance program (77). According to the WHO (78), in Vietnam, 87 percent of the total population have access to necessary health care services under the social health insurance program. Furthermore, the country spent nearly US$17 billion, equivalent to 6.6 percent of its gross domestic product (GDP), for its healthcare (79). Public health expenditures per capita increased at an average rate of 9.0 percent annually between 2000 and 2016 (77). These vast investments were paid off with better treatment for

COVID-19 patients with relatively limited deaths. Besides, Vietnam planned an excellent budget for pandemic prevention, including preventive centres, hospital staff, quarantine and financial provision for vulnerable groups, such as informal workers, migrant workers and women (44).

On the other hand, the healthcare system remained neglected in Bangladesh (68). Many of its people had limited or no access to healthcare services (1, 80). Health insurance, including national and private, is practically absent in the country (81). The budget for providing large population's healthcare needs remained the lowest in South Asia, with only 2.64 percent of the national budget (82) and 0.69 percent of the total GDP (68). In Bangladesh, corruption was widespread, and the immediately allocated funds for COVID-19 prevention were embezzled (83). The provision of forged COVID-19 test results evidenced that the health sector remained unregulated (68). It appeared that this suboptimal investment in the health sector, limited regulation, and the inefficient utilisation of allocated resources potentially made it challenging to meet the new spending needs of a pandemic like COVID-19.

Vaccine development and procurement

Like many developed countries globally, in early May, the Vietnamese government and pharmaceutical companies mobilised adequate resources and prioritised domestic production of COVID-19 vaccine candidates (84, 85). In December, Vietnam's Nanogen Pharmaceutical Biotechnology Company successfully launched the first phase of clinical trials of their vaccine named Nanocovax. Two other manufacturers will launch human trials of the COVID-19 vaccine in February and March 2021 (86, 87). Furthermore, in early August, Vietnam signed an agreement to purchase 50-150 million doses of Russian vaccines (88). At the beginning of 2021, Vietnam confirmed at least 30 million doses of the COVID-19 vaccine developed by AstraZeneca with the University of Oxford. Moreover, the government continues to receive vaccines through the COVAX facility (89) and are in discussion with other vaccine manufacturers, notably Pfizer-BioNTech, Russia's Sputnik V, and China's Sinovac, to purchase more vaccines (90). The country also formulated policies and regulatory frameworks to support vaccine transportation, distribution, storage, and application in the shortest possible time. In July, in consultation with various stakeholders, the government arranged workshops to accelerate the national regulatory pathways for the distribution, registration licensing, clinical trials, and manufacturing of COVID-19 vaccines (91). The vaccines' distribution will perform in phases through all four quarters of 2021 (92).

Although Bangladesh has the world's leading pharmaceutical and vaccine manufacturing industries, with a vaccination framework reinforced by the Global Alliance for Vaccines and Immunisation (GAVI) and the WHO, the government of Bangladesh provided limited support for developing home-grown COVID-19 vaccine candidates (93). However, a vaccine candidate named Bongovax vaccine developed by the Globe Biotech Company was under investigation and received approval from the Directorate General of Drug Administration to carry out clinical trials in mid-January 2021 (94, 95). Bangladesh is primarily dependent on purchasing vaccine candidates from foreign countries such as China, India, and Russia (96). In late December 2020, the Government of Bangladesh adopted an ambitious plan to inoculate nearly 140 million (80% of the total population) people within the next two years (97). However, as of late January 2021, Bangladesh managed to receive 49 million doses of vaccines from the Serum Institute of India (SII) and through the COVAX facility. The challenges remain for Bangladesh to procure the rest 91 million doses of vaccine for its populations. The country also had limited capacity for storing (minus 20-degree Celsius) and transporting Pfizer-BioNTech and Moderna vaccines (98) which require minus 70-80 degrees Celsius temperature (99). Notably, due to a lack of a judicious COVID-19 vaccine policy (100), it may be very challenging for Bangladesh to ensure the equitable distribution of COVID-19 vaccines (97). Thus, it appeared that the country lacked the readiness to support domestic vaccine development and provide immunisation services for its population.

Political commitment

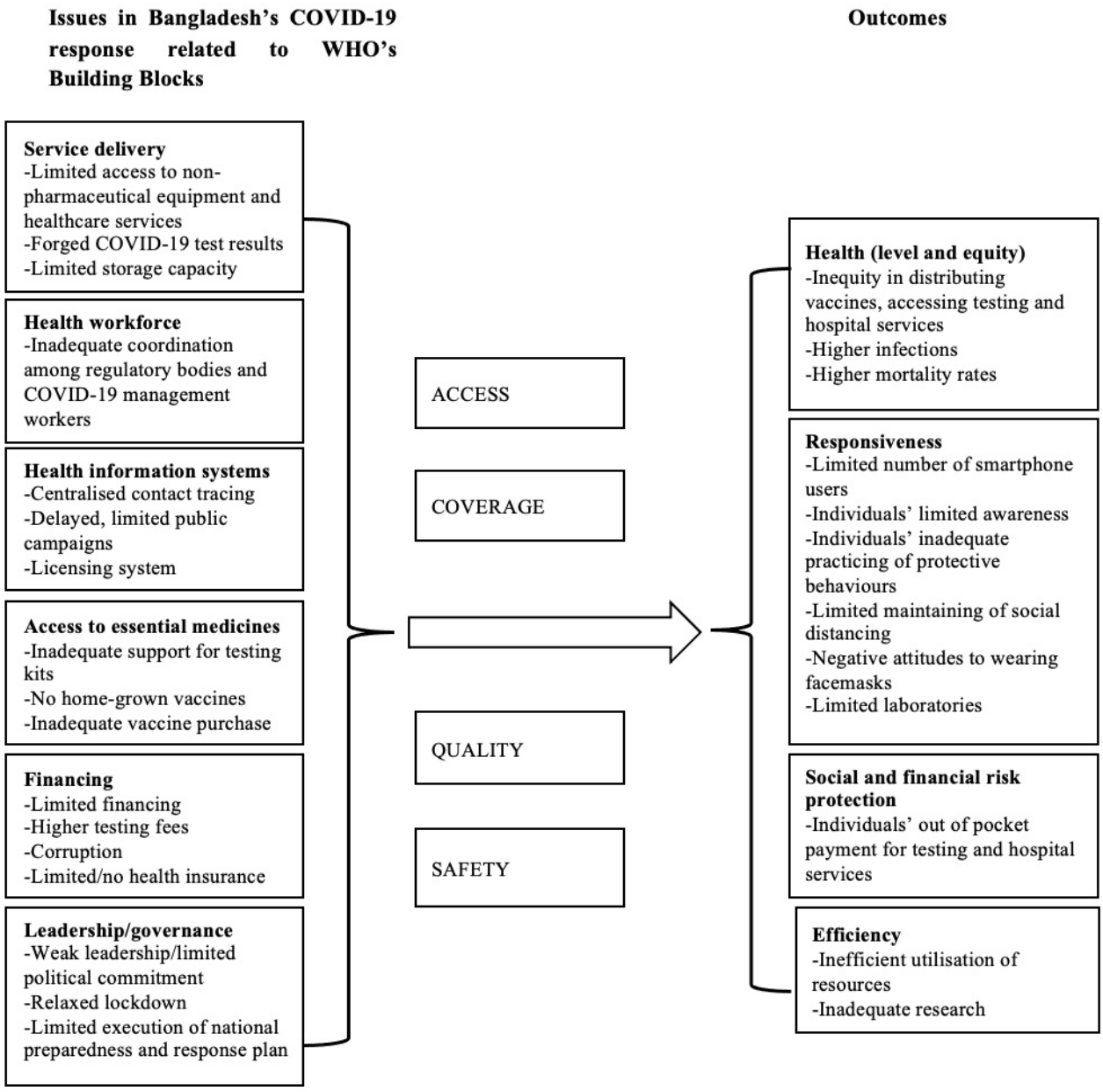
An important feature of Vietnam's response to the COVID-19 pandemic was the mobilisation of the entire political system to tolerate economic losses to ensure people's health and lives and reduce coronavirus-related deaths (77). The political system, their leaders, associated agencies, including health division, civil societies, the army and the security forces attempted to protect people's health and life (Ha et al., 2020; Minh, 2020). The strong leadership involving multi-sectoral alliance and significant support with national resources utilisation proved a best practice in Vietnam (25). Several powerful messages from the supreme leaders inspired the nation to fight against COVID-19 (101). Thus, the highest authority remained committed to implementing the pandemic's policies (51).

By contrast, Bangladesh seemed to lack a strong political commitment to controlling the COVID-19 pandemic (29) and seemed to prioritise its economic growth by enforcing partial lockdowns, and resuming business and economic activities (57). Partial lockdown potentially contributed to increasing the community transmission of the coronavirus (57). In addition, political leaders in Bangladesh appeared to have limited commitment to coordinating and preventing the pandemic (102). For example, it appears that the country failed to execute the 'National Preparedness and Response Plan for COVID-19' to plan and strengthen COVID-19 responses possibly due to inadequate coordination among the regulatory bodies and limited political commitment (7, 57). Furthermore, the Bangladeshi Health Minister's remarks – 'the novel coronavirus will leave Bangladesh by itself', 'people do

not need to come to hospitals as they get treatment at home now; this is why the hospitals have fewer patients' – on the prevention of COVID-19 suggests that the government overlooked the importance of the management and prevention of the disease (102, 103). Such a lack of political commitment and coordination, together with politicians' corruption, possibly weakened the country's response to the disease (83).

The findings regarding Bangladesh's COVID-19 responses can be related to the WHO's Health Systems Building Blocks framework (Figure 1). The framework is a tool to identify the gaps between the health systems of a country and its performance (104). It encompasses six building blocks: service delivery, health workforce, health information systems, access to essential medicines, financing and leadership/governance (105).

Figure 1. COVID-19-related issues and outcomes in the WHO building blocks in Bangladesh



Sources: (104, 105).

Discussion

This paper critically examined the extent of Bangladesh's COVID-19 preparedness and control measures in light of Vietnam's responses to COVID-19. Such a comparative study of responses to pandemics is particularly critical because it can help Bangladesh and comparable countries improve and strengthen pandemics management in the future. This review revealed remarkable differences in non-pharmaceutical measures and citizens' behaviours, developing testing kits and testing capacity, contact tracing, health investment, vaccine development and procurement. Furthermore, it seemed that there was a wide gap in political commitment to COVID-19 prevention between the two nations. Overall, Vietnam's responses to COVID-19 appeared to be more systematic, vigorous, and well-planned than those of Bangladesh. In contrast to Vietnam's responses, Bangladesh's responses seemed to be inadequate, less-systematic, and relatively ineffective. Such an approach might have resulted in poorer outcomes in Bangladesh than in Vietnam, including inequity in accessing testing and hospital services, individuals' inadequate protective behaviours, inefficient utilisation of resources, higher infections and fatality rates, inadequate research and so on as outlined in the WHO's Building Blocks framework (Figure 1).

Our findings indicated that Bangladesh had higher infections and deaths than Vietnam. This was potentially due to limited education and awareness about COVID-19 (29), prioritising economic activities (57), defective health sectoral policy and inadequate legislative structures (57), limited public health investment and widespread corruption (26) and a lack of political commitment (102), among others. The confluence of these factors contributed to a situation that ultimately led to higher infections and deaths from COVID-19 in Bangladesh. The precarious health systems and fragile health infrastructures also exposed the country to the Dengue outbreak (106), which took 104 lives and infected 85,000 persons across the country in 2019 alone (43). This suggests that Bangladesh needs to strengthen its health infrastructure and systems to tackle the current and future pandemics or any emergency situations.

In contrast to the current study's findings, previous studies of COVID-19 in Bangladesh focused on the impacts of COVID-19 (10-12) and its associated challenges (8). These studies did not provide a critical examination of the gaps and suggest potential ways to optimise Bangladesh's response to COVID-19. Beyond Bangladesh, Summers et al. (107) undertook a comparative analysis of New Zealand's and Taiwan's responses to the COVID-19 pandemic. They drew some lessons that these two countries can learn from each other. However, New Zealand's and Taiwan's responses may not be feasible in Bangladesh and similar low and middle-income countries (LMICs) since they are high-income countries. Our review addressed this knowledge gap by highlighting the lessons that Bangladesh and similar LMICs can learn from Vietnam. Our study extended previous research by critically examining Bangladesh's responses to the COVID-19 pandemic, offering novel insights into the weaknesses of Bangladesh's responses compared to Vietnam's responses and drawing some lessons to strengthen Bangladesh's COVID-19 responses and tackle future pandemics in Bangladesh and comparable countries.

Although Vietnam successfully tackled the pandemic, the country experienced some challenges, including the inadequate provision of medical equipment (ventilators in intensive care units) and personal protective equipment (facemasks and gowns) for frontline workers (doctors and nurses) in hospitals and clinics (25). Despite these challenges, this review indicates that Bangladesh and other comparable countries can learn useful lessons from the management of COVID-19 pandemic in Vietnam, which undertook relatively effective responses.

1. Bangladesh can build upon the COVID-19 experience and increase its capacity to respond to future pandemics as Vietnam unitised its previous experience of tackling SARS and the Avian Flu to combat the coronavirus disease.
2. Bangladesh should take prompt responses and policy interventions to prevent the spread of the outbreak, as seen in the Vietnamese responses. Prompt responses can be undertaken by providing appropriate training for public health practitioners and adequate funding for controlling the pandemic. It is also vital to ensure that corrupt individuals do not misappropriate the funding.
3. Citizens and politicians in Bangladesh need to act and behave sensibly and responsibly at personal, community and political levels and understand the importance of managing and preventing a pandemic.
4. Bangladesh needs to strengthen the pandemic responses by encouraging its people to follow self-protective behaviours and public health orders (e.g. using facemasks, maintaining social distancing and practising of cough etiquettes).
5. As seen in Vietnam, Bangladesh needs to mobilise its entire political system, political leaders, associated agencies such as health division, civil societies, the army and the security forces to protect people's health and life.
6. Bangladesh needs to further strengthen its health system further and initiate a social health insurance program to ensure universal health coverage for all.
7. By reducing political barriers and thwarting bureaucratic red tape, adequate and timely investment in the health sector, developing testing kits and vaccine candidates can result in limited infections and deaths in Bangladesh as occurred in Vietnam.
8. Vietnam showed how a country with low economic capacity and technical know-how successfully controlled the epidemic. Given that Bangladesh has limited economic capacity, a

low-cost approach would be a viable option for the country to tackle the current and future pandemics. A low-cost approach (e.g. 'National Preparedness and Response Plan for COVID-19') may work only when there has already been a considerable investment in strengthening the health system and strong political commitment in Bangladesh as done by Vietnam.

The paper's main strength lies in the comparison of Bangladesh's responses to COVID-19 with those of Vietnam and the lessons that can be learned from the review to control the current and future pandemics in Bangladesh and comparable LMICs across the world. Secondly, this study adds to the limited body of knowledge (108, 109) regarding the COVID-19 responses in relation to the WHO's Health Systems Building Blocks framework. Our paper has some limitations. Firstly, given a lack of relevant peer-reviewed publications on COVID-19 control measures in these two countries, to compare and contrast Bangladesh's responses to COVID-19 with those of Vietnam, some information used in this review were extracted from non-peer-reviewed academic sources. However, these sources were the most read, reputable local, national and international newspapers, as well as reports of the IEDCR, WHO and the websites of the Health Ministries of Bangladesh and Vietnam. Secondly, this study reviewed literature related to Bangladesh's and Vietnam's response to the COVID-19 pandemic up to January 2021. Thus, it excluded the recent changes in the health burden, including the total number of COVID-19 cases and deaths caused by the Delta and other variants. Thirdly, due to resource constraints, this review included literature published in English only. As such, this study excluded studies published in local languages (e.g. Bengali and Vietnamese). However, we found that the published English literature included in our review used information on the COVID-19 responses published by the local languages. Fourthly, although Bangladesh and Vietnam are lower-middle-income countries and are fast-growing nations, there are dissimilarities in population density, religion, and political system all of which may have shaped COVID-19 responses. As such, some aspects of Vietnam's COVID-19 responses may not be completely feasible or replicable to control the COVID-19 outbreak in Bangladesh or similar countries and require further research. However, this review sheds new light on the reliable, low-cost COVID-19 responses by comparing the two countries. It may guide future research on responses of LMICs to draw potential lessons in fighting against and managing the COVID-19 and future respiratory pandemics.

Conclusion

It is true that the recent emergence of the delta variant has contributed to increasing COVID-19 cases rapidly in both Bangladesh and Vietnam. This new variant may have tarnished Vietnam's efforts to control the epidemic (110). Despite this, Vietnam's response to COVID-19 up to 20 January 2021 resulted in relatively lower COVID-19 cases and death rates than Bangladesh. It seemed that this pro-active and rapid response to COVID-19 in Vietnam was in contrast to the more volatile and slower pandemic response in Bangladesh. While many aspects of Vietnam's responses to COVID-19 may be acceptable in Bangladesh, other comparable LMICs may also adopt them regardless of the differences in the population size, epidemiological, and health systems. Such transferable responses could improve current responses to COVID-19 and prepare health systems and populations for an appropriate and effective global response to the next potential pandemic.

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Author contribution statement

M. N. Huda: Conceived, designed the study, analysed data, drafted and revised the full manuscript. H. Uddin, J.S. Malo: Extracted information and drafted the results section. M.K, Hasan: drafted discussion section, edited the manuscript, and gave feedback. M.C. Duong, M. A. Rahman: Edited the manuscript and provided critical feedback.

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Conflict of interests statement

The authors declare no conflict of interest.

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