Exploring geographical differences and disparities of COVID-19 cases and understand the gaps in responses in South Asian countries: A three-month analysis of cases and responses

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Abstract

Background and Aim: Response in a beginning of an infection is important to prevent and control any infectious disease. It has never been studied how the countries in South Asia responded in the beginning of COVID-19 infections. The aim of this study was to explore the gap in responses by geographical variations and inequalities of COVID-19 cases in South Asian Countries.

Methods: Covid-19 cases, geographic and demographic data for South-Asian countries were abstracted from the news medias, Johns Hopkins University dashboard, and countries government websites. The coverage period was until May 7, 2020. Descriptive analyses of COVID-19 cases were stratified by gender and age group. Clustering and spatial analysis was performed to show the COVID-19 case distribution.

Results: Over 100000 confirmed cases were found in South-Asian countries until May 7, 2020, and 95% of them are in India, Pakistan, and Bangladesh. Alarmingly, a sharp increase in new cases was observed in Bangladesh and India in early May. In this region, India reported 56% of total cases, with the highest case fatality rate of 3.4%. Approximately 70% of infected cases in this region were found in men. Approximately 42% of confirmed cases were found between the ages of 20-40, and about 20% of infected cases were found over 50 years or older. All big, economically important cities in this region were mainly infected. Bangladesh and Afghanistan reported a slow rate of recovery with 16% and 13%, respectively while India reported 29%. Afghanistan used only four tests to detect a case while India used 25 tests to detect a case showing poor numbers and insufficient test facilities in Afghanistan.

Conclusion: The biggest and most economically-important cities in every South-Asian country were infected with COVID-19, where returning the migrant workers to work was a significant challenge after lifting the restrictions. Data from India, Pakistan, and Bangladesh suggest that these countries did not show the peak in the first six months. In South Asia, men were at higher risk for both infection and death, regardless of age. There were many underreported cases in these regions. Scale up services to improve the testing facilities and start a surveillance system to identify the cases rapidly especially from the marginalized population and women could reduce the burden of any infections.

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1. Introduction

In early January, the World Health Organization (WHO) started raising alarms on COVID-19 as soon as China told it of a new, mysterious disease in Wuhan City [1]. On May 1, 2020, the WHO extended its declaration of a global health emergency [2]. The move comes precisely three months after the organization's initial decision on January 30 to declare a "public health emergency of international concern." According to official estimates, over 3.5 million people worldwide were infected, and almost a quarter-million had died till May 1, 2020. There is evidence of continuous transmission of the virus on six continents at its early stage [3-4].

The spread of the virus has speeded up in most South Asian countries in late April and early May [5]. Because of this, the Governments of South Asian countries adopted several measures to limit the viral spread, including the closure of educational institutions, the prohibition of public gatherings, country-wide lockdowns, the distribution of clinical equipment, quarantine facilities, institutional isolation, awareness-raising substances and technical support, foreign travel screening, etc. However, governments across the South Asian countries had to grapple with the demands for an end to stay-at-home orders with the implications of loosening social distancing rules [6-12].

Most of the South Asian countries are densely populated. In South Asian countries, India was on the top with the highest number of COVID-19 infected persons and where India was followed by Pakistan, Bangladesh, Afghanistan, respectively, in terms of the number of COVID-19 infected persons [5,13]. It was challenging to ensure all the preventing measures in these territories. In this study, we reviewed and discussed the initiatives that had been taken in South Asian countries to prevent the transmission and infection of COVID-19 in its early stage. Understanding the regional and demographic context for COVID-19 cases is important for policy guidance so that the implementation of services is to be properly targeted for any future epidemic.

The manuscript explores the gap of responses by geographical variations and inequalities of COVID-19 cases in South Asian Countries. This study will apprehend how a country could implement adequate steps to tackle and provide a background to policymakers at the time of such outbreaks to apply suitable measures.

2. Methods and materials

The disease spread for various regions summarized here is based on different data sources and methods. Data for South-Asian countries were abstracted from the Johns Hopkins University Dashboard [14]. Demographic data were collected from country dashboards on coronavirus. The coverage period was until May 7, 2020 since the first case. There was no sampling performed to reach a predetermined size of the sample, and no eligibility requirements were used — all cases included.

2.1 Statistical Analysis

The case fatality rate, percentage of various indicators like test facility performance, was calculated. We also compared the case and deceased trajectories of the countries of South Asia after the 100 cases detection. For geographical analysis, the county-level location by latitude and longitude and cases at the time of diagnosis was used to build color-coded maps of South Asia for each division/province on May 5, 2020. Descriptive analyses of incident cases were stratified by gender and age group. This analysis was performed using R software (version 3.3.1).

3. Results

3.2 Response to COVID-19 by South-Asian Countries

Table 1 outlines country preparedness to address the pandemic. Nepal was the very first country to register a confirmed COVID-19 case in South Asia and was reported on January 24, 2020 [15]. From then until March 8, 2020, on January 27, January 30, February 24, February 26, March 6, March 7 and March 8, Sri Lanka, India, Afghanistan, Pakistan, Bhutan, Maldives, and Bangladesh registered their 1st case of COVID-19, respectively [16-22].

India, Nepal, and Sri Lanka were the countries where the first COVID-19 positive cases were found from China returnees [15-17]. In Pakistan and Afghanistan, returnees were found from Iran [18-19]. The first case was reported as an Italian returnee to Bangladesh and in the Maldives from an Italian tourist [21-22]. Upon receiving the first reported case of COVID-19 from an American tourist, Bhutan appeared to contain matters well, although there was a minimal diagnostic ability [20]. Reported on March 23, Bhutan sealed its borders and monitored the situation [23]. Every confirmed case in the country was correlated to overseas travel, suggesting community spread might be limited.

The transmission of COVID-19 identified in most South Asian countries (except Nepal and Bhutan) as the "Cluster of Cases," whereas this was known as the transmission of "Sporadic Situations" in Nepal and Bhutan [24]. On March 5, India was the first of the South Asian countries to shut down their educational institutions as part of the precautionary steps, which was almost a month after the first case was reported [6]. India suspended all international flights from March 13, when India's government called for a nationwide lockdown that the government continued for months [7, 25]. New Delhi's rapid introduction of a national shutdown was achieved without proper contact, leading to confusion and chaos as people initially questioned how vital supplies could be procured. Originally, govern-

Country	Detection of 1st case	Source of 1st case	Transmission classification	Closing of educational institutions	Prohibition of public gatherings	Effective of lock down	Closing of international flight
India [6-7,17,25]	30-Jan-2020	China returnees	Cluster of cases	5-Mar-2020	22-Mar-2020	25-Mar-2020	13-Mar-2020
Pakistan [11-12,19,26,37]	26-Feb-2020	Iran returnee	Cluster of cases	13-Mar-2020	13-Mar-2020	24-Mar-2020	21-Mar-2020
Bangladesh [22,37-38]	8-Mar-2020	Italy returnees	Cluster of cases	17-Mar-2020	19-Mar-2020	26-Mar-2020	12-April-2020
Afghanistan [18,24,27,37]	24-Feb-2020	Iran returnee	Cluster of cases	14-Mar-2020	18-Mar-2020	26-Mar-2020	March 2020
Sri Lanka [9,16,24,37]	27-Jan-2020	China tourist	Cluster of cases	13-Mar-2020	21-Mar-2020	20-Mar-2020	22-Mar-2020
Maldives [21,24,28,37]	07-Mar-2020	Italian tourist	Cluster of cases	11-Mar-2020	11-Mar-2020	17-Apr-2020	4-Feb-2020
Nepal [10,15,24,37]	24-Jan-2020	China returnee	Sporadic cases	18-Mar-2020 19-Mar-2020	1-Mar-2020	24-Mar-2020	20-Mar-2020
Bhutan [20,23-24,29,37]	6-Mar-2020	US tourist	Sporadic cases	NA	NA	No locked down	23-Mar-2020

Table 1: Summary of Response to COVID-19 by South-Asian Countries until May 7, 2020

ment officials told Indians not to panic, leading to a delayed panic following the announcement of the lockdown. To make matters good, law enforcement also embraced lockdowns with zeal.

Pakistan closed its educational institutions about three weeks after the identification of the first case on March 13 [23]. From March 21, all international flights in Pakistan were suspended, and on March 24, the government declared the country's lockdown [11-12,26]. The distribution of healthcare services across the pandemic in Pakistan was likely to diverge sharply between the population-dense provinces of Punjab and Sindh and the more rural areas of the country, including Balochistan and Khyber-Pakhtunkhwa.

Both Bangladesh and Afghanistan called for an effective lockdown on March 26, while Sri Lanka declared on March 20 and Nepal declared on March 24 [8-10,27]. Compared with other South Asian nations, Maldives was the most prompt in taking immediate steps. Just 4 days after the first COVID-19 case identification, the government closed all of its academic institutions. They closed their airports with effect from February 4, 2020 [28]. However, Bhutan did not declare any ban on lockdown or public gathering [29].

According to the Hospital management statistics, India equipped 586 hospitals for the care of COVID-19 cases and had more than 11,000 ICU beds, the highest in South Asia [30]. Though Bangladesh prepared 18 hospitals [31], Pakistan prepared 56 hospitals [32-33], Sri Lanka prepared 24 hospitals with 500 ICU beds [34], Afghanistan prepared eight hospitals, Maldives prepared eight hospitals [35], and Nepal made 115 ICU beds for COVID-19 [36].

3.3 COVID-19 cases in South-Asian Countries

Table 2 offers a list of confirmed COVID-19 positive cases and deaths along with the number of tests conducted to detect COVID-19 in South Asian countries. India reported 55.7% of the total cases in this region as of May 7, 2020, as well as the highest number of deaths (~1800, 66%) among the South Asian countries [5]. The case fatality rate of India was also the highest (3.37%) compared to Pakistan 2.37%, Bangladesh 1.60%, Afghanistan 2.98%, and Sri Lanka 1.12%. Maldives confirmed two deaths in 617 cases, Bhutan reported the lowest number of 7 cases, and Nepal registered the second-lowest of 101 cases. No death in Bhutan and Nepal was reported till May 7. Based on the number of cases, Afghanistan and Bangladesh recorded a slow rate of recovery from the disease in South Asia (~13% and

Country	Population*	Total Cases	Total Deaths	Total Recovered	Active Cases	Total Cases /1M pop.	# Hospitals for Covid-19 care	# Testing	Deaths /1M pop.	Total Tests	Tests/ 1M pop
India	~1.3B	54539	1837	16048	36654	40	586	435	1		984
Pakistan	~215M	24644	585	6464	17595	112	56	57	2	244778	1108
Bangladesh	~170M	12425	199	1910	10316	75	15	33	1	105513	641
Afghanistan	~37M	3563	106	468	2989	92	8	~7	3	14389	370
Sri Lanka	~22M	804	9	232	563	38	24	17	0.4	30525	1426
Maldives	~0.6M	642	2	63	552	1062	5	NA	4	9863	18246
Nepal	~29M	101	0	22	79	3	4	19	0	67066	2302
Bhutan	~0.8M	7	0	5	2	9	1	01	0	11492	14894

Table 2: Confirmed cases and testing facilities in South-Asian Countries (Update: May 7, 2020)
*~ indicates approximation, M is for million and B is for Billion

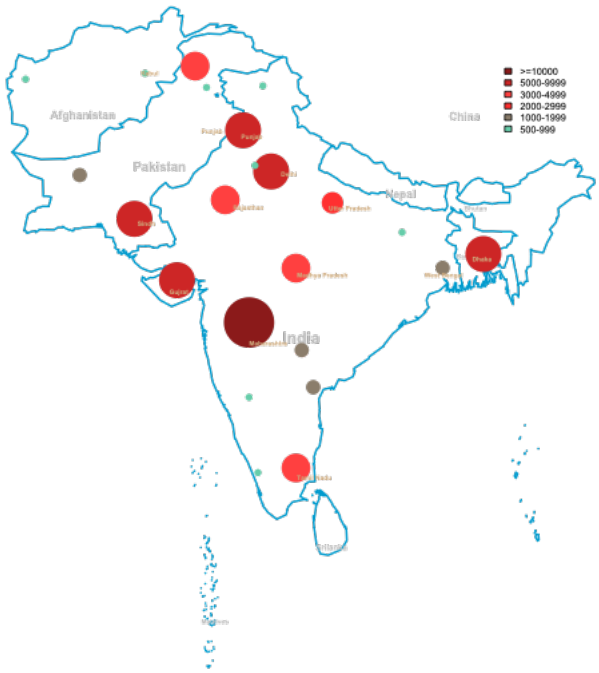

Figure 1: Case fatality rate trajectories of South-Asian Countries

~16%, respectively). Also, India registered 28.9% of the recovery rate and Pakistan reported 26.2% of recovery rate. Though India performed 925 tests for their 1 million people, on average, they used 25 tests for one case detection. On the other hand, on average, Pakistan used ten tests, Bangladesh used 8.5 tests, and Afghanistan only used four tests to detect one case. It indicates Afghanistan had a low testing capacity to detect the cases rapidly.

As for the detection of COVID-19 infections, India had 435 test centers for the identification of coronavirus for its 1.3 billion population [39]. While 33 centers were in Bangladesh, 57 centers were in Pakistan [31,40], and 17 centers were in Sri Lanka for case detection [41]. Afghanistan declared it would carry out tests in 7 centers for their 37 million people [42].

Figure 1 shows the frequency distribution of COVID-19 positive cases for the four South Asian countries. The figure shows a growing trend of new cases in every country as time increases. It appears from Figure 1 that both India and Pakistan saw a rapid rise in cases at the end of March, while Bangladesh saw the pattern of the increasing trend from mid-April. These three countries were exponentially growing in the number of cases identified. Nevertheless, when compared with these nations, Afghanistan was very stable in case detection. This steady trend was happening because Afghanistan could carry out a limited number of tests every day. None of these four countries are showing a plateau suggesting an incidence in this area was not gradually decreasing.

3.4 Case fatality rate trajectories of South-Asian Countries

Since the first 100 confirmed cases, Figure 2 indicates a comparison of case and deceased trajectories of South Asian countries. The increasing count of cases appears to have a similar trend after around 30 days of 100 case identification for both India and Bangladesh, but the case fatality in India is much higher than Bangladesh. After the first 100 cases were identified, Pakistan had a dramatic rise in cases, but the growth had shrunk. The growth of cases appears to have a constant increase in Afghanistan; it may be because of a limited number of tests every day. In Sri Lanka, the growth of infections was the lowest among these five countries, and they had been successful in making the case fatality curve flatten quickly.

3.5 Geographical Distribution of COVID-19 cases in South-Asia

The emphasis on the administrative divisions of every country was crucial where the disease was highly contained and continued. Identifying such containment was essential as each administrative division referred to a subnational body, has the power to administer its local government and take appropriate measures. Several cities from India, Pakistan, Bangladesh, and Afghanistan were infected by coronavirus with over 500 cases in the city and

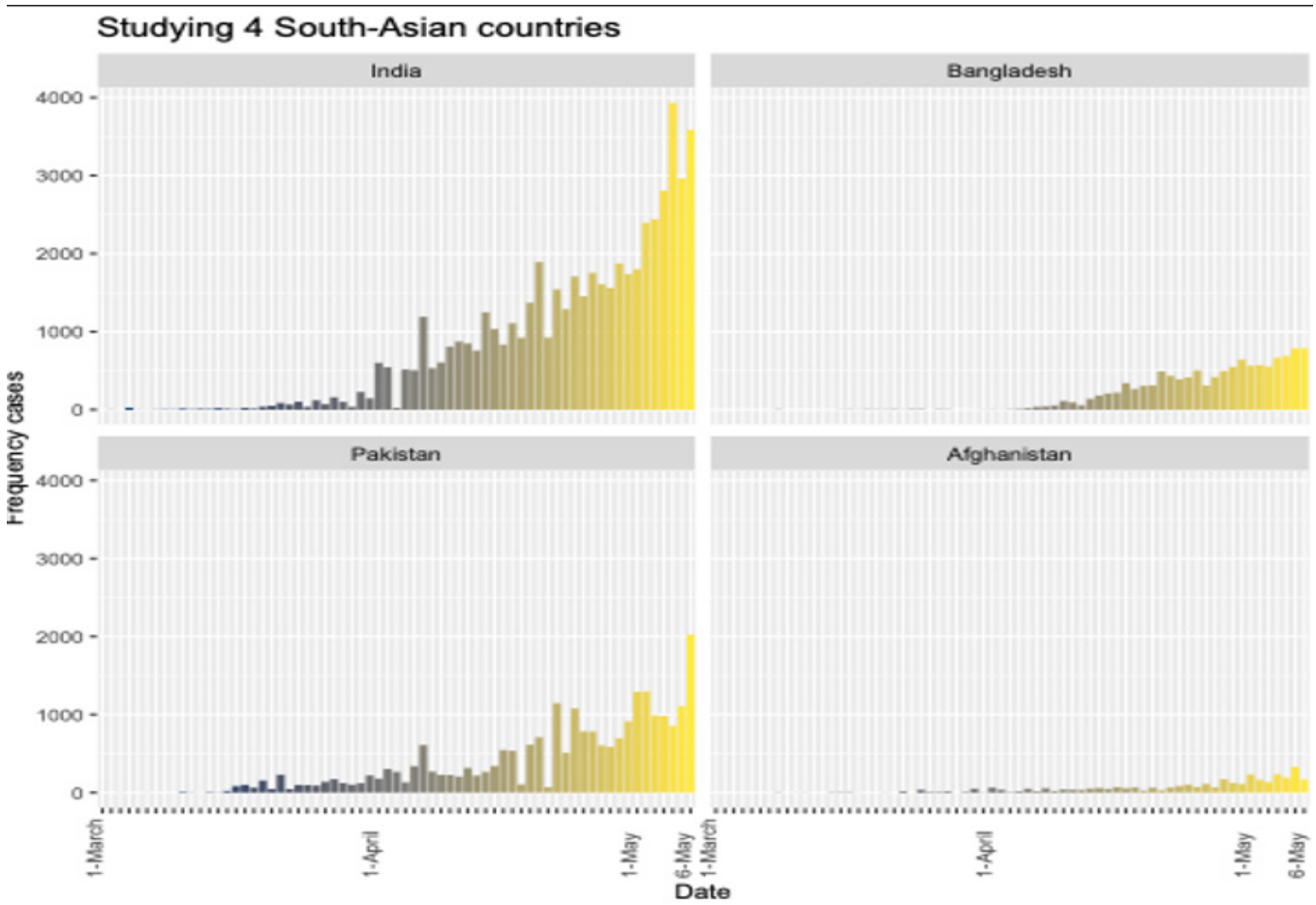

Figure 2: Geographical Distribution of COVID-19 cases in South-Asia

are shown in Figure 3. Whereas, till May 7, 2020, none of the cities from Nepal, Maldives, Sri Lanka, and Bhutan had been found in more than 500 cases [28,46]. Extensive measures that involve effective quarantining and adequate and early response to the virus might be attributed to these countries.

Fourteen of India's 28 states and two of India's eight unions or territories had over 500 cases. Maharashtra experiences more than 15000 cases with the most significant burden [1]. Although India's first case was identified in the southern state of Kerala in late January, the total number was nearly 500 till May 7, 2020. Worryingly, all the provinces of Pakistan except Islamabad territory cumulatively had more than a thousand cases. Punjab and Sindh had an almost identical number of 8000 cases [48]. In Bangladesh, the situation was different from the above. Over 70% of the cases in Bangladesh were diagnosed in the Dhaka district, and the Dhaka city was the epicenter for virus spreading [49]. Among the 34 provinces of Afghanistan, Kabul, which is the central zone of the country, had 25% of the cases, and Herat province follows the line with about 18% of total cases [42].

The investigation further digs into the distribution of cases in the cities of a district or a province. Such identification will help to find out the causes of disease spread and to compare with other countries. Maharashtra showed the highest number of cases according to the city distribution [47]. Mumbai, the capital of Maharashtra (India), crossed 10000 cases till May 7, 2020, the nation capital (Delhi) follows by

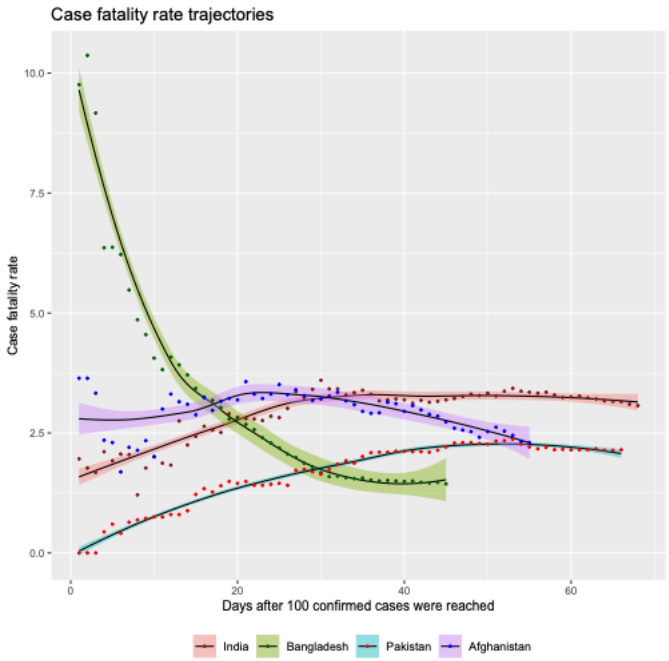

Figure 3: The map shows the known locations of at least 500 coronavirus cases by South-Asian countries. For total cases: Circles are sized by the number of people there who had tested positive. Four countries with lower than 500 COVID-19 cases per district/ province are not shaded.
Sources: South-Asian countries Corona dashboard (Access May

with about 5000 cases [50]. From Pakistan, Karachi and Lahore had around 5000 reported cases [48]. Approximately similar count of COVID cases was reported at Dhaka, Bangladesh, with more than 5000 cases. [49] It is also necessary to mention the economically important cities which had about more than 1000 cases individually. It includes Ahmedabad (India), Chennai (India), Indore (India), Jaipur (India), Hyderabad (India), Peshawar (Pakistan) and Narayanganj (Bangladesh) [47-49, 52-55, 58].

3.6 Age and Gender Distribution of COVID-19 cases

The documented incidence of the virus by gender distribution indicates that men in South Asia were at greater risk compared with women. Approximately 68% of cases was found male till May 7, 2020, and 32% of cases was found female in Bangladesh [49]. India reported 76% and 24% for males and females, respectively [67]. Around 78% of the cases reported by Pakistan were male, and female cases were the rest [48]. In COVID-19 case identification of the adult population in the South Asian countries, it suggests that there might be a significant gender gap. One reason may be, the role of a male in a South Asian context is particularly breadwinner for a family, and they require more mobility than the female. Another reason may be that the females sometimes avoid reporting or are cautious about saying symptoms in the males majority society in the regional context. This suggests women are often kept busy with household duties that neglect their symptoms to be examined. Underreporting these female cases is a challenge to concentrate and could potentially be a source of rapid transmission of disease.

Figure 4 shows the infected cases by age-group for four South-Asian countries: Bangladesh, India, Pakistan, and Sri Lanka. The pattern is similar in the South-Asian countries. About 42% of the infected cases were found in the age range of 20-40 years. Moreover, 22-25% of the infected cases belong to the age group of 50 years and older. It is the elderly, who need to think about it, considering that death rates hit the highest for people 50 and older.

4. Discussion

It is now more than three years since the novel coronavirus started spreading from Wuhan in China. The spread of COVID-19 already significantly affected India, Pakistan, Bangladesh, and Afghanistan. The South-Asian countries set up new laboratories, bought ventilators, and increased their stocks of testing kits rapidly to increase their respective capacity to combat coronavirus. However, there was no respite seems to be in sight for Bangladesh, India, Pakistan, and Afghanistan, at least for the moment when nearly 100,000 people were affected by the lethal disease in this region [5].

Our findings suggest that the significant economic hubs of India, Bangladesh, Pakistan, and Afghanistan, such as Ahmadabad, Mumbai, Chennai, Dhaka,

SL	Country	Division/ Province	Capital city of Province/ District	Cases in Division	Maximum infected city	2nd maximum infected city	First detected city in the country
1	India[47,50-51]	Maharashtra	Mumbai	15525	Mumbai	Pune	
2	India[47,52]	Gujarat	Gandhinagar	6245	Ahmadabad	Surat	
3	India[47,50]	Delhi	New Delhi*	5104	New Delhi	-	
4	India[47,53]	Madhya Pradesh	Bhopal	3049	Indore	Bhopal	
5	India[47,54]	Rajasthan	Jaipur	3158	Jaipur	Jodhpur	
6	India[47,55]	Tamil Nadu	Chennai	4058	Chennai	Cuddalore	
7	India[1,56]	Uttar Pradesh	Lucknow	2880	Agra	Lucknow	
8	India[47,57]	Andhra Pradesh	Amaravati	1717	Kurnool	Guntur	
9	India[47,58-59]	Telengana	Hyderabad	1096	Hyderabad	Surapet	
10	India[47,60]	West Bengal	Kolkata	1344	Kolkata	North 24 Parganas	
11	India[47,61]	Punjab	Chandigarh	1451	Amritsar	Jalandhar	
12	India[47,62]	Jammu Kashmir	Jammu/Srinagar	741	Bandipora	Srinagar	
13	India[47,63]	Karnataka	Bengaluru	671	Bengaluru	Mysuru	
14	India[47,64]	Haryana	Chandigarh	548	Gurugram	Faridabad	
15	India[47,65]	Bihar	Patna	536	Munger	Buxar	
16	India[47,66]	Kerala	Thiruvananthapuram	502	Kannur	Kottayam	√
17	Bangladesh[49]	Dhaka	Dhaka*	8035	Dhaka	Naryanganj	√
18	Afghanistan[42]	Kabul	Kabul*	779	Kabul	-	
19	Afghanistan[42]	Herat	Herat	571	Herat	-	√
20	Pakistan[48]	Punjab	Lahore	8420	Lahore	Rawalpindi	
21	Pakistan[48]	Sindh	Karachi	8189	Karachi	Sukur	√
22	Pakistan[48]	KPK	Peshawar	3499	Peshawar	Mardan	
23	Pakistan[48]	Baluchistan	Quetta	1495	Quetta	Pishin	

Table 3: Distribution of COVID-19 cases by major cities in South-Asia (Update: May 7, 2020) *Capital city of the country.

Karachi, Kabul, and many others, were on the list of South Asia's top infected cities. In India, Pakistan, and Bangladesh, the case number grew at a rapid rate, while in Afghanistan, it might be on a plateau period. However, different steps were considered to save thousands of lives, and this region's developing countries are still actively battling hunger. The long-drawn-out lockdown had a significant adverse effect. On the other side, when a rapid case deterioration happens due to lockdown relaxation, there had no resilience to win back.

The shutdown left tens of millions of South Asians living below the poverty line and seasonal rural-to-urban migrant workers with their livelihoods upended [68-70]. The same scenario exists worldwide [71-72]. India, Pakistan, and Bangladesh lift restrictions in some areas of the city as well [73-75]. The lifting of tight national controls marked a new phase in the country's response to the virus and came as confirmed cases continued to grow across this region. As India's government and Bangladesh's government pushed to restart the crippled econo-

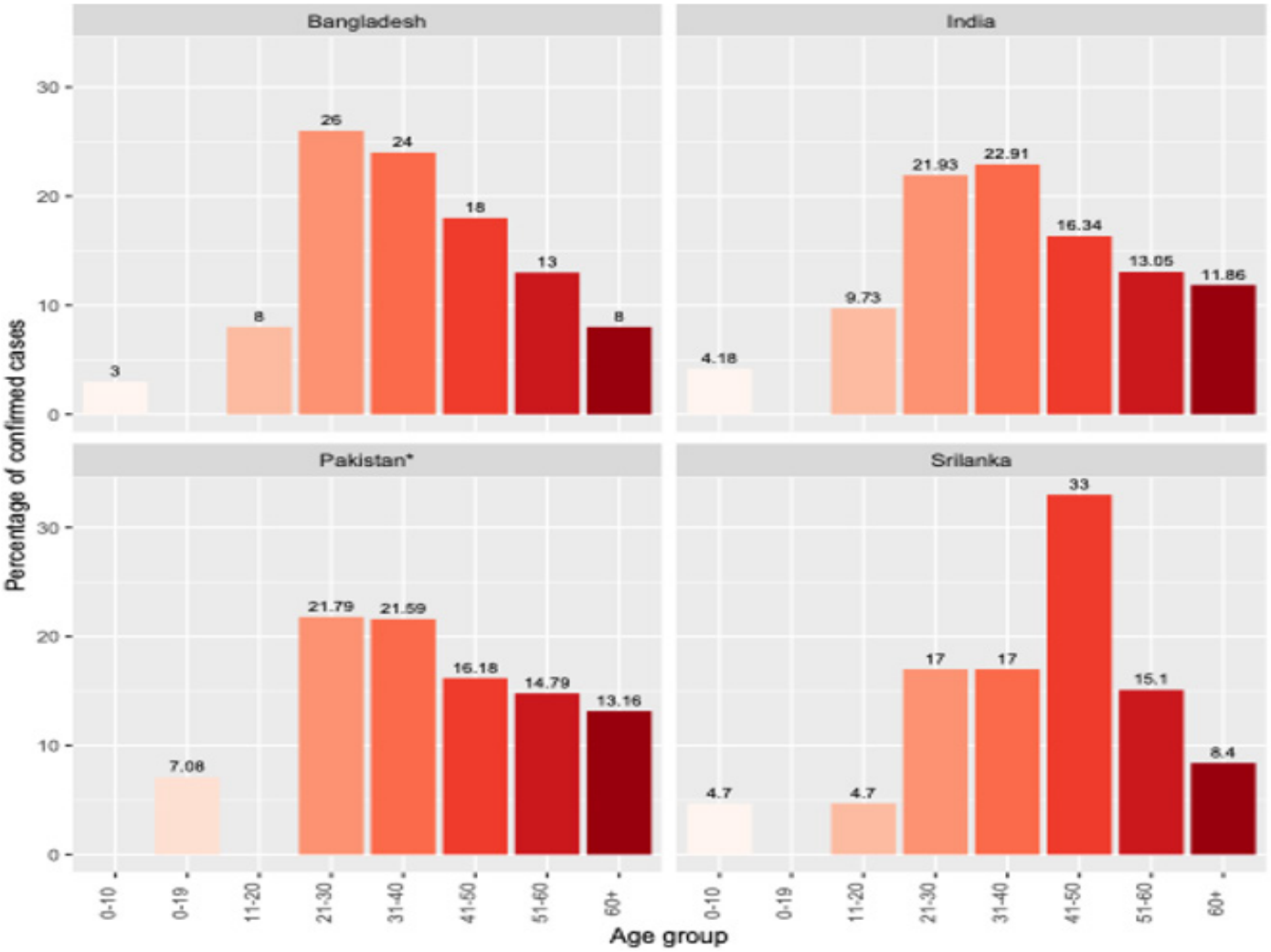

Figure 4: Age distribution of confirmed COVID-19 cases in 3 South-Asian countries (Update: May 7, 2020).
*Pakistan age group is provided as 0-19, 20-29, 30-39,40-49,50-59,>=60

my, the data and analysis show that many infections may be the reality for a more extended period, resulting in many daily deaths. And even as parts of the country began to reopen, officials cautioned that the return to community life would come in phases and that in the months ahead, the virus could re-emerge.

Although the pandemic has not stopped, some countries such as Sri Lanka, Nepal, and Maldives with a dropping infection or no incidence were gradually loosening restrictions on lockdown [76-78]. The good news is that these countries took COVID-19 seriously and took appropriate steps, including closing non-essential companies, curtailing travel, and implementing quarantines.

The most infected South Asian country's COVID-19 test capability remains limited. With minimal healthcare capability, limited testing facilities, and a population concentrated in rural areas of more than 70%, Afghanistan faced immense stress as the virus continues to spread widely in the country's far reaches [79]. The proximity of the nation to Iran, one of the early COVID-19 hotspots in the world, was remain an obstacle.

Our findings indicate that the older population in Pakistan was getting more infections compared to the older people in Bangladesh and India. However, China's first about forty thousand cases showed that the peak age was about 50-59 years of age for reported cases (22.4%) [80]. In Italy, 39.1% of all cases were 50-70 years and 31.4% of cases were over 70 years, respectively [81]. South Asian countries' age distribution doesn't lead to these results. The prevalence of comorbidities in this area at a younger age might play a vital role in the susceptibility to infections. Thus, due to the difference in the South Asian zone, the epidemic curve should have a different scenario, particularly for death. The case fatality rates were low in South Asian countries relative to the global situation, the highest was found in India with 3.26%. The level of resilience of the older community in this region was weak. India, Pakistan, and Bangladesh have about 12% of its population over the age of 60, while Italy has one-fourth [82-85]. It can clarify the above results in part, too.

Globally, COVID prevalence is approximately the same by gender [86]. On the contrary, our findings indicate that women in this community were less affected compared with men. Some of the critical factors are social stigma and shy disposition of women in the context of religion, with subsequent reporting pause.

A combination of comprehensive and integrated measures may help resist the growing trend of any epidemic in a less restricted and non-shutdown situation when the government tries to sustain the economy of a country [87, 88].

There are some limitations to the study. First, the public data was provided for patients with SARS-CoV-2, but comprehensive patient information was not available in the data set, especially regarding clinical outcomes, demographic information, etc. Because of the urgent circumstances of the pandemic, we do not have access to unique, homogenous data from every South Asian country. It could affect the study and any potential biased outcomes. However, this is a comprehensive study investigating the epidemiological characteristics and geographical distributions of patients who were infected with coronavirus in South-Asian countries at the early stage of the pandemic. Further clinical and basic work is required in the future as regards age, gender, and other prognostic factors for individualized assessment and care.

5. Conclusions

The study explains the gaps in responses to tackle COVID-19 infections and suggest strengthening the strategy to tackle any pandemic for India, Bangladesh, Pakistan, and Afghanistan. The slowing down of Afghanistan's infections in first three months does not mean they had gone out of risk at the early stage. Afghanistan, afflicted by a weak health-care system, malnutrition, conflict, and other vulnerabilities influenced them to face a "health catastrophe" without coronavirus control. Many of South Asia's economically developed cities implemented locked down, and the inability to work impacted households based on daily wages. The early lockdown in South Asian countries for containing the spread of the virus and protect their people is a debate particularly the poorest who faced with significantly worse health and economic consequences. Female was found to be less detected compared to the men in South Asia. The factors identified in the paper can help to explain the gaps in interventions to reduce virus infection among people of South-Asia.

6. Declarations

6.7 Consent to Publish

Not applicable.

6.8 Conflict of Interest

The authors state that the work was carried out in the absence of any commercial or financial relation-

ships which could be viewed as a possible conflict of interest.

6.9 Data Availability Statement

The raw data supporting the conclusions of this article are available as supplementary material.

6.10 Author Contributions

AH, SB, SRC and DD collected the epidemiological data and did statistical analysis. AH, SB, and SRC drafted the manuscript. All the authors revised the final manuscript. AH is responsible for summarizing all epidemiological and graphical data.

6.11 Ethical Approval

All the analysis was conducted from secondary data and so ethical approval was not taken from the participants.

6.12 Role of the funding source

None.

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