
Epidemiological Insights: Unraveling the Dynamics of COVID-19 Transmission in the South Asian Subcontinent During 2020-21

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Abstract

The global ramifications of the COVID-19 pandemic, originating in a Chinese city in December 2019, have profoundly impacted countries within the South Asian Association for Regional Cooperation (SAARC) and beyond. This research delves into the multifaceted repercussions of the virus, spanning areas such as mortality rates, economic upheavals, educational disruptions, and various other facets of societal well-being. The central aim of this study is to conduct a comprehensive examination of COVID-19 transmission dynamics in SAARC countries. Data from COVID-19 Worldometer (WHO) serves as the foundation for collecting pertinent information related to SAARC nations. Utilizing statistical methodologies, our analysis is focused on daily new cases, active cases, and daily death cases. The findings reveal an alarming exponential surge in COVID-19 cases since the inception of 2020. With a dedicated focus on aiding pharmacists and healthcare providers, this paper is committed to furnishing reliable information and empirical evidence. The intent is to fortify primary care and pharmacist practices, aligning them with effective regulatory frameworks during the challenging times imposed by the COVID-19 pandemic.

Key words: Covin-19 data, Correlation analysis, covariance

INTRODUCTION

Established in 1985 as a collaborative effort to foster regional cooperation in South Asia, the South Asian Association for Regional Cooperation (SAARC) currently consists of Afghanistan, Bangladesh, Bhutan, India, Nepal, the Maldives, Pakistan, and Sri Lanka as its member countries. Noteworthy observers, including China, the European Union, Iran, Australia, Japan, and Mauritius, contribute to SAARC's dynamic framework. SAARC's collaborative strength was exemplified

through a united stance on climate change conveyed to the UNFCCC Secretariat before the Copenhagen Summit in 2009. In 1918, the world witnessed the widespread impact of the flu pandemic, infecting 500 million people and claiming 50 to 100 million lives between January 1918 and December 1920 (Collier, 1974). marking one of the deadliest natural disasters in history. The global reach of COVID-19 led to extensive fatalities worldwide, with India's death toll matching that of the United States. The 1918 pandemic occurred just before the formalization of contemporary psychiatry, coinciding with the growing recognition of psychoanalysis as a legitimate medical treatment (Noymer & Garenne, 2000). These efforts proved successful in addressing declining immunity caused by viral mutations. Attributed to the novel coronavirus SARS-CoV-2, COVID-19 was officially declared a pandemic by the World Health Organization on March 22, 2020. Its rapid spread significantly impacted global healthcare, including repercussions on cancer care. While COVID-19 is a recent pandemic, historical records reveal a pattern of regular pandemics, with the 1918 influenza outbreak being the most recent prior to the ongoing crisis. The emergence of a pneumonia-like illness in Wuhan, Hubei Province, China, in December 2019 marked the onset of the current pandemic. The Huanan seafood marketplace in Wuhan, China, is suspected to be the source of this virus. The virus can spread from human to human after it has been passed from animal to human. Despite the fact that the molecular mechanism of COVID-19 transmission from human to human is still unknown, the concept of transmission of breathing illnesses is universal (Oxford et al., 2002): Droplet scattering is used to spread respiratory diseases. This type of transmission occurs when a sick person coughs or sneezes, exposing the microorganism to those around him. To put it another way, environmental factors are important in the propagation of the virus. Because the COVID-19 outbreak is expanding at such a fast rate and has infected over four million people, COVID-19 limitations have been implemented in almost every region of the globe (Oxford et al., 2002). The most fundamental strategy to reduce coronavirus transmission or prevent disease is to adhere to hygiene standards. The most fundamental strategy to reduce coronavirus transmission or prevent disease is to adhere to cleanliness standards. The most important thing is to wash your hands frequently. As a result, the transmission of this virus is restricted in nations where people wash their hands regularly and are aware of fundamental hygiene standards. The primary objective of this study is to elucidate the patterns and dynamics of the coronavirus dissemination within SAARC nations. Renowned institutions have actively championed the imperative "stay-at-home" directive, underscoring its pivotal role in mitigating the virus's proliferation. Scientists emphasize the swift transmissibility of the COVID-19 virus across all age groups, heightening the urgency of containment efforts. The global escalation of influenza infection rates underscores the rapidity with which such variations traverse the world. Our research draws upon meticulously curated data from sources

spanning (Phillips, 2014). Consequently, the World Health Organization has instituted a series of strategic measures aimed at staunching the onward march of the virus. Temporary Lockdown

- Stay at home
- Wash your hands frequently
- Wear the mask
- Keep a distance of at least one metre
- Scientists Create a Blood Test (RTPCR) to Confirm COVID 19.
- COVID-19 Outbreaks are monitored via a Mobile App. (Aarogya Setu Ap

METHODS AND MATERIALS:

We gathered and examined COVID-19 case data from South Asian countries, as documented in sources. (<https://www.worldometers.info>, <https://www.mohfw.gov.in/>, <https://www.who.int/>)

Employing descriptive statistical analysis, we investigated the relationships between various parameters in the COVID-19 dataset

Results and Analysis

S. No.	Parameters/Country	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
1	The Coefficient of Correlation (r) (New Cases and Deaths)	0.4799	0.8793	0.8793	0.9369	0.2744	0.7886	0.8942	0.6822
2	P-value	0	0	NA	0	5.953e-7	0	0	0
3	Covariance (New Cases and Deaths)	799.5	14978.698	NA	10726847.3	4.5501	8905.5	43863.5	230.5954
4	Population size (n)	321	321	321	321	321	321	321	321
5	t-test	9.7705	32.9743	NA	47.8657	5.096	22.906	35.6692	16.6636
6	Total Cases	52512	513510	669	10286329	13755	260592	479715	43298
7	Average Daily New Cases	163.58	159.71	2.089	32044.63	42.85	811.81	1494	134.88
8	Average Daily Deaths	6.85	23.54	0	469.81	0.14	8.42	31.47	0.63
9	Peak New Cases	915	4019	37	97869	215	5743	6825	878
9	Peak Death Cases	42	64	0	1294	2	43	159	9
10	Peak date of New Cases	6/15/2020	7/2/2020	12/24/2020	9/16/2020	8/2/2020	10/21/2020	6/14/2020	12/2/2020
11	Peak date of Death Cases	6/18/2020	6/30/2020	NA	9/15/2020	8/21/2020	11/4/2020	6/20/2020	11/21/2020

Table: Covid 19 data analysis of SAARC Countries (15-02-2020 to 31-12-2020)

The table-1 provided presents COVID-19 data collected from the South Asian Association for Regional Cooperation (SAARC) nations, spanning from February 15, 2020, to December 31, 2020. South Asia covers about 3.5 percent of the Earth's total land area and is home to approximately 1.891 billion people, constituting roughly one-fourth of the global population. This makes it the most densely populated geographical region worldwide. South Asia encompasses eight countries—Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka—each facing distinct demographic challenges. According to the tabulated information, Afghanistan reported an average of 164 daily COVID-19 cases and witnessed an average of 7 daily fatalities from February 15, 2020, to December 31, 2020. The peak of new COVID-19 cases occurred on June 15, 2020, with a staggering 915 cases reported. Simultaneously, the highest daily death toll was recorded at 42 during the same period. In Afghanistan, the Coefficient of Correlation(r) between new COVID-19 cases and death cases is identified as 0.4799, ranking as the second lowest among SAARC countries. If we examine the COVID-19 data of Bangladesh, we will find that an average of 160 Covid cases have been reported and an average of 24 people died during 15 Feb 20 to 31 Dec 20. The highest number of cases was reported on July 2nd, 2020, i.e., 4019. However, the peak death day came a little earlier on June 30, 2020, and on that day, 64 people died in Bangladesh due to COVID 19. In Bangladesh, the Coefficient of Correlation(r) indicating the association between newly reported cases and fatalities has been calculated to be 0.8793. An average of only 2 COVID cases were reported in Bhutan during the said period, and no deaths were reported during the said period. The highest number of new cases reported was 37 on December 24, 2020. In Bhutan, there is the Coefficient of Correlation(r) of 0.8793 between the number of new COVID-19 cases and the corresponding death cases.

An average of 32045 new cases were reported in India, which is the highest in comparison of other SAARC countries, and an average of 470 people died in India due to COVID-19 from 15 February 20 to 31 December 20. The highest number of 97869 Covid cases was reported on a day in India on June 16, 2020. The highest number of deaths was reported on 15 Jun 2020 on that 1294 people died due to COVID. The Coefficient of Correlation(r) for India, examining the relationship between new COVID-19 cases and death cases, was determined to be 0.9369, marking the highest correlation among the SAARC nations.

In Maldives around 46 average cases were reported and an average 0.14 people died daily. Highest 215 no's of cases were reported on 2 Aug 2020. Highest 2 people died in day on 21 Aug 2020. Correlation coefficient (r) between new cases and death case is found 0.2744 in Maldives, which is the lowest amongst the SAARC countries. In Nepal, an average of 812 daily COVID cases

were reported during the said period, and an average of 8 people died every day. The highest number of cases were reported on 21 Oct 20 and 5743 people fell sick due to COVID, and the highest 43 number of deaths occurred on November 4, Nov. 2020. The Coefficient of Correlation(r) between the number of new cases and death cases was determined to be 0.7886. In Pakistan, an average of 1494 daily COVID cases were reported during the said period and an average of 31 people died every day. The highest number of cases were reported on 14 Jun 20 and 6825 people fell sick due to COVID, and the highest 159 people died in day on 20 Jun 2020. the Coefficient of Correlation(r) indicating the relationship between new cases and death cases was determined to be 0.8942. In Sri Lanka, an average of 135 daily COVID cases were reported during the said period and an average of 0.63 people died each day. The highest number of cases were reported on 02 Dec 20 and 878 people fall sick due to COVID, and the highest 9 people died in day on 21 Dec 2020.

The correlation coefficient (r) linking new cases to death cases was determined to be 0.6822.

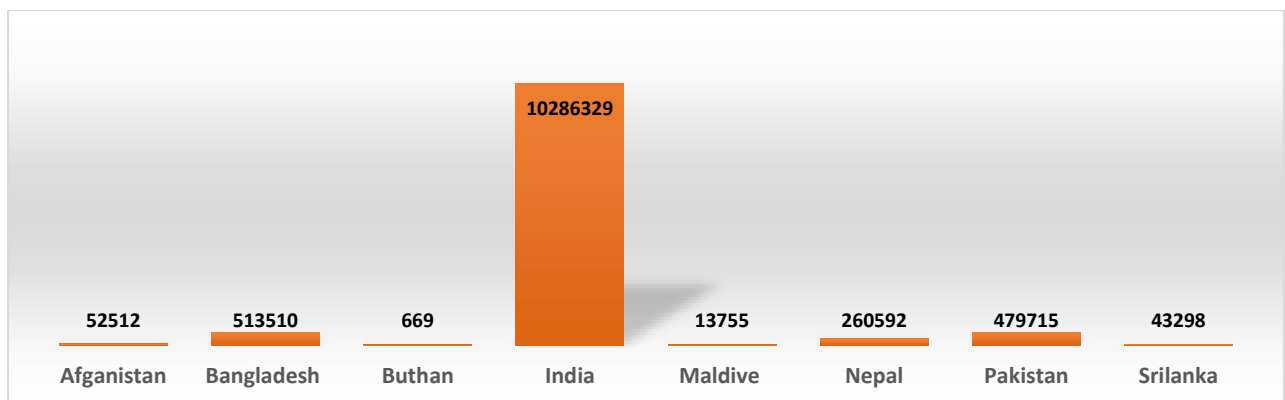


Figure1: Total Covid Cases in year 2020

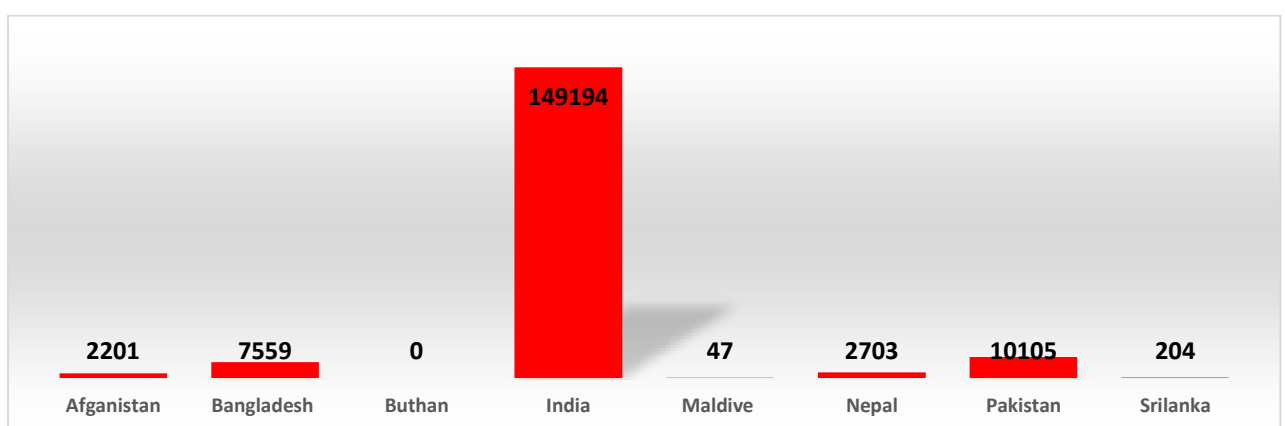


Figure 2: Total Covid casualties in ye2020



Figure 3: Correlation coefficient (r) between new cases and daily Casualties

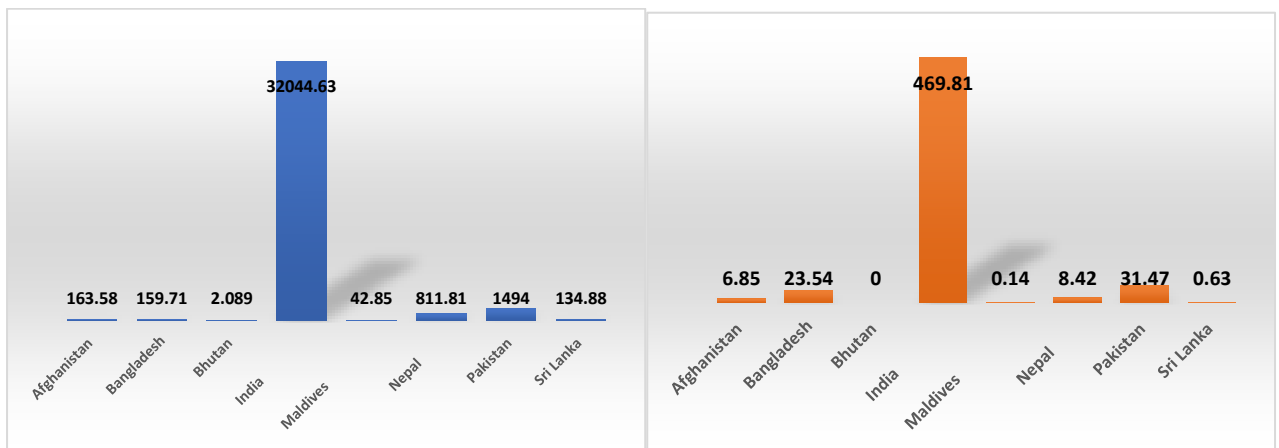


Figure 4: Average Daily New Cases Vs Daily Casualties

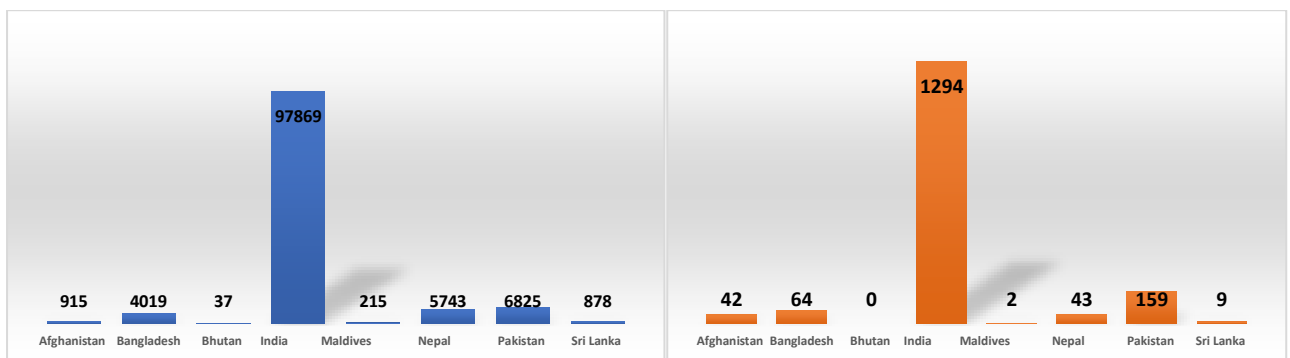


Figure 5: Max No of New Cases Vs Daily Deaths in Single Day

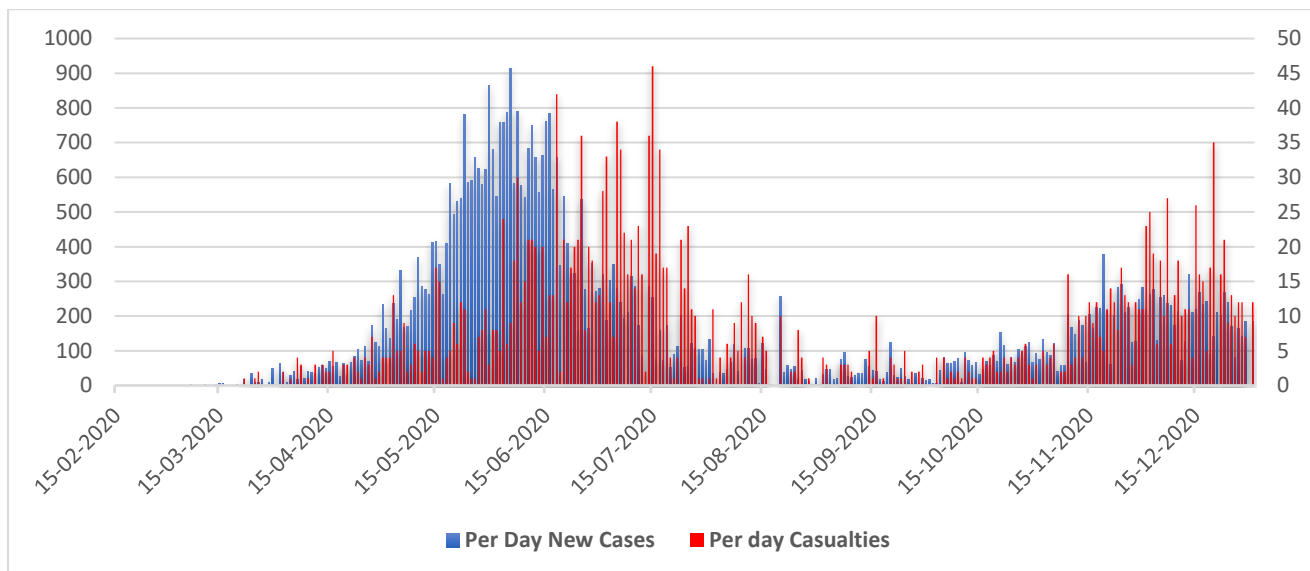


Figure 6: Afghanistan (Per day Cases Vs Per day Casualties)

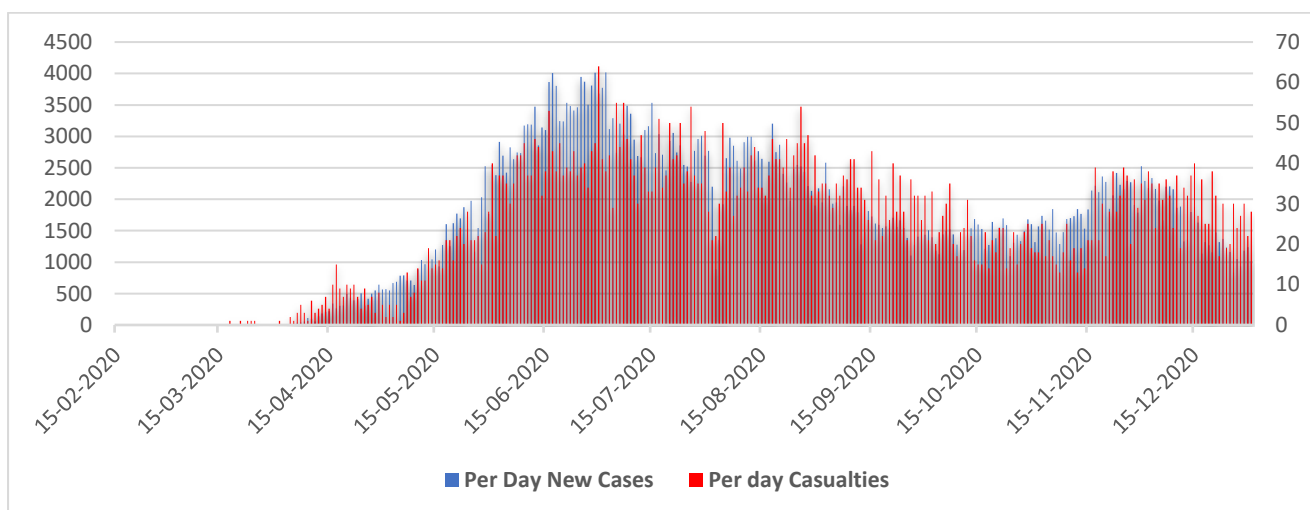


Figure 7: Bangladesh (Per day Cases Vs Per day Casualties)

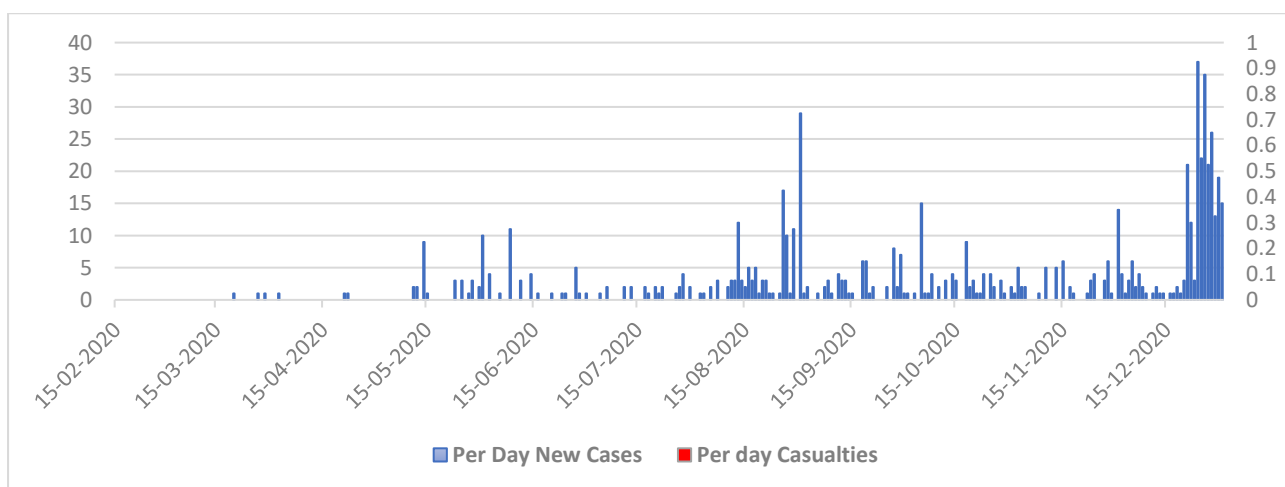


Figure 8: Bhutan (Per day Cases Vs Per day Casualties)

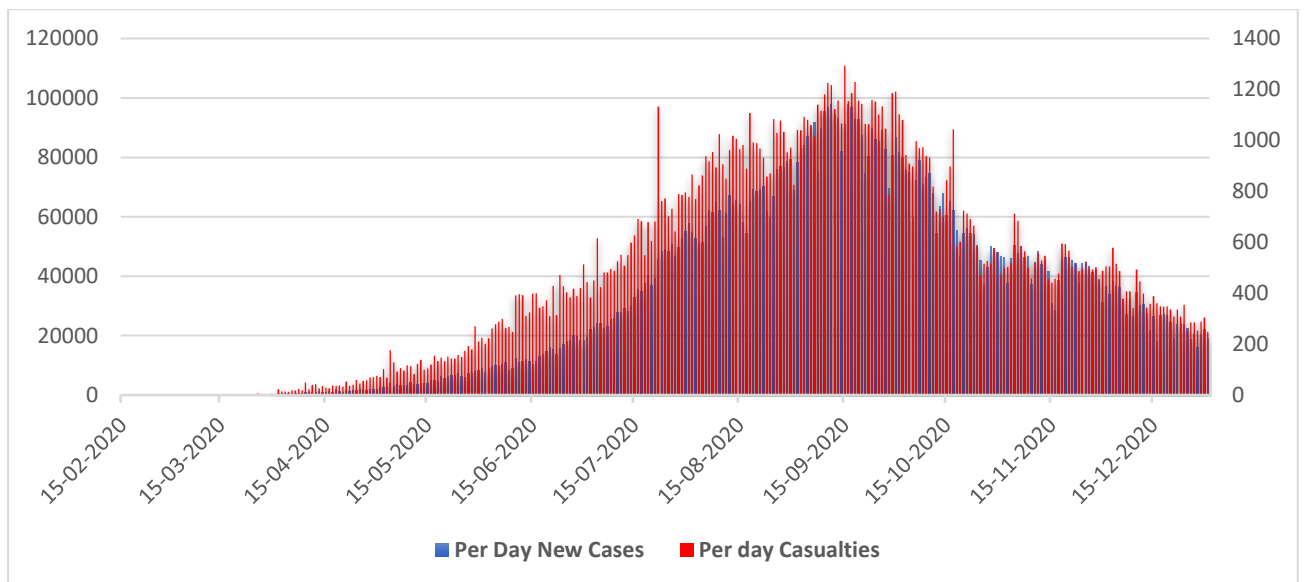


Figure 9: India (Per day Cases Vs Per day Casualties)

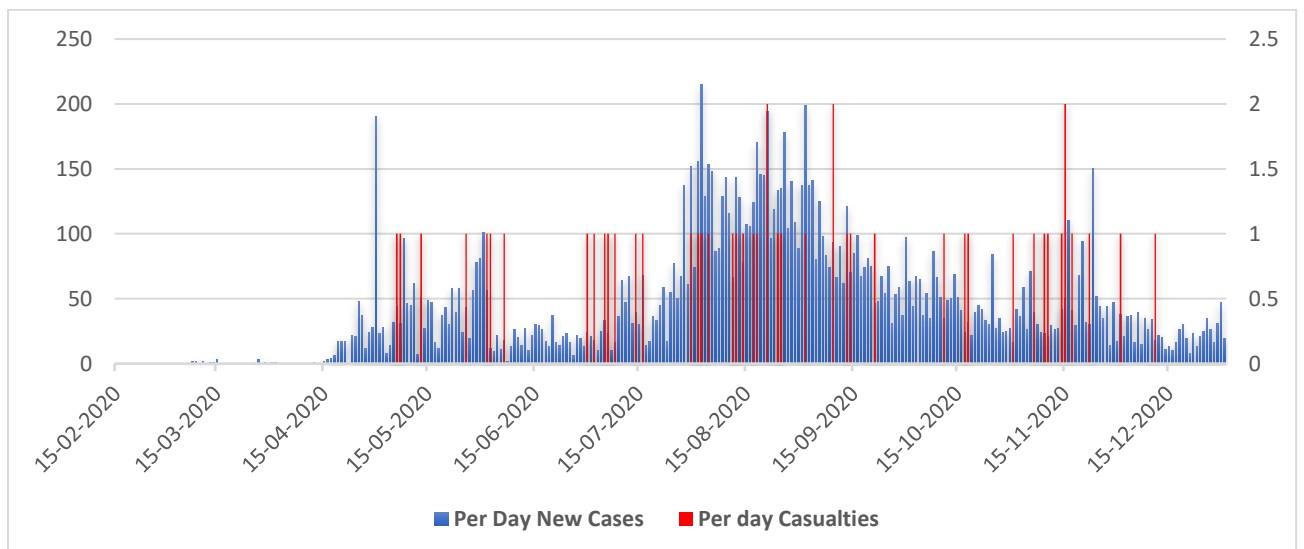


Figure 10: Maldives (Per day Cases Vs Per day Casualties)

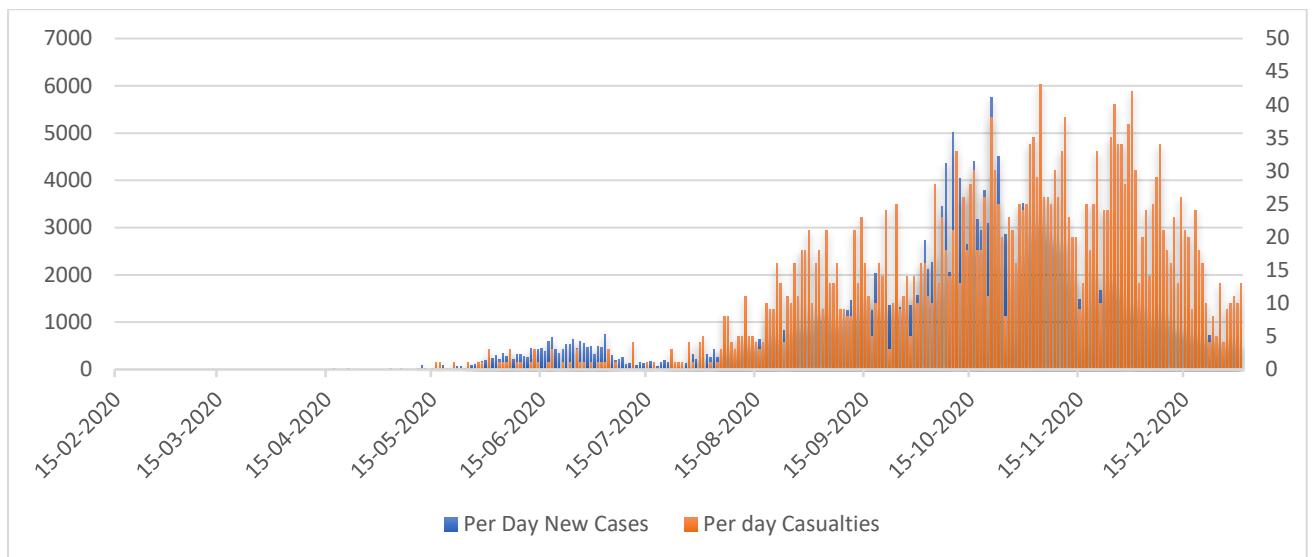


Figure 11: Nepal (Per day Cases Vs Per day Casualties)

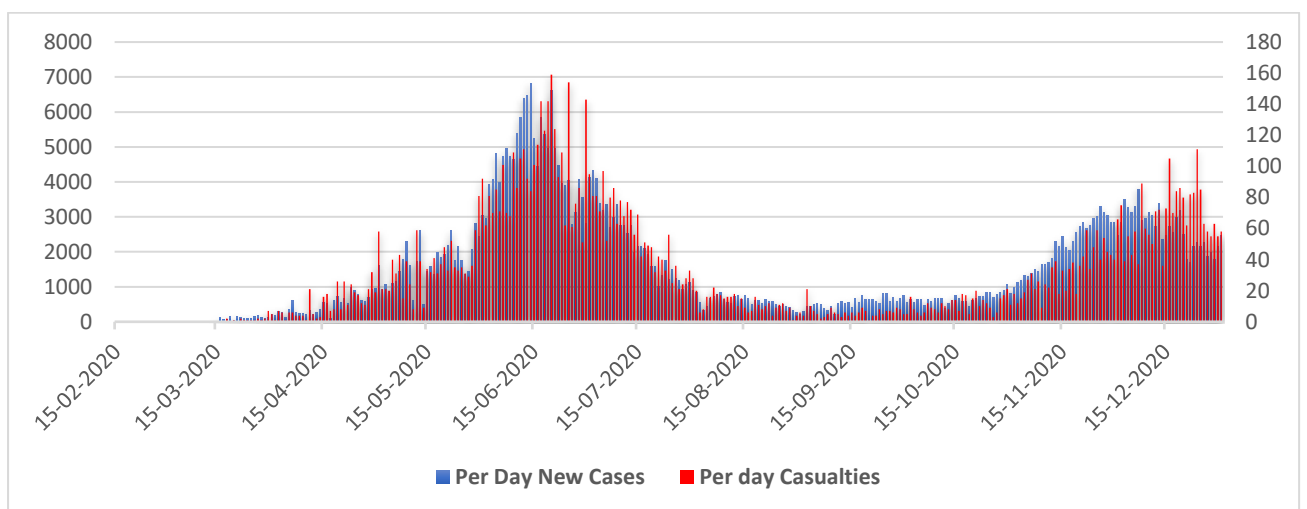


Figure 12: Pakistan (Per day Cases Vs Per day Casualties)

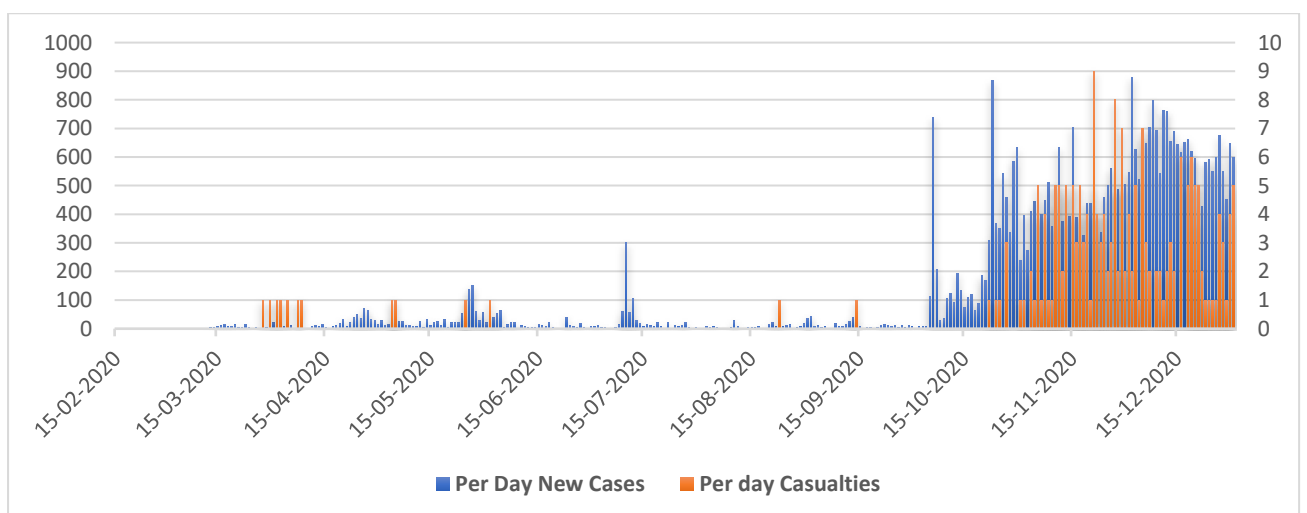


Figure 13: Sri Lanka (Per day Cases Vs Per day Casualties)

Conclusion:

In the face of the widespread devastation wrought by COVID-19, researchers in pharmacy practice and education have undertaken significant efforts to address this global catastrophe. Their findings are now starting to influence practices worldwide. Considering this positive outcome, it is crucial to carefully plan the next stage to ensure that the research's impact and value are maximized. The data in the table indicates that the correlation coefficient (r) between Daily New Cases and Daily Death cases in India and Pakistan is higher than in other countries. This suggests that the spread of the virus was at its peak during that period. The daily surge in COVID-19 cases and deaths has led to global lockdowns, quarantine measures, and various restrictions. This study offers preliminary evidence that a lockdown and other measures endorsed by world health organizations can significantly contribute to controlling the COVID-19 epidemic. Consequently, the decisions made by the World Health Organization (WHO) to combat the coronavirus have demonstrated effectiveness not only on public psychology but also on the environment, the economy, and the overall spread of COVID-19.

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