



Epidemiology of COVID-19 scenario in India

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Abstract

There was an outbreak of a new Coronavirus infection in Wuhan, Hubei Province, China in late December 2019, which caused acute respiratory syndrome of unknown etiology. The World Health Organization (WHO) named the viral causal agent as Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV2) or COVID-19, and declared this infection as a pandemic on the 11th of March, 2020. The first case of COVID-19 infection in India was reported on late January, 2020, and since then the numbers of confirmed cases have been increasing; thus the government had announced total lockdown of all activities. Most people infected with the COVID-19 virus experience mild to moderate respiratory illness, and recover without the need for special treatments. The elderly people and those with medical problems such as; cardiovascular disease, diabetes, chronic respiratory disease and cancer; are more likely to develop severe illness. Globally, corona virus cases rose to more than 500,000 for the first time on the 27th of October, 2020. Within two weeks and since 30th of October, 2020, COVID-19 cases had risen by almost 25 %, and about 400,000 daily cases were reported worldwide. The United States (US) was leading the global corona virus crisis with 8.9 million recorded infections and nearly 228,000 deaths worldwide. Asia had surpassed 10 million infections of the new corona virus on the 31 of October, 2020, and India reported an average of 48,000 cases daily with a total of 8 million cases. The aim of this review was to explore the epidemiological prevalence of COVID-19 in India along with age and gender stratified prevalence of this viral infection.

Keywords: COVID-19, Epidemiology, Prevalence, World, India



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1. Introduction

Reports of the spread of a new viral infection were recorded from Wuhan, China in the late December, 2019; named as coronavirus causing acute respiratory syndrome. According to [Balogun, \(2020\)](#), the World Health Organization (WHO) declared this viral infection as pandemic on 11th of March, 2020; naming it as Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV2) or COVID-19. In India, the first case of this viral pandemic was reported on the 30th of January 2020; originating from China ([Zhang, 2020](#)).

Coronavirus disease (COVID-19) is an infectious disease that can affect either the upper respiratory tract or the lower respiratory tract depending on the severity of the virus. A recent study conducted by [Jin *et al.*, \(2020\)](#) reported that most people infected with the COVID-19 experience mild to moderate respiratory illness and recover without the need for special treatments. The epidemiological pattern of COVID-19 suggests an incubation period of 5-14 days, which can vary accordingly. [Metintas, \(2020\)](#) revealed that the elderly and those people suffering from medical illness including; diabetes, cardiovascular diseases, chronic respiratory diseases and/or cancer are more sensitive to severe illness. The objective of this study was to explore the epidemiological prevalence of COVID-19 infection in India.

2. Risk of COVID-19 infection

The COVID-19 can infect peoples of all ages; though adults are more likely to be infected than the children. According to the study conducted by [Laxminarayan *et al.*, \(2020\)](#), the children were reported to have mild respiratory symptoms and they rarely show mortality from this disease. However, [Metintas, \(2020\)](#) highlighted that the risk of severe infection is several times higher among the older people and those suffering from medical illness.

3. COVID 19- symptoms

COVID-19 affects people in various ways; however, most infected people develop mild to moderate illness and heal without hospitalization. Recently, [Sharma and Sharma, \(2020\)](#) reported the most common symptoms include; fever; headache, tiredness, dry cough, sore throat, aches and pains, loss of smell and/or taste, diarrhea and skin rashes. Meanwhile, problems during inhalation or shortness of breath, chest pain and loss of smell or taste necessitates immediate medical help. Healthy people with mild symptoms should quarantine at home. [Laxminarayan *et al.*, \(2020\)](#) revealed that usually it takes about 5-6 days for someone infected with the virus to show disease symptoms, which may extend to 14 days. According to [Balogun, \(2020\)](#), the most common abnormalities in hospitalized patients diagnosed with pneumonia include; leukocytosis, leucopenia and lymphopenia, in addition to an elevated liver enzymes. Additional abnormalities may include thrombocytopenia; neutrophilia, decreased albumin and hemoglobin, and renal impairment. Furthermore, the pulse oximetry may reveal low oxygen saturation ($SpO_2 < 90\%$). [McIntosh *et al.*, \(2020\)](#) reported that in chest X rays; unilateral lung infiltrates were found in 25 % and bilateral lung infiltrates were recorded in 75 % of COVID-19 patients.

4. Worldwide distribution of COVID-19 cases

According to WHO, at the 14th November, 2020; globally there had been 53,164,803 confirmed cases of COVID-19 including 1,300,576 deaths, and about 220 countries were affected ([Pan *et al.*, 2020](#)), as shown in Table (1). Globally, [Helmy *et al.*, \(2020\)](#) reported that the distribution of COVID-19 was led by America (22,707,430), Europe (14,792,945), South-East Asia (9,964,225), Eastern Mediterranean (3,512,233), Africa (1,393,792) and Western Pacific (793,437). The top 5 countries with the highest burden of the COVID-19 infection include; the United States of America (10,460,365), India (8,773,749), Brazil (5,781,582),

Russia (1,903,253) and France (1,886,286); followed closely by Spain (1,458,591), United kingdom (1,317,500), Argentina (1,284,519), Colombia (1,174,012) and Italy (1,167,303) ([Laxminarayan *et al.*, 2020](#)), as presented in Table (2).

Table 1. Total number of confirmed COVID-19 cases globally at the 14th November, 2020

Region	Confirmed cases	Total deaths
Globally	53,507,282	1,305,164
Americas	22,960,102	675,735
Europe	14,792,945	337,767
South-East Asia	10,015,731	153,860
Eastern Mediterranean	3,545,801	90,052
Africa	1,393,792	31,360
Western Pacific	798,170	16,377

The sources of these data were: [Balogun, \(2020\)](#); [McIntosh *et al.*, \(2020\)](#)

Table 2. Top 10 countries with highest recorded COVID-19 cases at the 14th November, 2020

Region	Confirmed cases
United States of America	10,641,341
India	8,814,579
Brazil	5,810,652
Russian federation	1,903,253
France	1,886,286
Spain	1,458,591
United kingdom	1,317,500
Argentina	1,296,378
Colombia	1,182,697
Italy	1,107,303

The source of these data was: [Jin *et al.*, \(2020\)](#)

5. COVID-19 in Asia

Asia is divided into 4 regions namely; East Asia, South East Asia, south Asia and central Asia; with each country affected significantly. A recent study conducted by [Zhang, \(2020\)](#) revealed that the top 10 countries most affected in Asia include; India (8,773,479), Iran (7,38,322), Iraq (5,14,496), Indonesia (4,57,735), Bangladesh (4,04,713), Philippines (4,04,713), Saudi Arabia (3,52,601), Pakistan (3,52,296), Israel (3,22,371) and Nepal (2,06,353), as demonstrated in Table (3). The observed cases of COVID-19 continued to rise in Asia, and the WHO

South-East Asia Region (SEAR) recorded week 37 as the highest weekly increase in cumulative cases among all WHO regions, as highlighted by [Zimmermann and Curtis, \(2020\)](#). Meanwhile, [Laxminarayan *et al.*, \(2020\)](#) reported the highest weekly percentages of increase in the Asian region were recorded in Myanmar (107 %, 1513 cases), followed by Nepal (17 %, 7902 cases) and then India (16 %, 640,545 cases). However, the exact cases of COVID-19 were unclear in China, which was the country of origin of corona virus; as these data were not reported by the Chinese officials.

Table 3: Top 10 Asian countries with highest number of confirmed COVID 19 cases

Country	Confirmed cases
India	8773479
Iran	738322
Iraq	514496
Indonesia	457735
Bangladesh	428965
Philippines	404713
Saudi arabia	352061
Pakistan	352296
Israel	322371
Nepal	206353

The sources of these data were: [Adhikari *et al.*, \(2020\)](#); [Berghiche, \(2020\)](#)

5.1. COVID-19 in South Asia

The most affected country by COVID-19 in south Asia was India (8,773,479), whereas the least affected

countries include; Bangladesh (4,04,713), Pakistan (3,52,296), Nepal (2,06,353), Afghanistan (42,969), Sri Lanka (15,723) and finally the Maldives (12,112), as revealed recently by [Adhikari *et al.*, \(2020\)](#).

5.2. COVID-19 in India

As of 15th November, 2020, the total number of recorded COVID 19 cases in India were as follows: Active cases: 4,79,216; Cured/discharged: 82,05,728; Migrated cases: 1 and the recorded deaths were 1,29,63. As highlighted by [Adhikari *et al.*, \(2020\)](#), the 10 Indian states most affected by COVID-19 were; Maharashtra (1,744,698), Karnataka (8,60,082), Andhra Pradesh (8,52,955), Tamil Nadu (7,56,372), Uttar Pradesh (5,09,903), Delhi (4,82,170), West Bengal (4,28,498), Telangana (2,57,374) and Bihar (2,25,595). Amongst the 10 states with the maximum reported cases, 4 states were growing significantly at faster rates than the national growth rate including Maharashtra, which accounts for more than 20 % of all the recorded coronavirus cases in the Indian country. Maharashtra's growth rate was 2.18 % daily ([Pan *et al.*, 2020](#)). The south-western Indian state of Maharashtra reported the highest number of active coronavirus cases (COVID-19) recording over 84 000 cases as of the 12th November, 2020, followed by Kerala and Delhi with relatively lower recorded mortality rates ([Sharma and Sharma, 2020](#)). The gap was reducing steadily with the United States (US), which is the country with the highest recorded coronavirus cases in the world; compared to the rate with which India was adding numbers. Moreover, it was expected that India will overtake the United States, according to the recent study conducted by [Lipsitch *et al.*, \(2020\)](#).

6. Distribution

6.1. Gender distribution

Data from the Ministry of health and family welfare (MOHFW), India, revealed higher males predilection over females. Referring to the distribution of gender; India's figure matched up to the international pattern, where 76 % of all cases in India were males and 24 % were females. This was also reflected to the rate of fatalities in which 73 % fatalities were recorded among men, and 27 % among women ([Sharma and Sharma, 2020](#)).

6.2. Age distribution of COVID-19 positive cases

Recently, [Sharma and Sharma, \(2020\)](#) reported that 47 % of COVID-19 cases were less than 40 years of age; 34 % were between 40- 60 years, and 19 % were above 60. It is important to read and analyse these data in light of the India's massive young population and life expectancies of 69 years, as highlighted by [Jin *et al.*, \(2020\)](#).

6.3. Age distribution of fatalities

According to [Berghiche, \(2020\)](#), about 7 % of COVID-19 fatality cases were less than 40 years of age, 30 % were in the age group of 40-60 years, and 63 % were above 60.

6.4. Age distribution linked to co-morbidities

In terms of fatalities linked to co-morbidities; 86 % of deaths recorded in India had significant co-morbidities such as; diabetes, hypertension, chronic kidney and heart diseases. India had a massive crisis of lifestyle linked diseases, and unfortunately also had tag of diabetes and heart diseases capital of the world, as revealed by [Jin *et al.*, \(2020\)](#). Moreover, recent study of [Sharma and Sharma, \(2020\)](#) added that the number of young people suffering from these co-morbidities, which was reflected in the numbers of deaths (37 %); were among people below age of 60 years.

7. Prevention of COVID-19 infection

7.1. Routes of spread

COVID-19 spreads easily from person to person mainly through the following routes highlighted by [Park *et al.*, \(2020\)](#):

- Among people who are in close contact with one another (within 6 feet).
- Through respiratory droplets produced when an infected person coughs; breathes, sneezes, talks or sings.
- Respiratory droplets cause infection when they are inhaled and/or deposited on the mucous membranes,

such as those lining the inside of the mouth and the nose.

- People who are infected but do not show symptoms (latent infection) can also spread the virus to each other's.

7.2. Ways of prevention

7.2.1. Washing the hands

Wash your hands carefully with soap and water for at least 20 seconds especially after being in a public place, or after blowing the nose, sneezing or coughing. It's especially important to wash the hands;

- Before preparing food or eating;
- After blowing the nose, sneezing or coughing;
- After using the restroom;
- Before touching your face;
- After handling the mask;
- After leaving a public place;
- After touching animals or pets;
- After caring for sick somebody

If soap and water are not readily available, you must use a hand sanitizer containing at least 60 % alcohol ([Adhikari et al., 2020](#)). Avoid touching the nose, the eyes and\ or the mouth with unwashed hands ([Lipsitch et al., 2020](#)).

7.2.2. Avoid close contact

Avoid close contact with people who are sick inside the home. You have to maintain 6 feet between the sick person and the other household members. Leave a distance of at least 6 feet between you and the people who are not in your household ([Park et al., 2020](#)).

7.2.3. General precautions

-Cover your nose and mouth with a mask when you are among the others.

-Clean and disinfect daily the frequently touched inanimate surfaces including; light switches, tables, handles, doorknobs, countertops, desks, keyboards, phones, faucets, toilets and sinks ([Sharma and Sharma, 2020](#)).

-Monitor your health daily, through being alert for COVID-19 infection symptoms such as; cough, fever and shortness of breath ([Balogun, 2020](#)).

Limitations of this study

1. The data were collected from variable sources, so might not represent the exact figures.
2. As huge populations were affected, so there might be no reported cases such as the asymptomatic cases, who we don't recognize their infection.

Conclusion

The first case of COVID-19 in India was reported on the 30th of January, 2020 and since then the numbers of confirmed cases had increased significantly. As of 15th November, 2020, the total number of COVID-19 cases in India was as follows: Active cases: 4,79,216; Cured/discharged: 82,05,728; Migrated: 1; Deaths: 1,29,63; with Maharashtra state recording the highest number of corona virus cases followed by Karnataka and then Tamil Nadu. People with less than 40 years old were more susceptible to contracting this viral disease in India. Corona virus causes more deaths among people of 60 years and above. Generally, COVID-19 infection is characterized by low prevalence rate; case fatality rate and mortality rate; however, the recovery rate is relatively high, and most fatalities are associated with significant comorbidities.

Conflict of interest

The authors declare no conflict of interest.

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Ethical approval

Non-applicable.

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