ORIGINAL ARTICLE

Review of Global COVID-19 Cases and its Association with Selected Variables

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Abstract

Background and objective: In the alarming situation of COVID-19, every country is struggling to contain the spread. This study aimed to review the situation and correlate selected variables with a number of cases.

Materials and methods: The secondary data were collected from various sources in both government and non-government agencies for the review and analysis. Spearman's rho correlation was used to make inference about the association of COVID-19 cases with selected variables.

Results: Among the 10 countries included in the analysis, the USA had the highest number of COVID-19 cases as of April 26, 2020. Italy performed well in terms of number of tests per million population with 31,600 and India was very poor with 602. Positive case detection was 26.8% in France and India had just 3.2%. The proportion of urban population, elderly population, and tests per million population were significantly contributed to higher incidence of COVID-19 cases.

Conclusion: Special activities should be focused on urban population and elderly population to control COVID-19, and surveillance capacity should be increased extremely.

Keywords: Correlation, COVID-19, Migration.

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Introduction

COVID-19 initially known as 2019-nCoV is a severe acute respiratory syndrome emerging and spreading all over the world as originating from Wuhan, China.[1] The WHO declared it as pandemic and issuing guidelines and advised to do surveillance in all the countries in routine.[2] It also suggested carrying out, early detection, isolation, and prompting treatment to control the pandemic.[2] It is mild in most of the cases, but there is a risk of fatal if untreated. People with co-morbidity like asthma, diabetes, hypertension, and cardiovascular are more vulnerable to become severely ill.[3]

The Center for Disease Control and Prevention (CDC) reiterated that the virus is transmitted among people when an infected person sprays droplet by sneezing or coughing. It is likewise advised to maintain a good social distance of about 6 feet and wash hands with soap and water.[4] Activities like personal hygiene, social distancing, surveillance, and quarantines were suggested to reduce the transmission. So far, there was no proven effective treatment for this viral disease; the whole world depends upon the presumptive treatment and supportive care.[5] Initially, when cases were emerging from China, many countries started surveillance among people who had a travel history. The surveillance strategy was strengthened according to the guidelines of WHO/CDC from time to time. As of now, almost 212 countries were affected with a total of 30.9 lakhs and 2.177 lakhs deaths as on April 30, 2020.[6] The Union Health Minister for Health stated that India took this opportunity to strengthen the health care. He also reiterated that "we know the enemy and its whereabouts; we have corona warriors to control them."[7] In these circumstances, this article aims at reviewing the global situation of COVID-19 and correlating with selected variables.

Materials and Methods

Ten countries were selected for the analysis of which the first eight countries were based on the highest number of COVID-19 cases; China and India were selected since they are either epicenter or native, respectively. Current status of COVID-19 cases as on April 26, 2020, the density of the population, the proportion of urban population, net migration, the number of tests per million, the proportion of elderly population, and case detected per 100 tests for the selected countries were collected from various sources like CDC, WHO, GOI, GOTN. Analysis was done using SPSS version 26. Proportion and correlation were applied for making inferences.

Current Scenario (as on April 26, 2020)

Globally, there were 2,804,796 cases and 193,710 deaths, while India had 26,496 cases and 824 deaths distributed over 32 states/union territories.[8] The reported incubation period was 2–14 days. The mean incubation period was 5.2 days (95% CI 4.1–7 days), and in the initial stages, the doubling time was 7.4 days. Nearly 80.9% of the cases were mild with flu-like symptoms which can be cured

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at home; 13.8% are severe, developing severe diseases, including pneumonia and shortness of breath; 4.7% are critical and can include respiratory failure, septic shock, and multiorgan failure; and in about 2% of reported cases, the virus is fatal. The death rate among the confirmed cases of COVID-19 was higher among male with 61.8% and 28.2% for female. Mortality was high among the elder population 75 years and above (47.7%) followed by 65–74 years (24.6%) and 55–64 years (23.1%). Deaths contributed by preexisting co-morbidity were cardiovascular disease (13.2%), diabetes (9.2%), chronic respiratory disease (8.0%), and hypertension (8.4%).[9] Another study conducted to assess the risk of death among COVID-19 patients sequenced the causes as hypertension, diabetes, and cardiovascular disease as the most common causes.[3]

Results

COVID-19 cases were ranked from the highest to lowest country data; they are considered as an ordinal variable, and after testing the normality of distribution of data, it was decided to use Spearman's correlation (Table 1).[10,11]

The USA had the highest number of COVID-19 cases, and India had the lowest compared to the other countries. India had the highest number of people living per km^2 (464) while Russia had the lowest (9). The proportion of urban population was high with 84% in the USA and UK, but it was very low in India with 35%. Net migration was defined as immigrants were subtracted from emigrants. Net migration was compared with the number of cases of COVID-19, and it was found that top eight countries had a positive migration while India and China had negative migration. People from countries with positive migration have the highest number of COVID-19 cases and are expected to fly to other countries, while India and China with negative migration will receive them. Hence, the travel from one place to another was curtained during the lockdown period.

Testing for COVID-19 is crucial for identifying the positive cases for management and treatment. Testing a greater number of people will facilitate identifying more cases. Hence, the number of tests per one million population was taken as one of the important indicators to monitor the effectiveness of surveillance. Italy stood first with 31,603 tests per million population, followed by Germany (30,400) and Spain (30,253). India stood the last on the list with 602 tests per million population.

The details of elderly population (65 years and above) who are at a higher risk from these 10 countries were collected. Italy had the highest elderly population (22.8%) followed by Germany (21.4%) and France (20.3%). India stood at as less as 6.1% of the population in 65 years and above.

Corona-positive detection per 100 tests for each country was evaluated and found that France stood first with 26.8%. In many countries, it was above 10%, but in Russia and India, they were 2.1% and 3.2%, respectively (Table 2).

Spearman's correlation was administered to assess if there was any relationships between the number of COVID-19 cases in a country with the density of population living in the country, percentage of urban population, net migration, the number of tests per million population, percentage of population living with 65 years and above, and case detected per 100 tests. A two-tailed test was carried and α was taken as 0.05.

The correlation between the number of cases and density of the population was found to be negative and week ($r = -0.358$, $p = 0.310$), suggesting that density of population living in a country had no influence on the incidence.

It was observed that there was a high positive correlation ($r = 0.720$, $p = 0.019$) between the number of cases and urban population and it was significant. It was inferred that the proportion of urban population explains about 52% (R^2) of variations in number of COVID-19 cases in the country. It shows that a country with an increased number of urban population had an increased number of COVID-19 cases.

Correlation between the number of cases and number of tests done per million population was positive and weak ($r = 0.345$, $p = 0.328$). Though the number of COVID-19 cases increases with the number of tests per million population, it was not significant.

The correlation between the number of cases and the proportion of elderly population in the country had a high correlation ($r = 0.661$, $p = 0.038$) and it was significant. About 43% (R^2) of variations in number of COVID-19 cases were explained by the number of people living in 65 years and above in a country. It shows that a country with an increased number population aged 65 years and above had an increased number of COVID-19 cases.

Conclusion

It was observed that the USA had the highest number of cases in the world and India had the lowest cases among the selected ten countries. A country with a higher proportion of urban population tends to have a higher number of COVID-19 cases. Higher numbers

Table 1: Countrywise distribution of COVID-19 cases[9]

Sl. no.	*Country*	*Total COVID-19 cases (as on April 26, 2020)*	*Density/Km^2*	*Percentage of urban population*	*Estimated net migration*	*No. of tests/ million population*	*Percentage of population 65 years and above*[12]	*Case detected per 100 tests*
1	USA	1,064,572	36	83	954,806	18,549	16	15.3
2	Spain	236,899	94	80	40,000	30,253	19.1	14.7
3	Italy	203,591	206	69	148,943	31,603	22.8	10.2
4	France	166,420	119	82	36,527	7,103	20.3	26.8
5	UK	165,221	281	83	260,650	12,058	18.3	18.1
6	Germany	161,539	240	76	543,822	30,400	21.4	6.1
7	Turkey	117,589	110	76	283,922	11,757	8.8	10.9
8	Russia	106,498	9	74	182,456	23,915	14.6	2.1
9	China	82,862	153	61	–348,399	20,704	11.9	NA
10	India	33,062	464	35	–532,687	602	6.1	3.2

Table 2: Correlation matrix for selected variables

	COVID-19 cases	*Density of population*	*Urban population*	*Tests per million population*	*Elderly population*
COVID-19 cases	1				
Density of population	−0.358	1			
Urban population	0.720*	−0.293	1		
Tests per million population	0.345	−0.188	−0.098	1	
Elderly population	0.661*	0.055	0.348	0.636*	1

*Significant at $p = 0.05$

of tests done per million population are not correlated with the number of cases; other factors may influence the surveillance. Countries with a high proportion of the population living with 65 years and above had a higher chance of getting more number of COVID-19 cases. France leads with 26.8% in case detection followed by UK with 18.1%. It was very less with 3.2% in India.

Suggestions

Comparatively, COVID-19 cases were very less in India, and the number of tests carried out per million population and case detection rate were very less. It was proposed to improve the surveillance by increasing the number of tests in India. Globally, the elderly population is significantly higher risk; special care of the elderly population is essential. Intensive surveillance and preventions are focused on the urban areas.

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