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Model for prediction of death rate due to COVID-19 transmission and required precautions

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ABSTRACT

Study has been carried out to monitor the progression of COVID-19 and prediction of deceased in a period of time. To get this parameter, three parameters related COVID-19 infected persons such as total infected, recovered and deceased persons have been covered. A Multivariate Regression Model was developed to predict the Number of Deceased Persons based on the data available for Number of Infected and Recovered Persons. On the basis of graph plots, it observed that numbers of factors are important to the transmission of corona virus and among all if temperature is an important parameter then it will be hard time for humid states especially South Asian countries.

The most dangerous threat human being facing from last 4 months for its existence is coronavirus disease (COVID-19). It is the most infectious disease which is spreading very fast from one country to another. Till date nearly 200 countries are affected with this and trying to save life of their citizen at any cost. The origin of this disease is Wuhan city which is the capital of one of the state, Hubei, of Republic China. This is known by common people as a Wuhan virus or China virus due to its origin. First case of COVID-19 reported in Wuhan on 17th November 2019 in a 55 year old man. And for about one month, data shows a regular increase of patients in number one to five per day. On the 20th December 2019 confirmed data received through media up to 60. This pandemic virus has till date infected approximately half-million peoples across the world and more than 20,000 peoples died. Notable and positive information is that if infected persons get treatment in time, recovery of chances is also better as per international data which showed more that 100,000 of peoples have been recovered since it began. World society claiming that China is sole responsible for the current problem across the world due to their negligence behavior towards social responsibility and hiding the facts related with this disease for a long period of time and not providing information to other countries in time. These facts indicate that COVID-19 is indeed Wuhan virus; nobody can give a clean chit to China.

Its refusal tendency of not providing enough information to international society in time and power play in World Health Organization (WHO) provided a proper platform to transmit this disease human to human in a long chain. A high number of Wuhan residents were also allowed to travel across the world without any proper medical check-up as well as treatments. They travelled several countries, cities in couple of months and transmitted this severe infectious disease everywhere especially Silk Road area developed by China. The exponential growth of this disease resulted cost of many life’s as well as shutdown in many cities and countries for an unknown time period.

1. Model for deceased persons due to COVID-19 in stage – III

Based on the data since 2nd February available on worldmeter, info, the numbers of infected persons were only 17391, which was not reasonable and acceptable to scientific community [1–3]. A Multivariate Regression Model was developed to predict the Number of Deceased Persons based on the data available for Number of Infected and Recovered Persons. The Summary output below shows that it is a very good fit as the Adjusted R Square if 0.99. The model can be used by the Health Administration to have better control over the treatment of the COVID-19 infected patients. The formulation is given below:

Number of deceased = −0.00486*Number of Recovered + 0.04814*Number of Infected − 1139.7

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The analysis of data present in Fig. 1 shows that rate of COVID-19 transmission till 25th March was unimaginable and increased exponentially with a very high rate and, covered to approximately half million of population [2,3]. Data collection for plotting has been taken as 10 days of interval of as an unit and observed that in last 10 days, it increased in very fast pace. Number of factors may be favored for high transmission of disease such as increase in temperature, increase in number of infected persons, less facilities availability for treatment in developing as well as poor countries, etc. Among all reasons, if temperature is one of the factors to promote transmission of COVID-19, then next two months will be very hard time to all poor countries as well as developing countries due to presence of moderate temperature especially in South Asian countries. Analysis of Fig. 2, predicts that even though the disease is very lethal, if infected persons start taking medicine in time related with malaria/dengu etc as recommended by doctors, possibility of recovery is better. The data reveals that out 471,035 peoples 117,608 (24.97%) have been recovered while the number deceased are 22,071 (4.69%).

2. Effect on human

Primary symptoms of COVID-19 are similar to flu such as a cough, fever, shivering and in the critical state infected person feel difficulty in breathing. Some persons show additional symptoms like headache or conjunctivitis. Prof John Wilson, president-elect of the Royal Australasian College of Physicians and a respiratory physician categorized all patients in four categories.

1. The person who are in sub-clinical state, having virus but no symptoms visible to others. This category people are least serious.
2. In second category people, infection reached up to respiratory tract and it develop a state of fever and a cough or sneezing. In some cases addition symptoms like headache or conjunctivitis is also noticed. He added that in milder state of symptoms, infected persons are also able to transmit virus to nearby peoples.
3. In third stage, infected persons will likely be hospitalized and would have positive response to COVID-19 test.
4. In fourth state, infected persons will show critical infections state along with features of pneumonia. It was observed that in general persons who are more prone towards this disease are having problems related with high blood pressure, problems related with heart and lung problems or diabetes.

3. Common precautions [4]

As we know till date no medicines are available in market for the treatment of infected persons. So, we can say, precautions are most effective remedy to check spread of COVID-19. Precautions are as follows:
1. Social distancing is one of the most effective ways to protect you and stop transmission of this killer virus.
2. Frequent washing of hand, second way anyone can make them safe and we should also avoid touching of face, nose as well as eyes as much as possible. For washing hands, soap-water combination or alcohol-based hand rub is good enough to kill viruses on your body surface.
3. Improve your immune system by a routine Yoga practice.

If anyone is having any symptoms as discussed, they should make themselves home quarantine first and inform to nearby medical stations for help. They should also follow all advices as local authority direct them for the welfare of him, their family as well as society.

In conclusion, this paper will be useful to predict possible death in any state on the basis of data of infected person and possible recovered number. Utilization of this tool will be crucial to provide proper time to any state to make them ready for coming problem and to make them aware with common symptoms and required precautions.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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