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RESEARCH ARTICLE

INDIA SEEMS TO BE BETTER PLACED IN FIGHTING AGAINST COVID-19: A REVIEW

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Abstract

When the whole world is reeling under a severe impact of Covid 19, India which is 4 times more populous than US and many other developed nations, is not so severely hit by the epidemic. Despite India's very low per capita income and poorly ranked healthcare system in the world, it has escaped the brunt of the pandemic. Generally epidemics exhibit exponential growth at the beginning but the initial delay and lower mortality have been ensued from many intriguing possibilities such as high geographical temperatures, high immunity due to poor hygiene, BCG vaccinations and lower average age of the population The ongoing review presents a brief perusal of the probable causes for the initial containment of the pandemic and its potential in India.

Introduction:-

COVID19 is an acronym for Corona Virus Disease of 2019 which is a disease of the virus SARS CoV2 that emerged from the city of Wuhan in China. It has now spread across different nations all over the world [1].

India is a neighboring country and shares its political borders with China, the country from where the first case of infection came to be known. There has been an endless constant battle between countries to fight against the spread of the disease and safeguard its citizens since January'2020 when the virus was first noticed by the World Health Organization (WHO) [1].

Even though India is a populous country with the second highest population in the world, it has been better in controlling the spread of Coronavirus which being highly contagious continues to be a bigger threat to India which has 17.7% of the total world population [2].

Indian government has taken all necessary steps to ensure that the country is well prepared before it's too late by providing improvement in testing kits, labs, medical facilities and building of quarantine centers as India doesn't hold a good ranking in terms of its medical facilities.

By 25th May' 2020, the number of cases reported worldwide were 5,387,650 out of which 344,549 have died. The maximum number of cases has been reported in United States (1,642,021). Other countries after U.S. with maximum number of cases are, Brazil (363,211), Russia (344,481), United Kingdom (259,559), Spain (235,772), Italy

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(229,858), France (182,709), Germany (178,281), Turkey (156,827) and Iran (135,701) [data as per recorded by 25th May' 2020]. [3]

According to a study, the spread of this virus is seen lesser in countries that have earlier been hotspot of malarial infection indicating an inverse relation between the anti malaria prophylaxis and the prevention of COVID-19. Figure 1 shows the worldwide distribution of malaria and COVID-19 infection. It is suggested that this may be due to impairment of the terminal glycosylation of Angiotensin-converting enzyme2 (ACE2) receptor in pulmonary epithelial cells, when treated with chloroquine or its analog. Chloroquine is an effective drug used for treating malaria for prophylactic purposes mainly in the Sub-Saharan zones of the world. This prior treatment could have lead to reduced binding of SARS-CoV2 to its receptor and hence lesser no. of cases reported by countries that see a large number of cases of malaria every year or have been badly affected by it in the past i.e., areas with anti-malarial prophylaxis are naturally protected from COVID-19 infection. [4, 5, 6]

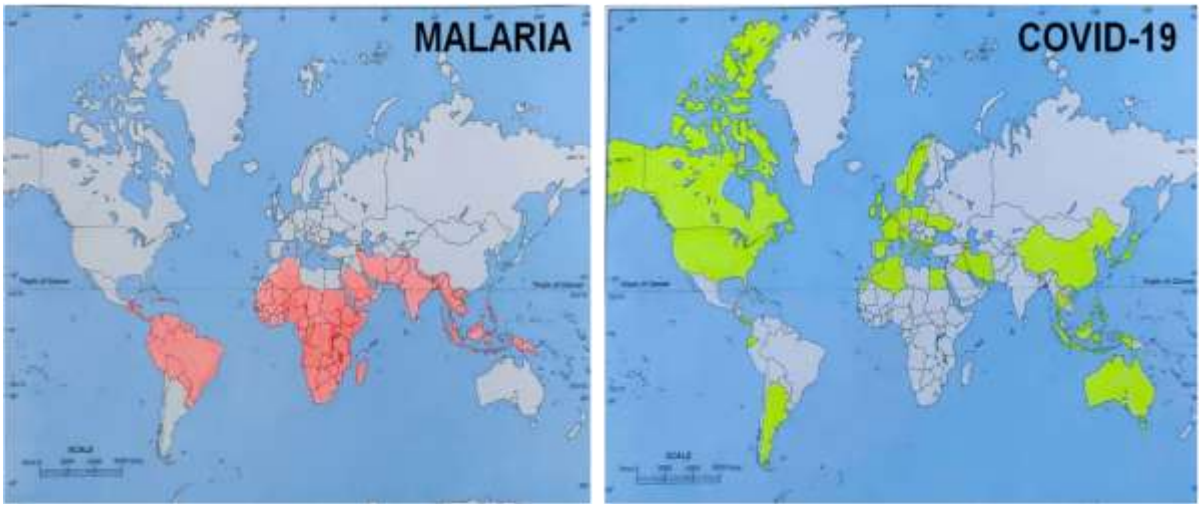


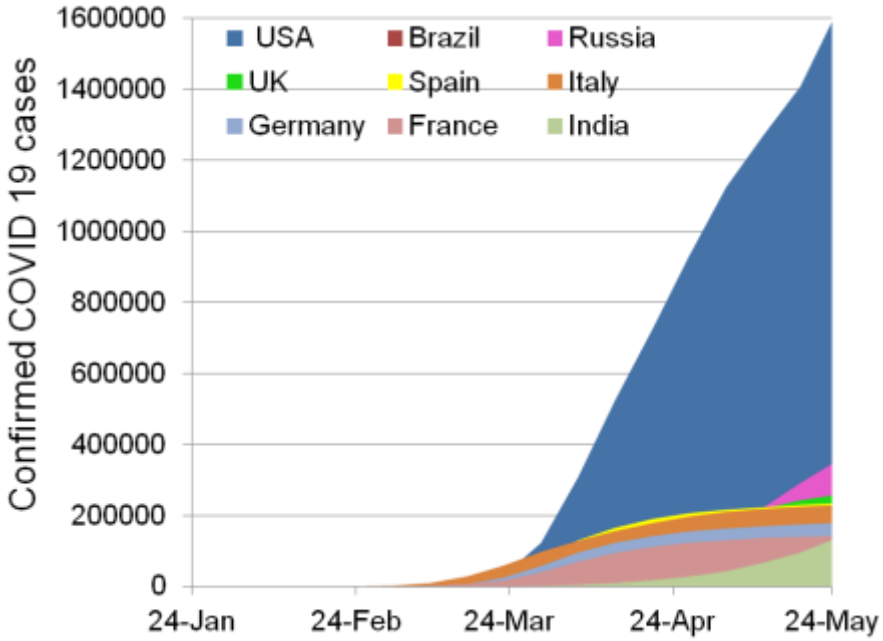
Figure 1:- Distribution of malaria and COVID-19 infection in different geographical zones of the world.

Similar pattern has been seen in countries where BCG (the vaccine for tuberculosis) is administered to neonates. Countries where this vaccine is a part of their scheduled vaccines chart have seen lesser number of cases till date. But there is no concrete proof that this vaccine can prevent infection against COVID19 also. This vaccine has shown some non-specific effects on immune system in body during clinical trials. So, WHO has not yet declared it as a vaccine for use in this pandemic and continues to recommend BCG for prevention against tuberculosis. [7]

Table 1:- Weekly data of confirmed COVID 19 cases in nine different countries since 20th January' 2020 [8].

DATE	Number of confirmed cases								
	USA	Brazil	Russia	UK	Spain	Italy	Germany	France	India
20-Jan	1	0	0	0	0	0	0	0	0
27-Jan	5	0	0	0	0	0	0	3	0
03-Feb	11	0	2	2	1	2	10	6	3
10-Feb	12	0	2	8	2	3	14	11	3
17-Feb	15	0	2	9	2	3	16	12	3
24-Feb	53	0	2	13	2	229	16	12	3
02-Mar	64	2	3	39	114	2036	158	188	5
09-Mar	472	25	7	323	1024	9172	1139	1402	44
16-Mar	1714	200	93	1547	9191	27980	6012	6573	114
23-Mar	31573	904	438	5687	28572	59138	24774	15821	434
30-Mar	122653	3904	1534	19526	78797	97689	57298	39642	1071
06-Apr	307318	10278	5389	47810	130759	128948	95391	69607	4067
13-Apr	524514	20727	18328	84283	166019	156363	123016	94382	9152
20-Apr	723605	36599	42853	120071	191163	178972	141672	111463	17265
27-Apr	931698	58509	87147	152844	207634	197675	155193	123279	27892

04-May	1125719	96559	145268	186603	217466	210717	163175	129708	42533
11-May	1271645	155939	221344	219187	224390	219070	169575	137073	67152
18-May	1409452	233142	290678	243699	231350	225435	174697	140036	96169
24-May	1592599	347398	344481	257158	235290	229327	178281	142173	131868



Graph 1:- Data of confirmed COVID-19 cases in nine different countries.

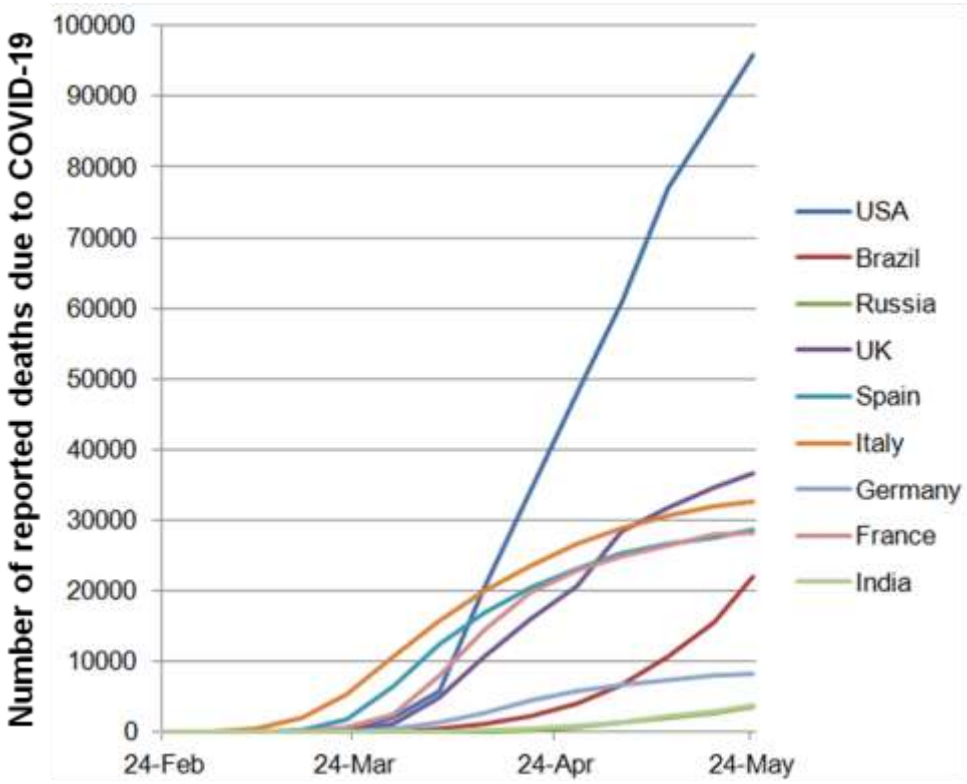
Table 1 and Graph 1 depict total confirmed cases of above 9 countries from 20th January'2020 to 24th May'2020. India, when compared to US, has 14 times less cases registered. India saw its first daily cases exceeding 1000 on 18th April' 2020 while this rise for USA, UK and Spain was seen much earlier on, 17th March, 24th March and 13th March' 2020 respectively.

Weekly analysis of number of cases across the world show that U.S.A., though is the most powerful country with upgraded medical facilities and lesser population density (36 per sq. km) as compared to country like India, which has a population density of 464 per sq. km, has seen largest number of deaths till date and is seeing a very large daily increase in the number of COVID cases [9].

DATE	Number of reported deaths								
	USA	Brazil	Russia	UK	Spain	Italy	Germany	France	India
17-Feb	0	0	0	0	0	0	0	1	0
24-Feb	0	0	0	0	0	7	0	1	0
02-Mar	0	0	0	0	0	52	0	3	0
09-Mar	19	0	0	3	28	463	2	30	0
16-Mar	41	0	0	55	309	2158	12	148	2
23-Mar	402	11	0	281	1720	5476	94	674	9
30-Mar	2112	114	9	1228	6528	10781	455	2602	29
06-Apr	5854	432	45	4934	12418	15889	1434	8064	109
13-Apr	20444	1124	148	10612	16972	19901	2799	14374	308
20-Apr	34203	2347	361	16060	20453	23660	4404	19689	543
27-Apr	47980	4016	792	20732	23190	26644	5750	22821	872
04-May	60710	6750	1356	28446	25264	28884	6692	24859	1373
11-May	76916	10627	2009	31855	26621	30560	7417	26338	2206

18-May	87180	15633	2722	34636	27650	31908	7935	28059	3029
24-May	95863	22013	3541	36675	28678	32735	8247	28281	3867

Table 2:- Weekly data of reported deaths (cumulative) due to COVID 19 infection in nine different countries since 17th February' 2020. [9].

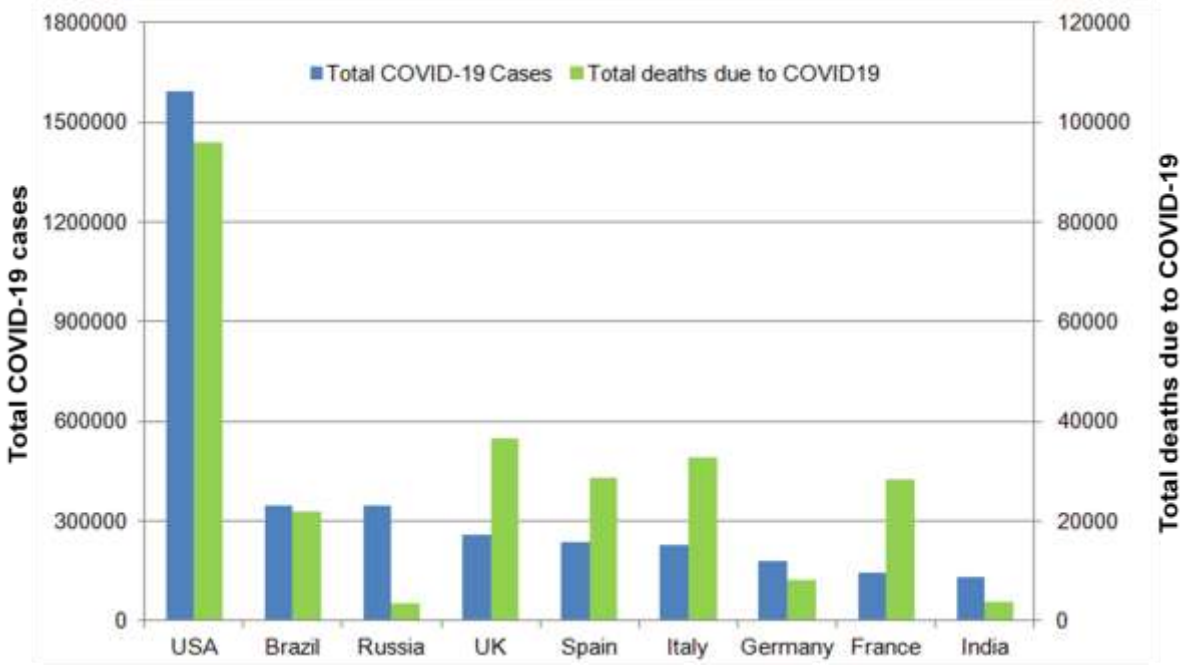


Graph 2:- Data of reported deaths due to COVID-19 in nine different countries across world.

Table 2 and Graph 2 depict data of deaths in 9 countries since 20th January'2020. There were no deaths reported from 20th January' 2020 to 16th February' 2020 for these nine countries. USA has maximum deaths due to COVID, followed by UK which has 2.5 times lesser deaths than USA. As per Table 2, USA saw a sudden increase in number of deaths from 5854 to 20444 from 6th April to 13th April, 2020 during which India saw cases increase from 109 to 308, which is 73.3 times less than USA. India saw a large increase in the no. of deaths from 1373 to 2206 from 4th May to 11th May, 2020. When compared, India has 25 times less deaths than USA, and 10 times less than UK. The ratio of total registered cases to total deaths for USA is 16.61, UK is 7, Russia is 97 and India is 34.

On comparing total cases to total deaths for each country from the values illustrated in Table 1 and 2, we can see that few countries like Russia and India have a high value for this ratio, which corresponds to a lower mortality rate. India has not seen more than 200 deaths in a single day (max. deaths reported being 195 on 5th May' 2020) which is an indicator of how India and Indian government has been taking crucial steps in saving lives of its people. Italy ranks second in terms of medical and healthcare facilities in the world [10]. Despite that it has not been able to control the increasing cases (229327) and deaths (32735). This makes it even more important to take stricter actions for containment of the spread of disease.

The underlying graph shows the rise in cases and number of deaths reported in countries that have been hit the worst [11]. This data can be used to compare the status of spread of the disease in different geographical zones of the world:

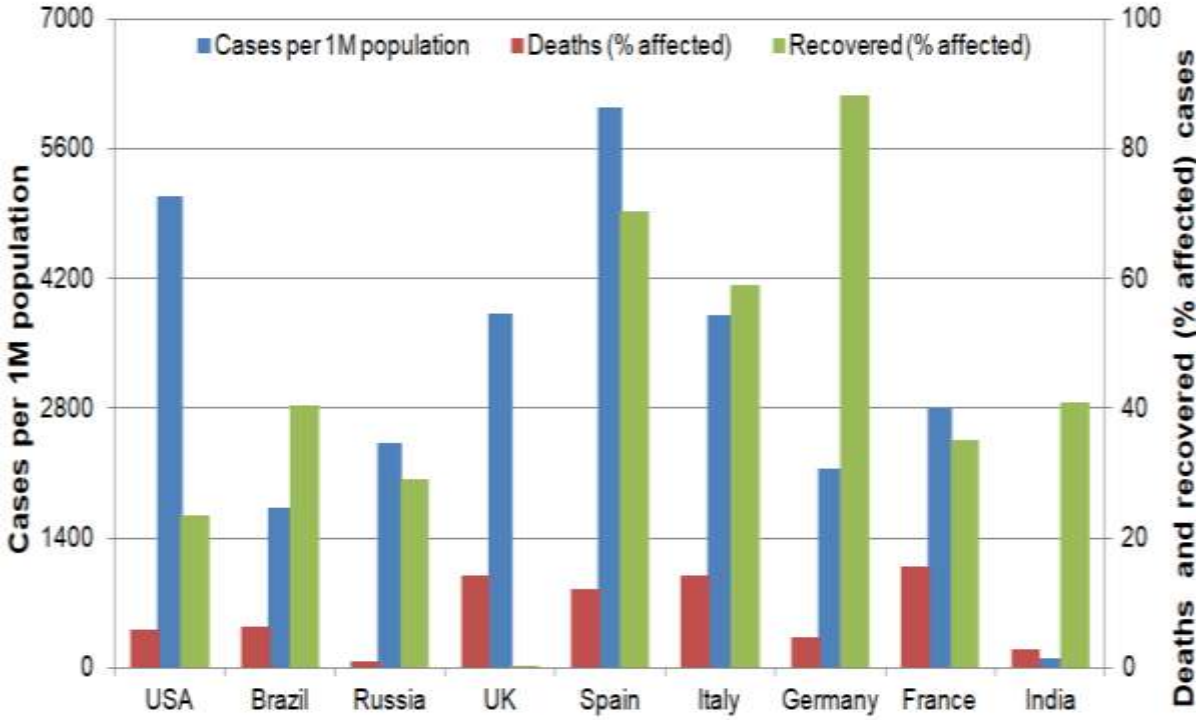


Graph 3:- The graph depicts the comparison of number of total COVID19 cases and deaths of nine different countries as per 24th May' 2020.

Graph 3 shows total cases and deaths due to COVID-19 in 8 worst hit countries, and compares that with India: Maximum deaths were reported in US since the pandemic spread was not taken seriously in its initial phase. The stats in US are approximately 5 times the count in the country following it in total COVID cases, i.e. Brazil. USA had its first corona case on 20th January' 2020 [12] and 10 days from that India encountered its first case. India, Spain, UK, Russia, though, saw their first cases by the end of January 2020, the total rise in the number of cases had been very fast in other countries when compared to India.

Table 3:- This table shows the total cases (per 1M population), death percent and recovery percent data of nine different countries that have been hit the worst due to COVID 19 infection (data as per 25th May' 2020). [9, 11].

Country	Cases per 1M population	Deaths (% affected)	Recovered (% affected)
USA	5,098	5.9	23.57
Brazil	1,719	6.2	40.51
Russia	2,422	1	29.18
UK	3,825	14.1	0.053
Spain	6,050	12.2	70.31
Italy	3,801	14.3	59.01
Germany	2,153	4.6	88.25
France	2,798	15.5	35.12
India	102	2.9	40.97



Graph 4:- Above graph depicts the total number of cases, death (% affected) and recovered cases (% affected) of COVID-19 infection in nine different countries (data as per 25th May' 2020). [Refer to data in Table 3].

Table 3 and Graph 4 show cases per million population and percentage of people died and recovered of the total affected population. India's mortality rate is just 2.9% till now, with highest mortality rate being reported from France (15.5%). Russia has lowest mortality rate of 1% followed by India. For contrast Brazil, Spain, UK and Italy have a mortality rate of 6.2, 12.2, 14.1 and 14.3 % respectively. Also India has lowest cases per million (102) which is far less than that for Spain (6050), mainly due the initial lockdown in the country which was strictly implemented when cases had not even exceeded 1000. This not only helped in stopping the large increase in number of cases but also gave government time to make proper medical arrangements for future increase in cases. India, though crossed its 100,000 cases mark on 19th May' 2020 [8], the recovery rate is 41%.

Germany tops in rate of recovery of infected patients with a huge percentile of 88.25%, while India is at a mediocre level of almost 41%. Fatality rate is highest in France amongst its affected population, followed by Italy and UK.

Discussion:-

Low mortality rate in India can be attributed to various factors like immunity of the people prevailing there, condition of medical services provided to COVID patients and percentage of people of different age groups, for instance India having more younger population seems to have less fatality than a country having more elderly or minor population, since the COVID-19 virus is considered more lethal to people having less immunity and to the people of older age groups or children. [13]

Another reason could be the difference in temperature of different geographical zones of the world. Studies suggest that an increase in temperature and humidity reduces the stability of the virus, both in air and on different surfaces. A temperature of more than 95 degrees Fahrenheit and humidity can reduce the half life of virus on surfaces where it can live for hours to just a few minutes. This can be thought of as a reason why India and other countries of the temperate zone have not seen as many number of cases as in US or Italy. The R_o value (average number of person infected by one sick person who have no immunity for the infection) is higher in places where the temperature is less-like in Northern Hemisphere- as compared to areas that are experiencing summers, as in southern hemisphere. [14, 15]

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