

COVID-19: ANALYSIS DISEASE PATTERN, TREATMENT AND USE OF ADVANCE TECHNOLOGY TO CONTROL SPREADING OF DISEASE***Vishal Kumar Deshwal**

Head, Department of Microbiology, BFIT Group of Institutions, Dehradun (India).

***Corresponding Author: Dr. Vishal Kumar Deshwal**

Head, Department of Microbiology, BFIT Group of Institutions, Dehradun (India).

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ABSTRACT

Aim of present study is to analysis disease pattern, treatment and use of advance surveillance technology for controlling and spreading of Covid-19 disease. Europe countries and United States of America are more affected by RNA virus "SAR-Cov-2". At present number of cases in China is constant and reduced which are nearly 40 cases per day. In United States of America, Covid-19 cases are jumped to 22.8 times within last 18 days which is highest among all Covid-19 cases. The pattern of Covid-19 disease is unique where disease rate is sharply increase or disease within 15-18 days. South Korean's data showed some stability in number of Covid-19 cases and slightly drop down in numbers which indicated that disease is in control condition but numbers of Covid-19 cases per day are higher than China in present scenario. In case of Russia, confirmed case speed up but death rate is constant. Hydroxychloroquine and Chloroquine phosphate can be used for treatment of Covid-19 disease. Russia, China, Israel, Singapore and South Korea are using high-tech surveillance system for monitoring the movement of citizen including quarantine person under lockdown condition.

KEYWORDS: Covid-19, SAR-Cov-2, Hydroxychloroquine, Chloroquine.

COVID-19 continues to dramatically alter lives; the death toll has topped more than 74000, with more than 1,340,000 confirmed cases which are gradually increasing day by day. The SARS-CoV-2 is beta coronavirus. No confirm report has been published about the source of Covid-19 disease. But SARS disease is originated from animal but now it is spreads from person to person.

Pathogen: Coronaviruses (CoVs) are named for the crown-like spikes on their surface. These CoVs have enveloped positive-sense RNA viruses, are characterized by club-like spikes that project from their surface, an unusually large RNA genome, and a unique replication strategy.^[1] The Coronaviruses (CoVs) are belong to family Coronaviridae and they are subdivided into four groups namely alpha, beta, gamma and delta coronaviruses. These viruses were characterized by serology and phylogenetic clustering.^[2] Human coronaviruses were first identified in the mid-1960s and the seven coronaviruses that can infect people are: 229E (alpha coronavirus), NL63 (alpha coronavirus), OC43 (beta coronavirus), HKU1 (beta coronavirus), MERS-CoV (the beta coronavirus that causes Middle East Respiratory Syndrome, or MERS), SARS-CoV (the beta coronavirus that causes severe acute respiratory syndrome, or SARS) and SARS-COV-2/ Novel Coronavirios/ COVID-19.^[3]

Source of infection: Coronavirus (CoV) come under severe acute respiratory syndrome (SARS) which are likely characterized by frequent host shifting events, whether can be zoonosis, reverse zoonosis or animal-to-animal.^[4-7] Coronavirus derived from various wild animals as well as domestic animal such as *Paguma larvata*^[8], Civet^[9], *Paradoxurus hermaphrodites*^[10], *Aselliscus stoliczkanus*^[11], *Rhinolophus sinicus*^[8] and Camel.^[11] A novel coronavirus (SCoV) is the etiological agent of severe acute respiratory syndrome (SARS). SCoV-like viruses were isolated from Himalayan palm civets found in a live-animal market in Guangdong, China. Evidence of virus infection was also detected in other animals (including a raccoon dog, *Nyctereutes procyonoides*) and in humans working at the same market.^[5] Further, SARS in 2002, Middle East respiratory syndrome in 2012, fatal swine acute diarrhea syndrome in 2017 caused serious infectious diseases in humans was caused by coronaviruses (CoVs) which were confirmed to originate from bats.^[12]

Spreading of disease: These virus spreads rapidly due to various factors are such as global connectivity, social practices, unplanned urbanization, high population, prevalence of immunosuppressive diseases^[13-14] and genetic alterations in pathogens.^[15] According to CDC, any person with weakened immune systems include those with HIV/AIDS; cancer and transplant patients who are taking certain immunosuppressive drugs; and those with inherited diseases that affect the immune

system (e.g. congenital agammaglobulinemia, congenital IgA deficiency) have risk of developing severe disease may differ depending on each person's degree of immune suppression.^[16] Similarly, an experiment conducted to prove that diabetes predisposes to influenza virus infection through compromise of collectin-mediated host defense of the lung by glucose.^[17]

Genetics of SARS-CoV-2: On the basis of the homology of the whole genome of SARS-CoV-2 with bat coronavirus RaTG13 is closely related but Bat SARS-like coronavirus Rs4874 isolated from *R. sinicus* were less than 90% which indicating the coronavirus carried by different bat individuals may be different.^[18] SARS-CoV-2 is begins to mutate in patients and such mutations of different SARS-CoV-2 isolates mainly occurs in five genes, including S, N, ORF8, ORF3a, and ORF1ab, with about 42% of the variations are non-synonymous mutation.^[18,19] Other report suggested that the virus has begun to adapt to the human environment and its genomes have begun to evolve in the population.^[18] All present information suggested that no authentic information regarding origin of COVID-19 is available as genetic profile is variable. Now, this COVID-19 is spread from human to human and death rate will gradually increase.

Disease Pattern: data of confirmed cases and deaths due to COVID-19 disease has been collected.^[20] Top 10 populated countries in world and South Korea are selected for present study. All data were recorded every three days interval.

In China, the average numbers of COVID-19 cases were near 40 per days and highest case was approx. 192 per 3days on 26 March. On 20th March 2020, COVID-19 cased in India and Russia was only approx 223 and 253 respectively but after 3days Russia confirmed cases were 13 more as compared to India. Now, Russia has nearly 1500 cases more than India where India population is nearly 9 times higher. In United States of America, cases were jumped 16067 to 367629 within last 18 days which was highest in recorded date. In India, Pakistan, Brazil and Russia's cases were ranges from near 1000 to 2900 per 3days. Covid-19 cases in Indonesia and Mexico were slowly increased but very slow increase in case of

Nigeria and Bangladesh (Table 1). Death rate per 1000 confirmed case of COVID-19 was ranges from 7.41 to 97.56. Highest death rate was recorded in Bangladesh and lowest Russia (Table 2). Previous study confirmed that death rate per 1000 confirmed Covid-19 cases in china and Europe is 40 to 100 respectively.^[21] This death rate per 1000 cased or percentage does not clear any picture as this is based on numbers of deaths and confirmed cases so if number of cases are more than death rate will reduced. Our available data showed that when confirmed case rapidly increase in thousands per day than it is problematic and same observed in Europe as well as United States of America. South Korean data showed some stability in number of Covid-19 cases and slightly drop down in numbers which is good sign.

Medicine: Scientists are searching effective drugs to control Covid-19 disease. Many drugs include interferon, ribavirin, lopinavir-ritonavir have been used in treatment of other SARS diseases but efficacy of some drugs against SARS-Cov-2 remains controversial.^[22-23] Hydroxychloroquine and Chloroquine phosphate are well known for class of the drugs called antimalarials and amebicides. But surprisingly, Hydroxychloroquine was found to be more potent than chloroquine at inhibiting SARS-CoV-2 *in vitro*. Hydroxychloroquine sulfate 400 mg given twice daily for 1 day, followed by 200 mg twice daily for 4 more days is recommended to treat SARS-CoV-2 infection.^[24] Hydroxychloroquine, a less toxic derivative of chloroquine, is effective in inhibiting SARS-CoV-2 infection *in vitro*.^[25] Similarly, two drugs, remdesivir (GS-5734) and chloroquine (CQ) phosphate, efficiently inhibited SARS-CoV-2 infection *in vitro*.^[23]

Advance technology: In 21th century, we don't know exact treatment of this pandemic COVID-19 but advance technology is being used for monitoring the movement of citizens under lockdown order for controlling the deadly COVID-19. Russia is tracking movement with help of mobile app and CCTV camera with facial recognition software "cybergulag".^[26] Similarly, China, Israel, Singapore and South Korea are also using a combination of location data, video camera footage and credit card information, to track COVID-19 in their countries.^[27]

Table 1: Population and number of confirmed case COVID-19.

S. No.	Country	Confirmed case (year 2020)						
		20-03	23-03	26-03	29-03	01-04	04-04	07-04
1	China	80,967	81,093	81,285	81,439	81,554	81,639	81,740
2	India	223	425	695	1,024	1,637	3,082	4,778
3	United States	16,067	35,060	68,489	135,627	189,711	290,920	367,629
4	Indonesia	369	514	893	1,285	1,677	2,092	2,491
5	Pakistan	478	803	1,102	1,571	2,071	2,708	3,766
6	Brazil	651	1,546	2,554	4,065	5,868	9,244	12,232
7	Nigeria	12	30	51	97	151	210	238
8	Bangladesh	20	27	44	48	54	70	123
9	Russia	253	438	840	1,534	2,777	4,731	6,343
10	Mexico	164	316	475	848	1,215	1,688	2,439
11	South Korea	8,652	8,961	9,241	9,583	9,887	10,156	10,331

Note: 3 days interval data is used, 03=March month; 04= April.

Table 2: Number of confirmed cases, deaths and death rate per 1000 confirmed cases.

S. No.	Country	Confirmed case	Deaths	Death rate per 1000 confirmed cases
1	China	81,740	3,331	40.75
2	India	4,778	136	28.46
3	United States	367,629	10,941	29.76
4	Indonesia	2,491	209	83.90
5	Pakistan	3,766	53	14.07
6	Brazil	12,232	566	46.27
7	Nigeria	238	5	21.01
8	Bangladesh	123	12	97.56
9	Russia	6,343	47	7.41
10	Mexico	2,439	125	51.25
11	South Korea	10,331	192	18.58

CONCLUSION

Deadly SAR-Cov-2 virus has been spread in all parts of world. Number of cases in China is constant and reduced which are nearly 40 cases per day. In United States of America, Covid-19 cases are jumped to 22.8 times within last 18 days which is highest among all Covid-19 cases. The pattern of disease is unique where disease rate is sharply increase or disease within 15-18 days. At present number of cases in India, Pakistan and Russia's cases were ranges from near 1000 to 2900 per 3days which is in control. But Covid-19 data pattern showed that Brazil's confirmed cases are slightly speed up and this is alarming condition but right now Brazil is safe zone. Covid-19 cases in Indonesia, Nigeria and Bangladesh are normal but picture will clear after starting of 3rd week of April 2020. Available data suggested that Hydroxychloroquine and Chloroquine phosphate are inhibiting SARS-CoV-2 *in vitro* and are used in treatment of Covid-19 disease. Lockdown and social distancing are best methods of spreading of Covid-19 disease. Now, countries are using software to monitoring the movement of citizen including infected one. Russia, China, Israel, Singapore and South Korea are also using technique to track COVID-19 patients in their countries.

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