



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203




Human Journals

Review Article


May 2020 Vol.:18, Issue:2

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COVID 19: A Review on Current Scenario, Therapeutic Intervention and Recent Developments



IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals



ISSN 2349-7203

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Submission: 23 April 2020
Accepted: 30 April 2020
Published: 30 May 2020

Keywords: Corona Virus, COVID 19, Therapy, Immunotherapy

ABSTRACT

World is threatened with the emergence and spread of novel coronavirus (2019-nCoV) or the Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2). The virus originated in bats and was transmitted to humans through yet unknown intermediary animals in Wuhan, Hubei province, China in December 2019. As of April 9, 2020, 1 436 198 confirmed cases were confirmed worldwide causing 85 522 deaths is being reported. In India, 6638 cases have been reported till 9/04/2020. Among total the cases, Maharashtra and Tamil Nadu is being reported as the highly effected area with 1346 and 834 cases. This virus that causes COVID-19 can infect people of all ages. However, evidence to date suggests that two groups of people are at a higher risk of getting severe COVID-19 disease as reported by WHO. Infection is acquired either by inhalation of these droplets or touching surfaces contaminated by them and then touching the nose, mouth and eyes. As currently there are no such specific treatments for this infection, prevention is the only way to be safe. As infected individuals are hospitalized, human patients should immediately be given symptomatic and supportive treatment as per severity of symptoms. Immunotherapy, monoclonal antibody treatment can be used as an era in infectious disease prevention. The global impact of this new epidemic is yet uncertain.



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INTRODUCTION

December 2019 novel coronavirus (2019-nCoV) or (SARS-CoV-2) originated in Wuhan City of Hubei Province of China [1]. The clinical condition caused by novel coronavirus (CoVs) is referred to as COVID-19 [2-5]. CoVs are enveloped viruses containing single-stranded positive-sense RNA that belongs to Coronaviridae family of the Orthocoronavirinae subfamily. Coronaviruses are enveloped positive sense RNA viruses ranging from 60 nm to 140 nm in diameter with spike like projections on its surface giving it a crown like appearance under the electron microscope; hence the name coronavirus [6]. It rapidly spread, throughout China, followed by an increasing number of cases throughout the world. Coronaviruses can cause diseases in mammals and birds. In humans, coronaviruses leads to respiratory tract infections that can be mild like cold, cough and it can be lethal, such as SARS and COVID-19 which can cause death, whereas in chickens, they cause an upper respiratory tract disease and in cows and pigs they might cause diarrhea. This review will be giving knowledge on the current scenario of the epidemic caused by this virus across the whole world as well on therapeutic intervention.

Current Scenario across the World

On 31st December 2019, World Health Organization (WHO) was notified by China regarding the outbreak and on 1st January the Huanan seafood market was closed. On 7th January the virus was being identified as coronavirus which was found to have >95% homology with the bat coronavirus and >70% similarity with the SARS-CoV. The first fatal case was reported on 11th Jan 2020. By 23rd January, the 11 million population of Wuhan was placed under lockdown with restrictions of entry and exit from the region. Soon this lockdown was extended to other cities of Hubei province. On January 30, 2020, the WHO declared COVID-19 to be a Public Health Emergency of International Concern (PHEIC) and declared an epidemic [3,7]. As of February 29, 2020, 1 436 198 confirmed cases were confirmed worldwide causing 85 522 deaths. Besides affecting mainly China, SARS-CoV-2/COVID-19 has now spread to more than 100 countries [8] as shown in Table 1. As of now the number of new cases has reduced in China, whereas it has increased exponentially in other countries including South Korea, Italy, Iran and US according to the latest report from WHO.

Table I: Countries, territories or areas with reported laboratory-confirmed COVID-19 cases and deaths. Data as of 9/04/2020. Source WHO.

Reporting Country/Territory/Area	Total confirmed cases	Total confirmed new cases	Total deaths	Total new deaths	Transmission/classification	Days since last reported case
Western Pacific Region						
China	83249	92	3344	2	Cluster of cases	0
Republic of Korea	10423	39	204	4	Cluster of cases	0
Australia	6052	96	50	5	Cluster of cases	0
Japan	4768	511	85	4	Cluster of cases	0
Malaysia	4119	156	65	2	Cluster of cases	0
Philippines	3870	106	182	5	Cluster of cases	0
Singapore	1623	142	6	0	Cluster of cases	0
New Zealand	992	23	1	0	Sporadic Cases	0
Viet Nam	251	2	0	0	Cluster of cases	0
Brunei Darussalam	135	0	1	0	Sporadic Cases	4
Cambodia	117	2	0	0	Sporadic Cases	0
Mongolia	16	1	0	0	Sporadic Cases	0
Fiji	15	0	0	0	Sporadic Cases	1
Lao People's Democratic Republic	15	3	0	0	Sporadic Cases	0
Papua New Guinea	2	1	0	0	Sporadic Cases	0
Territories **						
Guam	125	4	4	0	Cluster of cases	0
French Polynesia	51	4	0	0	Sporadic Cases	0
New Caledonia	18	0	0	0	Sporadic	6

					Cases	
Northern Mariana Islands(Commo n wealth of the)	11	3	2	0	Pending	0
European Region						
Spain	146690	6180	14555	757	Pending	0
Italy	139422	3836	17669	540	Pending	0
Germany	108202	4974	2107	246	Pending	0
France	81095	3869	10853	540	Pending	0
The United Kingdom	60737	5491	7097	938	Pending	0
Turkey	38226	4117	812	87	Community Transmission	0
Belgium	23403	1209	2240	205	Pending	0
Switzerland	22710	546	705	64	Community Transmission	0
Netherlands	20549	969	2248	147	Pending	0
Portugal	13141	699	380	35	Pending	0
Austria	12969	329	273	30	Pending	0
Russian Federation	10131	2634	76	18	Cluster of cases	0
Israel	9404	0	71	0	Pending	1
Sweden	8419	726	687	96	Pending	0
Ireland	6224	515	235	25	Pending	0
Norway	6010	147	80	11	Pending	0
Denmark	5402	331	218	15	Pending	0
Czechia	5312	295	99	11	Pending	0
Poland	5205	357	159	30	Pending	0
Romania	4761	344	209	27	Pending	0
Luxembourg	3034	64	46	2	Pending	0
Serbia	2666	219	65	4	Pending	0
Finland	2487	179	40	6	Pending	0
Ukraine	1892	224	57	5	Cluster of cases	0
Greece	1884	52	83	2	Pending	0
Iceland	1616	30	6	0	Pending	0
Croatia	1343	61	19	1	Pending	0
Estonia	1185	36	24	3	Pending	0
Republic of Moldova	1174	118	28	6	Pending	0
Slovenia	1091	36	40	4	Pending	0

Belarus	1066	205	13	0	Cluster of cases	0
Hungary	980	85	66	8	Pending	0
Armenia	921	44	10	2	Cluster of cases	0
Lithuania	912	32	15	0	Pending	0
Azerbaijan	822	105	8	0	Cluster of cases	0
Bosnia and Herzegovina	816	35	35	3	Community Transmission	0
Kazakhstan	727	18	7	1	Pending	0
Slovakia	682	84	2	0	Pending	0
North Macedonia	617	18	30	3	Cluster of cases	0
Bulgaria	593	16	24	1	Pending	0
Latvia	577	29	2	0	Pending	0
Andorra	566	15	24	2	Community Transmission	0
Uzbekistan	555	21	3	0	Cluster of cases	0
Cyprus	526	32	14	0	Pending	0
Albania	409	9	22	0	Cluster of cases	0
San Marino	308	29	34	0	Community Transmission	0
Malta	299	6	1	1	Pending	0
Kyrgyzstan	280	10	4	0	Pending	0
Montenegro	248	0	2	0	Cluster of cases	1
Georgia	214	6	3	0	Cluster of cases	0
Liechtenstein	79	1	1	0	Pending	0
Monaco	54	14	0	0	Sporadic Cases	0
Holy See	8	1	0	0	Sporadic Cases	0
Territories **						
Kosovo ^[1]	224	40	6	1	Community Transmission	0
Faroe Islands	184	0	0	0	Pending	1

Jersey	170	0	3	0	Pending	1
Guernsey	166	0	4	0	Pending	1
Isle of Man	150	0	1	0	Pending	1
Gibraltar	113	0	1	0	Pending	1
Greenland	11	0	0	0	Pending	3
South-East Asia Region						
India	5734	540	166	17	Cluster of cases	0
Indonesia	2956	218	240	19	Cluster of cases	0
Thailand	2423	54	32	2	Cluster of cases	0
Bangladesh	218	54	20	3	Cluster of cases	0
Sri Lanka	189	3	7	1	Cluster of cases	0
Myanmar	22	0	3	0	Sporadic Cases	1
Maldives	19	0	0	0	Cluster of cases	6
Nepal	9	0	0	0	Sporadic Cases	4
Bhutan	5	0	0	0	Sporadic Cases	6
Timor-Leste	1	0	0	0	Sporadic Cases	19
Eastern Mediterranean Region						
Iran(Islamic Republic of)	64586	1997	3993	121	Pending	0
Pakistan	4322	250	63	5	Cluster of cases	0
Saudi Arabia	2932	137	41	0	Cluster of cases	0
United Arab Emirates	2659	300	12	0	Pending	0
Qatar	2210	153	6	0	Pending	0
Egypt	1560	110	103	9	Cluster of cases	0
Morocco	1275	91	93	3	Cluster of cases	0
Iraq	1202	80	69	4	Cluster of cases	0
Kuwait	855	112	1	0	Cluster of cases	0
Bahrain	823	12	5	0	Cluster of	0

					cases	
Tunisia	628	5	24	1	Community Transmission	0
Lebanon	575	27	19	0	Cluster of cases	0
Oman	457	38	2	0	Cluster of cases	0
Afghanistan	444	21	15	1	Cluster of cases	0
Jordan	358	5	6	0	Cluster of cases	0
Djibouti	135	14	0	0	Cluster of cases	0
Libya	21	1	1	0	Cluster of cases	0
Syrian Arab Republic	19	0	2	0	Community Transmission	3
Sudan	14	0	2	0	Sporadic Cases	2
Somalia	12	4	1	1	Sporadic Cases	0
Territories**						
Occupied Palestinian territory	263	0	1	0	Cluster of cases	1
Region of the Americas						
United States of America	395030	31709	12740	1895	Community Transmission	0
Canada	18433	1384	401	56	Community Transmission	0
Brazil	13717	1661	667	114	Community Transmission	0
Chile	5546	430	48	5	Community Transmission	0
Ecuador	4450	703	242	51	Community Transmission	0
Peru	2954	393	107	15	Community Transmission	0

					n	
Mexico	2785	346	141	16	Community Transmission	0
Panama	2249	149	59	4	Community Transmission	0
Dominican Republic	1956	0	98	0	Community Transmission	1
Colombia	1780	201	50	4	Community Transmission	0
Argentina	1715	87	60	7	Community Transmission	0
Costa Rica	483	16	2	0	Cluster of cases	0
Cuba	457	61	12	1	Cluster of cases	0
Uruguay	424	9	7	1	Cluster of cases	0
Honduras	312	7	22	0	Cluster of cases	0
Bolivia (Plurinational State of)	210	16	15	1	Cluster of cases	0
Venezuela(Bolivarian Republic of)	166	1	7	0	Cluster of cases	0
Paraguay	119	4	5	0	Cluster of cases	0
Trinidad and Tobago	107	1	8	0	Cluster of cases	0
El Salvador	93	15	5	1	Cluster of cases	0
Guatemala	87	10	3	0	Cluster of cases	0
Barbados	63	3	3	1	Cluster of cases	0
Jamaica	63	4	3	0	Cluster of cases	0
Bahamas	36	3	6	1	Cluster of cases	0
Guyana	33	2	5	0	Cluster of cases	0

Haiti	27	2	1	0	Cluster of cases	0
Antigua and Barbuda	19	4	2	2	Cluster of cases	0
Dominica	15	0	0	0	Cluster of cases	1
Saint Lucia	14	0	0	0	Sporadic Cases	3
Grenada	12	0	0	0	Cluster of cases	4
Saint Kitts and Nevis	11	1	0	0	Sporadic Cases	0
Suriname	10	0	1	0	Sporadic Cases	5
Belize	8	1	1	0	Sporadic Cases	0
Saint Vincent and the Grenadines	8	1	0	0	Sporadic Cases	0
Nicaragua	6	0	1	0	Pending	2
Territories**						
Puerto Rico	620	47	24	1	Cluster of cases	0
Martinique	152	1	4	0	Cluster of cases	0
Guadeloupe	139	0	8	1	Cluster of cases	1
French Guiana	77	5	0	0	Cluster of cases	0
Aruba	74	3	0	0	Cluster of cases	0
Cayman Islands	45	6	2	1	Cluster of cases	0
United States Virgin Islands	45	2	1	0	Cluster of cases	0
Sint Maarten	40	0	8	0	Sporadic Cases	1
Bermuda	39	0	2	0	Cluster of cases	1
Saint Martin	31	0	2	0	Sporadic Cases	2
Curaçao	14	1	1	0	Sporadic Cases	0
Montserrat	8	2	0	0	Sporadic Cases	0

Turks and Caicos Islands	8	0	1	0	Sporadic Cases	1
Saint Barthélemy	6	0	0	0	Sporadic Cases	9
Falkland Islands (Malvinas)	5	3	0	0	Sporadic Cases	0
Anguilla	3	0	0	0	Sporadic Cases	5
British Virgin Islands	3	0	0	0	Sporadic Cases	8
Bonaire, Sint Eustatius and Saba	2	0	0	0	Sporadic Cases	5
Saint Pierre and Miquelon	1	0	0	0	Sporadic Cases	1
African Region						
South Africa	1845	96	18	5	Community Transmission	0
Algeria	1572	104	205	11	Community Transmission	0
Cameroon	730	175	10	1	Cluster of cases	0
Burkina Faso	384	20	19	1	Cluster of cases	0
Côte d'Ivoire	384	35	3	0	Cluster of cases	0
Niger	342	64	11	0	Cluster of cases	0
Ghana	313	26	6	1	Cluster of cases	0
Nigeria	276	22	6	0	Cluster of cases	0
Mauritius	273	5	7	0	Cluster of cases	0
Senegal	244	7	2	0	Cluster of cases	0
Democratic Republic of the Congo	207	24	20	0	Cluster of cases	0
Kenya	179	7	6	0	Cluster of cases	0
Guinea	164	20	0	0	Cluster of cases	0
Rwanda	110	5	0	0	Sporadic	0

					Cases	
Madagascar	93	1	0	0	Cluster of cases	0
Togo	70	12	3	0	Sporadic Cases	0
Congo	60	15	5	0	Cluster of cases	0
Mali	56	9	6	1	Sporadic Cases	0
Ethiopia	55	3	2	1	Sporadic Cases	0
Uganda	53	1	0	0	Sporadic Cases	0
Zambia	39	0	1	0	Sporadic Cases	6
Eritrea	33	2	0	0	Sporadic Cases	0
Guinea-Bissau	33	0	0	0	Sporadic Cases	2
Liberia	31	17	4	1	Sporadic Cases	0
Benin	26	0	1	0	Sporadic Cases	1
United Republic of Tanzania	25	1	1	0	Sporadic Cases	0
Gabon	24	0	1	0	Sporadic Cases	1
Angola	19	2	2	0	Sporadic Cases	0
Mozambique	17	7	0	0	Sporadic Cases	0
Equatorial Guinea	16	0	0	0	Sporadic Cases	4
Namibia	16	0	0	0	Sporadic Cases	3
Eswatini	12	2	0	0	Sporadic Cases	0
Seychelles	11	0	0	0	Sporadic Cases	2
Zimbabwe	11	0	3	1	Sporadic Cases	1
Central African Republic	10	1	0	0	Sporadic Cases	0
Chad	10	0	0	0	Sporadic Cases	1

Malawi	8	0	1	0	Sporadic Cases	1
Cabo Verde	7	0	1	0	Sporadic Cases	2
Sierra Leone	7	1	0	0	Sporadic Cases	0
Botswana	6	0	1	0	Sporadic Cases	2
Mauritania	6	0	1	0	Sporadic Cases	5
Gambia	4	0	1	0	Sporadic Cases	6
Sao Tome and Príncipe	4	0	0	0	Pending	2
Burundi	3	0	0	0	Sporadic Cases	5
South Sudan	1	0	0	0	Pending	3
Territories**						
Réunion	362	4	0	0	Cluster of cases	0
Mayotte	186	2	2	0	Cluster of cases	0
Subtotal for all Regions	1435486	82837	85511	6287		
International conveyance (Diamond Princess)	712	0	11	0		24
Grand total	1436198	82837	85522	6287		

Current Scenario In India

Cases of COVID-19 in countries outside China were reported in those with no history of travel to China suggesting that local human-to-human transmission was occurring in these countries [9]. In India, 6638 cases have been reported till 9th April 2020 [10]. Among total the cases, Maharashtra and Tamil Nadu are being reported as the highly effected area with 1346 and 834 cases as we can see in Table 2.

Table II: States in India with reported laboratory-confirmed COVID-19 cases and deaths. Data as of 9th April 2020 obtained from INDIA COVID-19 TRACKER.

COMPILED FROM STATE GOVT. NUMBERS

STATE/UT	CONFIRMED	ACTIVE	RECOVERED	DECEASED
MAHARASHTRA	1346	1148	117	81
TAMIL NADU	834	799	27	8
DELHI	720	683	25	12
TELANGANA	471	415	45	11
RAJASTHAN	430	382	45	3
UTTAR PRADESH	410	375	31	4
MADHYA PRADESH	397	346	25	26
KERALA	357	258	97	2
ANDHRA PRADESH	348	339	6	3
GUJARAT	262	219	26	17
KARNATAKA	197	161	30	16
JAMMU AND KASHMIR	184	174	6	14
HARYANA	170	136	32	2
PUNJAB	130	102	18	10
WEST BENGAL	103	82	16	5
BIHAR	51	35	15	1
ODISHA	44	41	2	1
UTTARAKHAND	35	30	5	-
ASSAM	29	29	-	-
HIMACHAL PRADESH	28	24	2	2
CHANDIGARH	18	11	7	-
CHHATTISGARH	18	9	9	-
LADAKH	14	4	10	-
JHARKHAND	13	12	-	11
ANDAMAN AND NICOBAR ISLANDS	11	11	-	-
GOA	7	7	-	-
PUDUCHERRY	5	4	1	-
MANIPUR	2	1	1	-
ARUNACHAL PRADESH	1	1	-	-
DADRA AND NAGAR HAVELI	1	1	-	-
MIZORAM	1	1	-	-

STATE/UT	CONFIRMED	ACTIVE	RECOVERED	DECEASED
TRIPURA	1	1	-	-
TOTAL	6638	5841	598	199

Symptoms And Diagnosis

This virus that causes COVID-19 can infect people of all ages. However, evidence to date suggests that two groups of people are at a higher risk of getting severe COVID-19 disease as reported by WHO. Older people (that is people over 60 years old); and those with underlying medical conditions (such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer) are more susceptible to this virus. The risk of severe disease gradually increases with age starting from around 40 years. It's important that adults in this age range protect themselves and in turn protect others that may be more vulnerable. The COVID-19 symptoms have reportedly ranged from mild to severe that can ultimately lead to death. The symptoms usually appear 2-14 days after viral exposure which includes fever, cough, shortness of breath and pneumonia. The severe cases showed respiratory, hepatic, gastrointestinal and neurological complications that can leads to mortality. The transmission of COVID-19 is reported to be human-to-human transmission via., respiratory droplets or direct contact with the infected patients [2-5,11-15]. Patients can be infectious for as long as the symptoms last. The virus can remain viable on surfaces for days in favorable atmospheric conditions but are destroyed in less than a minute by common disinfectants like sodium hypochlorite, hydrogen peroxide etc [12]. Infection is acquired either by inhalation of these droplets or touching surfaces contaminated by them and then touching the nose, mouth and eyes. The virus is also present in the stool and contamination of the water supply and subsequent transmission *via* aerosolization/ feco oral route is also hypothesized [6].

For prompt diagnosis of SARS-CoV-2, molecular tools are widely preferred [6,16-20]. In severely infected patients, Computed Tomography technique (CT) and X-Ray can be of help to observe the lesions of pulmonary pneumonia in the lungs in correlation with clinical symptoms to depict the picture of COVID-19 [21]. Most popularly, real-time RT-PCR (rRT-qPCR) is performed over respiratory secretions so that within a short period, viral RNA can be detected [22]. Commercial tests are also not available at present. In a suspect case in India, the appropriate sample must be sent to designated reference labs in India or the National Institute of

Virology in Pune. As the epidemic progresses, commercial tests will become available. The rate at which people are getting effected researchers have also developed a reverse transcriptional loop-mediated isothermal amplification (RT-LAMP) diagnostic technique for rapid and colorimetric detection. This isothermal LAMP based method for COVID-19 detection is referred to as iLACO. In this technique, a fragment of the ORF1ab gene was amplified by using six primers, and phenol red are used as a pH indicator when amplification takes place color changes from pink to light yellow. At the same time, in negative cases, it remains pink [23].

Prevention

As currently there are no such specific treatments for this infection, prevention is the only way to be safe. Several properties of this virus make prevention difficult namely, non-specific features of the disease, the infectivity even before onset of symptoms in the incubation period, transmission from asymptomatic people, long incubation period, tropism for mucosal surfaces such as the conjunctiva, prolonged duration of the illness and transmission even after clinical recovery. Isolation of confirmed or suspected cases to be at home is recommended with proper ventilation. Patients should be asked to wear a simple surgical mask and practice cough hygiene. Caretakers should be asked to wear a surgical mask when in the same room as patient and use hand hygiene every 15–20 min.

Key advice for older adults and people with pre-existing conditions by WHO [6]: When you have visitors to your home, exchange “1 metre greetings”, like a wave, nod, or bow. Ask visitors and those you live with to wash their hands. Regularly clean and disinfect surfaces in your home, especially areas that people touch a lot. If someone you live with isn’t feeling well (especially with possible COVID-19 symptoms), limit your shared spaces. If you become ill with symptoms of COVID-19, contact your healthcare provider by telephone before visiting your healthcare facility. Plan in preparation for an outbreak of COVID-19 in your community. When you go out in public, follow the same preventative guidelines as you would at home. Stay up to date using information from reliable sources.

Therapeutic Intervention

As infected individuals are hospitalized, human patients should immediately be given symptomatic and supportive treatment as per severity of symptoms [24,25]. Neither an effective vaccines nor anti-viral therapeutic agents have been approved to treat COVID-19 or any other human CoV infection till date. The first step is to ensure adequate isolation to prevent transmission to other contacts, patients and healthcare workers as well as mild illness should be managed at home with proper counseling. The usual principles are maintaining hydration and nutrition and controlling fever keeping your immune system strong. Therapy may be comprised of supplementary oxygen or High-Flow Nasal Cannula (HFNC) oxygen therapy through nasal route to reduce breathing stress if needed methylprednisolone intravenously to correct hypoxemia and in extreme cases adrenaline by Intravenous Route (IV), any repurposed drug such as lopinavir plus ritonavir as anti-viral drug by oral way, moxifloxacin or any antibiotic to prevent secondary bacterial infection by IM/IV route [21,24]. Passive antibody therapy can be considered to limit COVID-19 epidemics. Passive immunization of antibody that can recognize epitopic regions in the foreign virus particle can reduce virus replication and disease severity. Antibodies for passive immunotherapy can be isolated from the blood of the infected patients or it can be manufactured in the laboratory [26]. Immunotherapy can be done by transferring the convalescent sera to infected patients may be effective in humans in neutralizing the virus and prevent further infection. The use of monoclonal antibodies is a new era in infectious disease prevention which overcomes many drawbacks associated with serum therapy and intravenous immunoglobulins preparations in terms of specificity, purity, low risk of blood-borne pathogen contamination and safety. Many monoclonal antibodies against viruses are developed in recent years and some are in clinical pipeline [27-29].

Recent Developments

The US Food and Drug Administration (FDA) approved limited emergency use for chloroquine and hydroxychloroquine as a treatment for COVID-19. The President of the United States, Donald Trump, had announced on 19 March that chloroquine and hydroxychloroquine/Plaquenil, used to treat malaria and arthritis, were approved by the FDA to be tested as a treatment for COVID-19. Chloroquine is being tested in various clinical trials conducted by government

agencies and academic institutions. Other antiviral drugs are also planned to be fast-tracked for testing for coronavirus. The National Medical Products Administration of China has approved the use of Favilavir, an anti-viral drug, as a treatment for coronavirus. The drug has reportedly shown efficacy in treating the disease with minimal side effects in a clinical trial involving 70 patients. The clinical trial is being conducted in Shenzhen, Guangdong province. Entos Pharmaceuticals is developing Fusogenix DNA vaccine developed using the Fusogenix drug delivery platform to prevent COVID-19 infections. Fusogenix drug delivery platform is a proteo-lipid vehicle that introduces genetic payload directly into the cells. The University of Oxford's ChAdOx1 nCoV-19 is an adenovirus vaccine vector developed by the university's Jenner Institute. The university is testing the vaccine in a clinical trial planned to be conducted in the Thames Valley Region. Approximately 510 volunteers aged between 18 years and 55 years will be enrolled for the study. Abbvie's HIV protease inhibitor, lopinavir is being studied along with ritonavir for the treatment of MERS and SARS coronaviruses. The repurposed drug is already approved for the treatment of HIV infection under the trade name Kaletra®. Apart from this many pharmaceuticals industry are totally engaged in finding out effective for COVID 19.

FUNDING: None

CONFLICTS OF INTEREST/COMPETING INTERESTS: None

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