

# Dealing with “Coronavirus Pandemic”: A Dental Outlook

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## ABSTRACT

An emergent pneumonia outbreak, denoted as coronavirus disease-2019 (COVID-19) by the World Health Organization (WHO) originated in Wuhan City, in late December 2019 and spread at an alarming rate to become a pandemic affecting more than 200 countries. The COVID-19 is caused by a novel coronavirus (2019-nCoV), which is highly contagious and is associated with a high mortality rate. The current COVID-19 outbreak has created a major havoc among every strata of the society with a detrimental impact on healthcare professionals, including dentists limiting their capabilities at large. The transmission of virus through aerosols produced by high- and low-speed handpieces, ultrasonic scalers, air/water syringes, or an infected patient coughing, and even when taking intraoral radiographs has made it difficult for dental personnel to provide even the most basic services to the needful. The virus survives on environmental surfaces for extended periods of time, including metal and plastic surfaces commonly found in dental offices making it utmost necessary to follow the precautions and recommendations issued by various organizations in order to contain its spread. This article aims to provide the latest knowledge encompassing the various aspects of COVID-19 to pediatric dentists in India.

**Keywords:** Coronavirus disease 2019, Pandemic, Pediatric dentistry.

*International Journal of Clinical Pediatric Dentistry* (2020): 10.5005/jp-journals-10005-1757

## INTRODUCTION

The human body is prone to a plethora of infections caused by various microorganisms, which damage the tissues by different mechanisms.<sup>1</sup> These infectious agents can be broadly classified into viruses, bacteria, fungi, protozoa, and helminths.<sup>1</sup> Amongst these five groups, viruses hold special significance due to their ability to manipulate the host-cell machinery in a unique manner and evolve continuously to thrive and survive in all species.<sup>1</sup>

Nearing by the end of 2019, a group of pneumonia cases occurred in Wuhan, a city in the Hubei Province of China with the causative agent being identified as a novel coronavirus. It spread at a rapid pace in China culminating into an epidemic with widespread involvement of other countries across the globe. The World Health Organization (WHO) declared the outbreak as a ‘Public Health Emergency of International Concern’ on 30 January, 2020, and subsequently designated the disease as ‘COVID-19’, which stands for coronavirus disease 2019.<sup>2</sup> The number of COVID-19 cases in areas other than China increased multifold and the global burden of the disease rose to an alarming 118,000 cases in 114 countries with a loss of 4,291 lives. This led WHO to ultimately declare COVID-19 as a pandemic on 11 March, 2020.<sup>3</sup> The cases are still increasing at an alarming rate involving a total of 209 countries with 1,136,851 confirmed cases and 62,955 reported deaths till 6 April, 2020.<sup>4</sup> It is also designated as 2019 novel coronavirus acute respiratory disease or novel coronavirus pneumonia.

This is the first ever pandemic to be initiated by a coronavirus and a situation of this gravitas has not been experienced by the world post the Second World War (WW II: 1939–1945). The Second World War with nearly 85 million casualties including more than 30 countries was undoubtedly the most dangerous event in human history. At that time, all the countries diligently utilized their entire scientific and economic capabilities in order to strengthen their position on the war front.<sup>5</sup>

Mirroring this to the present scenario, all the countries must diagnose, isolate, provide treatment, locate, and mobilize the people to the maximum extent. This approach can prevent the

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**How to cite this article:** Goswami M, Sharma S, Kumar G, *et al.* Dealing with “Coronavirus Pandemic”: A Dental Outlook. *Int J Clin Pediatr Dent* 2020;13(3):269–278.

**Source of support:** Nil

**Conflict of interest:** None

conversion of a few cases into clusters and further limit the spread via community transmission. Even countries with widespread involvement can turn the tide on this virus by coming together as one unit and effectively screening, isolating, and tracing all the possible cases.<sup>3</sup>

Major events have been canceled, rescheduled, or modified to curb the transmission of this deadly disease. The Grand Slam tennis tournament at Wimbledon scheduled for 29 June–12 July, 2020 has been canceled for the first time since World War II on 1 April, 2020. The tournament has been rescheduled between 28 June and 11 July, 2021. Another mega event, such as, the 2020 Summer Olympics to be held in Tokyo has been postponed until 23 July–8 August, 2021. The European Soccer Championships have been postponed to 2021 by the Union of European Football Associations. Champions League, Premier League, and the Europa League have all suspended games until further notice. On 9 March, 2020, Federation Internationale de Football Association (FIFA) and Asian Football Confederation (AFC) announced that 2022 FIFA World Cup qualification matches due to take place in March and June, 2020, were postponed due to the COVID-19 pandemic.

Pandemic as a word should be used cautiously and the intensity of using this word must be understood carefully. An inappropriate use of this word can either lead to undue fear or create a false

impression of the fight being over.<sup>3</sup> Also, delineation of a situation as a pandemic should not alter the course of estimation of its danger and should strengthen the efforts to control the disease. The WHO propagates that in order to contain the spread and minimize the impact, every country must adopt a comprehensive approach involving both the governing bodies and the societies at large.<sup>3</sup>

### 2019 Novel Coronavirus (2019-nCoV)

Viruses are miniature organisms which can multiply only inside a living cell. They contain nucleic acid, such as, RNA or DNA surrounded by a protein shell. Viruses are generally classified by the organisms they infect including animals, plants, or bacteria.<sup>1</sup>

Coronaviruses are single-stranded RNA viruses surrounded by an envelope, belonging to the family Coronaviridae.<sup>6</sup> They mostly affect mammals including humans and birds.<sup>6</sup> They possess unique crown-like projections on their surface which correspond to large spike proteins as seen on electron microscopy. Coronaviruses have been classified into three groups based on serology and genetic characteristics with the Human Coronaviruses (HCoVs) belonging to Groups 1 and 2.<sup>1</sup> In humans, coronaviruses are implicated for causing common cold as well as more severe respiratory infections including both severe acute respiratory syndrome (SARS) and middle east respiratory syndrome (MERS).<sup>7</sup>

The World Health Organization (WHO) has classified 2019 novel coronavirus (2019-nCoV) as a beta-Coronavirus ( $\beta$  CoV) of group 2B belonging to subfamily Orthocoronavirinae.<sup>8</sup> The genetic attributes of the 2019-nCoV are highly identical to SARS-CoV and MERS-CoV with their source of origin being bats.<sup>8</sup>

Another piece of evidence, which supports that 2019-nCoV is of bat origin, is the existence of a high degree of homology of the angiotensin converting enzyme-2 (ACE-2) receptor amongst different species of animals causing them to either act as intermediate hosts or be utilized for research-oriented studies for 2019-nCoV infections.<sup>9</sup>

The epithelial cells of lungs have been hypothesized as the primary targets of 2019-nCoV. The first step of infection with the virus involves binding with a host-cell receptor and subsequent union with the host-cell membrane.<sup>9</sup> Thus, there is a strong evidence, which points toward human-to-human transmission of 2019-nCoV *via* binding between viral surface spike proteins and host ACE-2 receptor.<sup>9</sup>

In Wuhan City, the wet animal markets being a source of live animals were largely implicated for a high number of positive cases, strongly pointing at the zoonotic origin of 2019-nCoV.<sup>10</sup> Efforts were made to identify the reservoir host transmitting the infection to humans with preliminary evidence suggesting two species of snakes as possible reservoirs of 2019-nCoV.<sup>10</sup> However, there is still a lack of concrete data, which identifies any coronavirus reservoir other than birds and mammals.<sup>10</sup> The high degree of genetic similarity between 2019-nCoV and two SARS-like coronaviruses indicates mammals as the mode of transmission of 2019-nCoV to humans. The cause of spread of 2019-nCoV infection has been identified as person-to-person transmission.<sup>8,10</sup> The basis of this observation lies with the fact that a large number of cases were identified among those families who had never visited Wuhan's wet animal markets. Direct contact with an infected individual and spread of infection *via* droplets either by sneezing or coughing are the two most important modes of person-to-person transmission.<sup>10</sup> Also, no definitive vaccine is yet available against the virus with trials underway for the same.

## WORLDWIDE EPIDEMIOLOGY OF COVID-19

Coronavirus disease-2019 (COVID-19) was first seen in Wuhan, China, in the end of 2019 and spread at an alarming speed to involve a large number of countries, culminating into a deadly pandemic. In December 2019, a group of pneumonia cases of unknown cause was linked to a local seafood market in Wuhan. Following this, a total of five patients with acute respiratory distress syndrome were hospitalized from 18 December, 2019 to 29 December, 2019 with one reported fatality. As of 6 April, 2020, a total of 1,136,851 cases of COVID-19 have been reported in 209 countries and territories, resulting in nearly 62,955 deaths. More than 264,843 people have recovered.<sup>11</sup>

The large variations in number of these cases are dependent upon their region of origin, time since initial outbreak, degree to which diagnostic tests are being conducted, healthcare infrastructure and services, treatment facilities, and various other population parameters. Amongst the six WHO regions including the Western Pacific, European, South-east Asia, Eastern Mediterranean Region, Region of the Americas and African Region, local transmission has been reported in several countries.<sup>12</sup>

In Western Pacific region, China reported highest number of cases (81,589) followed by South Korea (9,976), Australia (5,136), Malaysia (2,766), and Japan (2,178). In European region, Italy had highest cases (110,574) followed by Spain (104,118), Germany (78,027), France (56,325), UK (29,474), and Switzerland (17,785). Iran had reported 47,593 cases followed by Pakistan (2,291) and Saudi Arabia (1,563) in Eastern Mediterranean Region. USA reported the highest cases (216,362) among the region of Americas followed by Canada (9,731), Brazil (6,836), and Chile. In African region, South Africa reported 1,380 cases followed by Algeria. In South-east Asia, Indonesia reported 2,291 cases followed by India (2,094), Thailand (1,771), Sri Lanka (143), Bangladesh (54), and Maldives (18).<sup>13</sup>

In India, first case was reported on 30 January, 2020 in Kerala. As of 2 April, 2020, there were approximately 2,094 cases among which 150 recovered with 50 casualties. Maharashtra had reported the highest number of cases (325) followed by Kerala (265), Tamil Nadu (234), Delhi (219), and Uttar Pradesh (121).<sup>14</sup>

The total number of confirmed COVID-19 cases, deaths, and summary of cases among different countries till 6th of April, 2020 can be summarized as depicted in Tables 1 to 3, respectively. The increase in confirmed COVID-19 cases and deaths among different countries till 6 April, 2020, has been depicted in Figures 1 and 2, respectively.

### Impact of COVID-19 among Dentists and Pediatric Dentists

The current COVID-19 outbreak has created a major havoc amongst healthcare professionals, including dentists. Since dental professionals perform procedures which create aerosols and are in direct contact with saliva and blood, the exposure risk is high among dentists. As a result, the entire dental team is highly vulnerable, facing a high possibility of direct exposure to the virus, which also implies a major negative psychological impact.

Due to this emergent outbreak and difficulty in screening the patient for COVID-19, dentists are mostly uncertain of encountering a positive patient. Seasonal flu is common among children, and with the changing weather conditions, cold and cough have become extremely prevalent. These may present with overlapping signs and symptoms of COVID-19, complicating

**Table 1:** Total number of confirmed COVID-19 cases in different countries with effect from 31 December, 2019, to 6 April, 2020

<i>Date</i>	<i>Spain</i>	<i>Italy</i>	<i>USA</i>	<i>Germany</i>	<i>France</i>	<i>Pakistan</i>	<i>India</i>	<i>China</i>
31 December, 2019	2				11		2	27
3 January								27
4 January								44
5 January								44
6 January								59
7 January								
8 January								
9 January								
10 January								
11 January								
12 January								
13 January								
14 January								
15 January								
16 January								
17 January								
18 January								59
19 January								136
20 January								213
21 January								362
22 January								933
23 January								1,192
24 January								1,636
25 January								2,324
26 January								3,093
27 January								4,864
28 January								6,323
29 January								8,060
30 January								9,519
31 January								11,256
1 February								13,237
2 February								15,336
3 February								17,925
4 February								20,750
5 February								23,983
6 February								27,869
7 February								31,563
8 February								34,706
9 February								40,171
10 February								48,315
11 February								55,220
12 February	2				11		2	58,761
13 February								63,851
14 February								66,492
15 February								68,500
16 February								70,548
17 February								72,436
18 February								74,185
19 February								75,002
20 February								75,891

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Date	Spain	Italy	USA	Germany	France	Pakistan	India	China
21 February								76,288
22 February		79	14					76,936
23 February		150	14					77,150
24 February		227	14	16				77,658
25 February	3	320	14	18	14			78,064
26 February	7	445	15	21	18	2		78,497
27 February	16	650	15	26	34			78,824
28 February	31	888	19	53	48			79,251
29 February		1,128	24	66	65	4		79,824
1 March		1,694	42	117	123		3	80,026
2 March		2,036	57	150	203		5	80,151
3 March	114	2,234	85	188	212	5	6	80,270
4 March	197	2,502	111	240	290		28	80,409
5 March	237	3,089	175	349	422	6	30	80,552
6 March	365	3,858	252	534	612		31	80,651
7 March		4,636	353	684	999		34	80,695
8 March		5,883	497	847	1,230	7	39	80,735
9 March	1,204	7,375	645	1,112	1,449	16	44	80,754
10 March	1,634	9,172	936	1,460	1,783	19	50	80,778
11 March	2,140	10,149	1,205	1,884	2,280	20	60	80,793
12 March	2,965	12,462	1,598	2,369	2,875	21	73	80,813
13 March	4,231	15,113	2,163	3,062	3,660	28	81	80,824
14 March	5,753	17,660	2,825	3,795	4,498	31	97	80,844
15 March	7,753	21,157	3,501	4,838	5,420	53	107	80,860
16 March	9,191	24,747	4,373	6,012	6,632	187	118	80,881
17 March	11,178	27,980	5,664	7,156	7,729	241	137	80,894
18 March	13,716	31,506	8,074	8,198	9,133	302	151	80,928
19 March	17,147	35,713	12,022	10,999	10,994	461	173	80,967
20 March	19,980	41,035	17,439	13,957	12,608	495	223	81,008
21 March	24,926	47,021	23,710	16,662	14,458	646	283	81,054
22 March	28,572	53,578	32,341	18,610	16,685	784	360	81,093
23 March	33,089	59,138	42,751	22,672	19,852	887	434	81,171
24 March	39,673	63,927	52,690	27,436	22,298	991	519	81,218
25 March	47,610	69,176	64,916	31,554	25,227	1,057	606	81,285
26 March	56,188	74,386	81,966	36,508	29,149	1,197	694	81,340
27 March	64,059	80,539	101,012	42,288	32,958	1,408	834	81,394
28 March	72,248	86,498	121,105	48,582	37,569	1,526	918	81,439
29 March	78,797	92,472	140,223	52,547	40,168	1,625	1,024	81,470
30 March	85,195	97,689	160,686	57,298	44,544	1,865	1,251	81,518
31 March	94,417	101,739	178,082	61,913	52,122	2,039	1,397	81,554
1 April	102,136	105,792	186,101	67,366	56,983	2,291	1,834	81,589
2 April	110,238	110,574	212,814	73,522	59,099	2,450	2,069	81,620
3 April	117,710	115,242	241,626	79,696	82,159	2,640	2,547	81,639
4 April	124,736	119,827	273,808	85,778	89,947	2,818	3,072	81,669
5 April	130,759	124,632	307,876	91,714	92,833	3,059	3,577	81,708
6 April	135,032	128,948	333,593	95,391	96,745	3,277	4,067	81,740

the process of arriving at a definitive diagnosis. Pedodontics experience that children in pediatric dental practice are unable to express their symptoms in general. Hence, during this time of crisis of COVID-19, many symptoms may overlap and correlate with other viral illnesses creating diagnostic confusion. This creates a

fear of exposure among pediatric dentists while performing the treatment.

In the wake of COVID-19 outbreak, various organizations, such as, American Dental Association (ADA)<sup>15</sup> and the American Dental Hygienists' Association (ADHA)<sup>16</sup> have recommended postponing

**Table 2:** Total number of deaths due to COVID-19 in different countries with effect from 18 January, 2020, to 6 April, 2020

<i>Date</i>	<i>Deaths in Spain</i>	<i>Deaths in Italy</i>	<i>Deaths in USA</i>	<i>Deaths in France</i>	<i>Deaths in Germany</i>	<i>Deaths in Pakistan</i>	<i>Deaths in India</i>	<i>Deaths in China</i>
18 January								1
21 January								4
22 January								21
23 January								29
24 January								45
25 January								60
26 January								84
27 January								110
28 January								136
29 January								174
30 January								217
31 January								263
1 February								308
2 February								365
3 February								429
4 February								494
5 February								567
6 February								641
7 February								726
8 February								815
9 February								912
10 February								1,020
11 February								1,117
12 February								1,263
13 February								1,384
14 February								1,481
15 February								1,527
16 February								1,669
17 February								1,774
18 February								1,872
19 February								2,008
20 February								2,122
21 February		1						2,240
22 February		2						2,349
23 February		3						2,447
24 February		7						2,596
25 February		10		1				2,667
26 February		12		1				2,719
27 February		17		1				2,748
28 February		21		1				2,792
29 February		29	1	1				2,839
1 March		34	2	2				2,874
2 March		52	6	2				2,916
3 March		79	9	4				2,947
4 March	1	107	11	4				2,985
5 March	3	148	11	7				3,016
6 March	5	197	14	9				3,046
7 March		233	19	16				3,074
8 March		366	21	21				3,101
9 March	28	463	26	25	2			3,123

Contd...

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Date	Deaths in Spain	Deaths in Italy	Deaths in USA	Deaths in France	Deaths in Germany	Deaths in Pakistan	Deaths in India	Deaths in China
10 March	36	631	31	33	2			3,140
11 March	48	827	37	48	3			3,162
12 March	84	1,016	41	61	5		1	3,173
13 March	121	1,266	49	79	8		1	3,180
14 March	136	1,441	56	91	8		2	3,193
15 March	288	1,809	62	127	12		2	3,203
16 March	309	2,158	76	148	12		2	3,217
17 March	491	2,503	97	175	12		3	3,230
18 March	598	2,978	123	244	12	2	3	3,241
19 March	767	3,405	175	372	20	2	4	3,249
20 March	1,002	4,032	230	450	31	3	4	3,252
21 March	1,326	4,825	298	562	47	3	4	3,259
22 March	1,720	5,475	408	674	55	5	7	3,265
23 March	2,182	6,077	519	860	86	6	9	3,274
24 March	2,696	6,820	681	1,100	114	7	9	3,281
25 March	3,434	7,503	906	1,331	149	8	12	3,288
26 March	4,089	8,215	1,159	1,696	198	9	16	3,292
27 March	4,858	9,134	1,592	1,995	253	11	18	3,298
28 March	5,690	10,023	2,039	2,314	325	13	20	3,303
29 March	6,528	10,779	2,431	2,606	389	18	27	3,306
30 March	7,340	11,591	2,985	3,024	455	25	32	3,311
31 March	8,189	12,428	3,806	3,523	583	26	35	3,315
1 April	9,053	13,155	4,746	4,032	732	31	41	3,316
2 April	10,003	13,915	5,821	5,387	872	35	53	3,323
3 April	10,935	14,681	7,007	6,507	1,017	36	62	3,329
4 April	11,744	15,362	8,359	7,560	1,158	41	75	3,331
5 April	12,418	15,887	9,534	8,078	1,342	45	83	3,333
6 April	13,055	16,523	9,620	8,078	1,434	50	109	3,333

**Table 3:** Summary of COVID-19 cases among different countries till 6 April, 2020

Location	Confirmed	Recovered	Deaths
Worldwide	1,136,851	264,843	62,955
India	4,067	337	109
Pakistan	3,277	257	50
United States	3,33,593	17,977	9,620
Italy	1,28,948	21,815	15,887
Spain	1,31,646	38,080	12,641
Germany	95,391	11,722	1,434
France	92,839	16,183	8,078
China	81,708	77,078	3,331

all elective dental procedures and provision of noncritical dental care. The Centers for Medicare and Medicaid Services (CMS)<sup>17</sup> recommend that all nonessential dental examinations and procedures must be postponed until further notice. Since the announcement of a total lockdown in India on 25 March, 2020, a vast number of private and government dental colleges and hospitals along with private clinics have been completely shut so as to prevent the exposure. The Indian Dental Association (IDA) has recommended that all the private dental clinics must

not perform any type of nonemergency dental care.<sup>18</sup> The Indian Society of Pedodontics and Preventive Dentistry (ISPPD) also issued an advisory for oral health professionals and pediatric dentists including C (clean, cover, and confine), O (observe, online, or telephonic consultation as possible), R (restrict to emergency treatment only and all elective treatment to be postponed as far as possible), O (obey), N (no aerosol), and A (avoid).<sup>19</sup>

The declarations issued by these various organizations prove the threatening nature of the current situation for dental professionals. With the closure of various private dental clinics, provision of essential services has become difficult with the dentists incurring economic losses of varying magnitudes. Despite these guidelines, hospitals, such as, Maulana Azad Institute of Dental Sciences, (MAIDS) New Delhi, Centre for Dental Education and Research (CDER) AIIMS, New Delhi, and Dental Department at Ram Manohar Lohia Hospital, New Delhi along with various other hospitals across the country, still continue to provide emergency dental services to the needful. Even in grave circumstances, such as, today, a patient reporting with a dental emergency is being effectively treated by dental professionals at such hospitals.

The COVID-19 pandemic has continued to unfold dramatically all over the world, bringing us to the current state of an International emergency. The cases have seen an exponential rise and so has

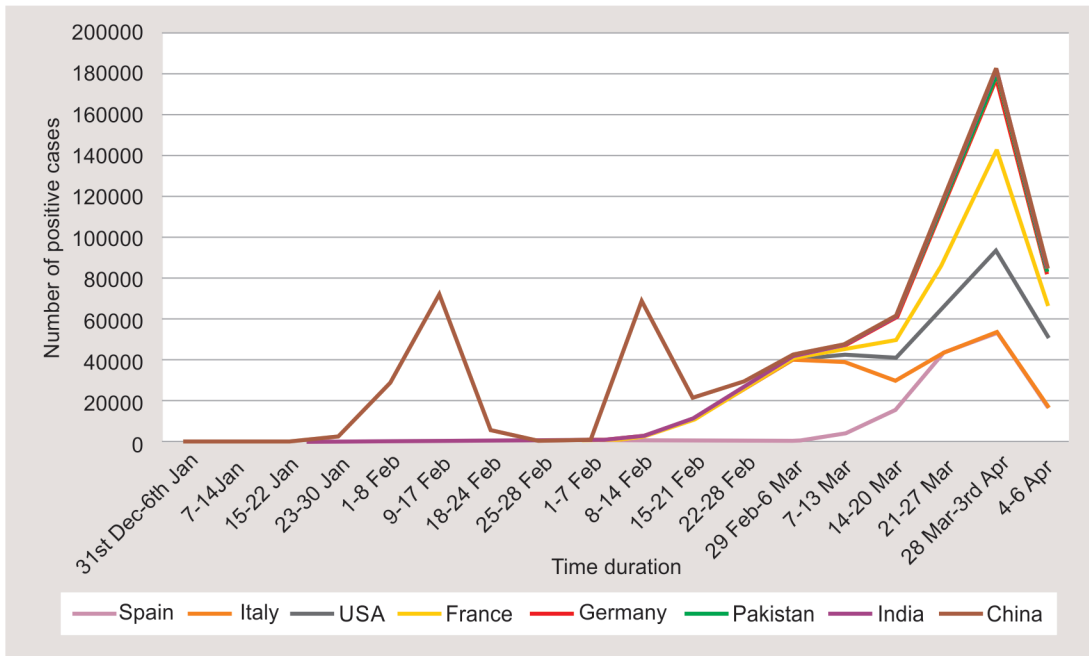


Fig. 1: Graph depicting the increase in number of confirmed COVID-19 cases in different countries with effect from 31 December, 2019, to 6 April, 2020

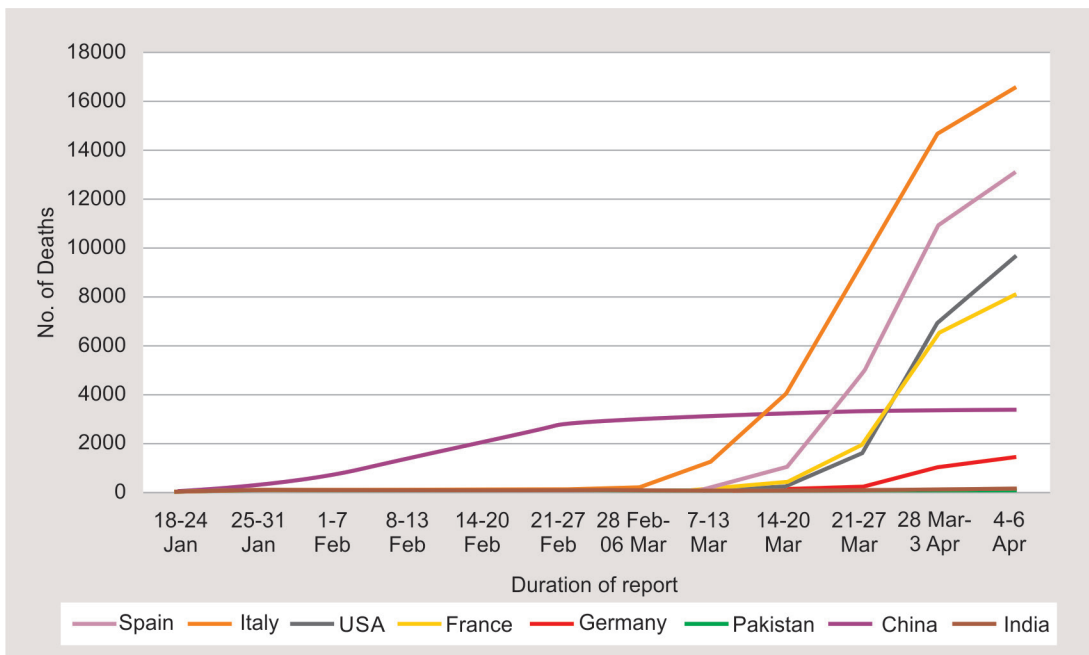


Fig. 2: Graph depicting the increase in number of deaths due to COVID-19 in different countries with effect from 18 January, 2020, to 6 April, 2020

the panic. It has affected us in numerous ways. The current state of an international emergency has shown great impact on various international societies like ADA, American Academy of Pediatric Dentistry (AAPD), International Association of Pediatric Dentistry (IAPD), European Academy of Pediatric Dentistry (EAPD), ISPPD, and South Asian Association of Pediatric Dentistry (SAAPD), etc. They have been continuously trying to reinforce the precautionary guidelines for all, time and again. To ensure everyone’s safety and following the restrictions laid on travel and large gatherings, the scheduled international conferences have also been postponed. The dental practices have been limited to emergency services only

and our entire dental fraternity has been challenged academically, professionally, and financially. To cope up with academic loss, continuous efforts are being made to provide high-quality educational content. Social platforms are being used to conduct webinars in an effort to connect people all around the world with the experts, in various interactive learning sessions. Surveys are being conducted to evaluate the stress and future implications of this pandemic on dental professionals in order to seek solutions to deal with it on a wide spectrum. Efforts are being made by various dental organizations and societies to not connect ‘physically’ but ‘digitally’.

The current situation has created a severe negative psychological impact among dental professionals. Though all precautionary measures are taken and no procedure is performed without the use of personal protective equipment (PPE), the risk of being exposed and carrying the infection to home is still a major concern. Also, the limited availability of PPEs is becoming a matter of great concern among health professionals largely restricting their capabilities for providing emergent health services.

Though the responsibilities are major and expectations are high, dental professionals are at the forefront to provide with whatever best they can!

### Risk of infection in Dentist in COVID-19 Pandemic

The COVID-19 pandemic, caused by 2019 novel coronavirus, has caused a major disruption in the Indian healthcare system including both medical and dental facilities. The risk of infection is particularly high among the dental professionals due to a variety of reasons. The COVID-19 virus may spread through handpiece-generated aerosols, aerosols produced while using ultrasonic scalers, use of air/water syringes in different dental procedures, or via infected droplets through coughing and sneezing.<sup>20</sup> This virus has a high tendency to survive on exposed environmental surfaces, such as, those found in dental offices for extended periods of time.<sup>20</sup> Also, it has been seen that asymptomatic individuals infected with the virus may shed the virus via various body secretions, such as, saliva and transmit the disease.<sup>20</sup> The risk is even higher in pediatric dentistry as children may be asymptomatic but infectious posing a high risk not only to the dentist but also to the parents or guardians accompanying the patient.<sup>20</sup>

Due to the impending danger of spreading the infection, various dental organizations, such as, American Dental Association (ADA), American Dental Hygienists' Association (ADHA), Indian Dental Association (IDA), Indian Society of Pedodontics and Preventive Dentistry (ISPPD), and many others have advised the dental professionals to undertake only essential and urgent dental procedures.<sup>15,16,18,19</sup>

### PRESENT SCENARIO

It is important that the dental professionals must carefully weigh the risk associated with provision of nonessential treatment and emergency care to the needful against the availability of personal protective equipment (PPE) for limiting the transmission of infection.

The ADA, ISPPD, Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration (OSHA) have proposed various measures and guidelines for the safety of both the patients and dental professionals.<sup>15,19–21</sup>

The following measures should be taken to minimize risk during dental treatment<sup>15,19–21</sup>:

- Dentists should follow appropriate hand hygiene practices and proper usage of personal protective equipment (PPE).
- While treating patients in close approximation to their respiratory system, usage of N95 masks, with proper sealing of areas around the nose and mouth, together with a full-face shield and goggles should be worn.
- Rinsing the oral cavity with 0.2% povidone-iodine prior to any dental procedure can cause significant reduction in salivary viral load.
- Use of disposable mouth mirror, syringes, and blood pressure cuff to prevent cross contamination.

- Take extraoral radiographs whenever possible; intraoral techniques may induce coughing.
- While taking intraoral radiographs, double barriers must be used for protection of sensors and to further limit the chances of cross infection.
- Use of hand instruments should be preferred over aerosol-generating procedures and high-speed suction facility must be available.
- Use of dental dam must be encouraged during various dental procedures in order to limit splashing of saliva. Also, covering the nose with rubber dam sheet can provide additional benefit to the patient.
- Dental treatment of patients with suspected or confirmed COVID-19 disease must be carried out in negative pressure treatment rooms or airborne infection isolation rooms.
- Proper disinfection of all the inanimate surfaces must be carried out daily by mopping with a linen/absorbable cloth soaked in 1% sodium hypochlorite and must maintain a dry environment.

### Role of a Dentist as a Healthcare Worker during the Present Scenario

During the active COVID-19 crisis and lockdown period:

- Creating awareness among people regarding the disease, transmission, and protective measures to be taken (Table 4).
- It is also essential to impart knowledge to them regarding the importance of social distancing.
- In this crucial time, it is mandatory to make the patients understand what is dental emergency and to realize the pros and cons of providing unnecessary exposure.
- Screening for patients with dental emergencies with a history of contact.
- Using teledentistry in order to limit the spread of infection.

**Table 4:** Simple measures to prevent spread of COVID-19

- Clean your hands often:
  - With soap and water for at least for 20 seconds.
  - With sanitizer having 60% alcohol.
- Avoid touching your eyes, nose, and mouth with unwashed hands.
- Avoid close contact with people who are sick.
  - Social distancing with other people due to asymptomatic cases (at least 6 feet).
- Cover your mouth and nose with a cloth face cover when around others.
  - Cover coughs and sneezes.
- Throw used tissues in the closed bin and immediately wash your hands.
- Clean and disinfect frequently touched surfaces daily by the following:
  - Diluting household bleach.
  - Alcohol solutions with at least 70% concentration.
  - Other common EPA-registered household disinfectants.

If surfaces are dirty, clean them: Use detergent or soap and water prior to disinfection.



## FUTURE SCENARIO

The cases of COVID-19 seem to be rising at an alarming rate across the world. If the conditions continue to deteriorate, the healthcare professionals will have to face the grave challenge of balancing the treatment needs with the available workforce. In such circumstances, dental professionals with their basic knowledge of human body and vast usage of aseptic techniques can prove to be highly indispensable to the healthcare workforce.

This will certainly provide an opportunity for the local hospitals facing the highest demand to utilize dentists' skills in the time of need.

Some of the ways dentists can provide their assistance may include:

- Primary screening of patients with history regarding symptoms of COVID-19.
- Recording the four primary vital signs, i.e., body temperature, blood pressure, heart rate, and respiratory rate.
- Performing diagnostic tests for COVID-19 detection.
- Triaging to determine the priority of treatment.
- Providing emergency dental care.
- Oxygen administration along with provision of essential vaccinations.
- Writing prescriptions.
- Provision of services including deep sedation or general anesthesia along with intubations by dental anesthesiologists.
- Donating spare PPE, N95, and surgical masks, face shields, gowns, gloves, and hand sanitizers to hospitals in order to meet the increased treatment demands.

In this way, the dental healthcare professionals can accomplish their role as healthcare workers and help in serving the nation.

### Future Implications of COVID-19 Outbreak

The anticipated difficulties in the future can be rationally divided into immediate implications, which would be observed after completion of lockdown period and before the availability of a therapeutic drug or vaccine, and extended implications may be seen after the availability of a therapeutic drug or vaccine and hence emerge over an extended period of time thereafter.<sup>22,23</sup>

#### Anticipated Immediate Implications

*Social front:* Even after India overcomes the disaster stage of the pandemic, the viral infection would still prevail and should not be overlooked. Hence, preventive measures and use of safety equipment would be necessary till a potential vaccine or therapeutic drug is made to overpower the COVID-19 virus. Measures at the public front would include the following:<sup>22,23</sup>

- Wearing masks in public places
- Social distancing
- Good Hygiene measures
- Continued screening for COVID-19 at all potential places involving airports, railway stations, hotels, and hospitals.
- Limited social gatherings/conferences
- Limited international travel
- Immediate consultation on appearance of symptoms and quarantining

### Healthcare Sector

The healthcare sector's active participation on following the current protocol for disease screening, evaluation, and treatment is necessary. Measures adopted:<sup>22,23</sup>

- Continued screening for COVID-19.
- Use of PPE while performing procedure.
- Addressing emergency and urgent care cases.
- Referral to a COVID-affiliated center for evaluation if patient is screened positive.

#### Extended Anticipated Implications Over Time

##### Role of the government

- Formulation of an immunization schedule including COVID-19 vaccine.
- Increasing availability of COVID-19 medicine.
- Reinforcing awareness regarding novel coronavirus infection.
- Authorized COVID-19 centers and isolation units in all tertiary hospitals.
- Increasing production and availability of personal protective equipment (PPE).
- Complete medical history taking and screening (if required) at airports/gatherings/religious places/shopping malls, etc.

*Public sector:* Adequate measures should be taken by the public as part of a daily routine to avoid infection by novel coronavirus in future:

- Good personal hygiene measures.
- Wear masks if one catches cold or cough.
- Consulting with doctors if symptoms of novel coronavirus infections occur.
- Social distancing from people with respiratory distress symptoms (cough, cold, and breathing difficulty).
- Avoiding close contact with people.
- Getting vaccinated for novel coronavirus.

##### Healthcare sector:

- Detailed past medical and traveling history should be taken from the patients with elaborated discussion on symptoms for the infection.
- Vaccination history regarding COVID-19 should be taken.
- Screened patients with signs of infection should be referred to an authorized COVID-19 center.
- Repeated awareness programs on novel coronavirus infection should be organized with recent updates.
- Adequate personal protection should be used while treating patients.
- Following infection control protocol guidelines strictly to avoid hospital-acquired novel coronavirus infection.

##### Impacts on dental sector:

- Detailed past medical and traveling history should be taken from the patients with elaborated discussion on symptoms for the infection – Continuing screening of patients.
- All patients should be treated under universal precautions.
- Use of masks and personal protective equipment (PPE) while treating a patient should be mandatory.
- Patients with symptoms of COVID-19 should be referred and elective dental treatment deferred till recovery.
- Minimizing aerosol production to avoid infection from asymptomatic patients.

The present time is proving to be difficult for every strata of the society but it is expeditiously arduous for healthcare professionals

including dental personnel. Although all the necessary precautions are being diligently followed at various dental hospitals, providing services even to most needful has become a tedious expedition. With so much uncertainty and peculiarly precarious nature of the present situation, we can only hope to contribute in the best of our capabilities without overlooking the need for adopting all the necessary steps to prevent and limit the spread of this deadly disease at large.

## REFERENCES

- Caspar DLD. Design principles in virus particle construction. In: Horsfall FL, Tamm I. *Viral and Rickettsial Infections in Man*. 4th ed., Philadelphia: JB Lippincott; 1975.
- World Health Organization, Director-General’s remarks at the media briefing on 2019-nCoV on 11 February 2020. World Health Organisation. 2020 [Last accessed on April 2, 2020]. Available from: <https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020>.
- World Health Organization, Director-General’s opening remarks at the media briefing on COVID-19 - 11 March 2020. World Health Organisation. 2020 [Last accessed on April 2, 2020]. Available from: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>.
- World Health Organization, Coronavirus disease (COVID-19) Pandemic. World Health Organisation. 2020 [Last accessed on April 2, 2020]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.
- World War II [Internet]. Wikipedia. 2020 [Last accessed on April 2, 2020]. Available from: [https://en.wikipedia.org/wiki/World\\_War\\_II](https://en.wikipedia.org/wiki/World_War_II).
- Weiss SR, Leibowitz JL. Coronavirus pathogenesis. *Adv Virus Res* 2011;81:85–164. DOI: 10.1016/B978-0-12-385885-6.00009-2.
- Mattern CFT. Symmetry in virus architecture. In: Nayak DP. *Molecular Biology of Animal Viruses*. New York: Marcel Dekker; 1977.
- Cui J, Li F, Shi ZL. Origin and evolution of pathogenic coronaviruses. *Nat Rev Microbiol* 2018;17(3):181–192. DOI: 10.1038/s41579-018-0118-9.
- Wan Y, Shang J, Graham R, et al. Receptor recognition by the novel coronavirus from Wuhan: an analysis based on decade-long structural studies of SARS coronavirus. *J Virol* 2020;94(7):e00127-20. DOI: 10.1128/JVI.00127-20.
- Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China. *N Engl J Med* 2019;382(8):727–733. DOI: 10.1056/NEJMoa2001017.
- Coronavirus Update (Live) [Internet]. Worldometer. 2020 [Last accessed on April 2, 2020]. Available from: [www.worldometers.info/coronavirus/](http://www.worldometers.info/coronavirus/).
- Coronavirus disease 2019 [Internet]. Wikipedia. 2020 [Last accessed on April 2, 2020]. Available from: [https://en.wikipedia.org/wiki/Coronavirus\\_disease\\_2019](https://en.wikipedia.org/wiki/Coronavirus_disease_2019).
- Coronavirus disease 2019 (COVID-19). Situation Report – 59. World Health Organisation. 2020 [Last accessed on April 2, 2020]. Available from: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200319-sitrep-59-covid-19.pdf?sfvrsn=c3dcdef9\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200319-sitrep-59-covid-19.pdf?sfvrsn=c3dcdef9_2).
- COVID-19 INDIA [Internet]. Ministry of Health and Family Welfare. 2020 [Last accessed on April 2, 2020]. Available from: <https://www.mohfw.gov.in/>.
- ADA recommending dentists postpone elective procedures. American Dental Association. 2020 [Last accessed on April 2, 2020]. Available from: <https://www.ada.org/en/publications/ada-news/2020-archieve/march/ada-recommending-dentists-postpone-elective-procedures>.
- ADHA COVID-19 Updates for Dental Hygienists. American Dental Hygienists’ Association. 2020 [Last accessed on April 2, 2020]. Available from: <https://www.adha.org/covid19>.
- CMS Adult Elective Surgery and Procedures Recommendations. Centers for Medicare and Medicaid Services. 2020 [Last accessed on April 2, 2020]. Available from: <https://www.cms.gov/files/document/31820-cms-adult-elective-surgery-and-procedures-recommendations.pdf>.
- IDA Preventive Guidelines for Dental Professionals on the Coronavirus Threat. Indian Dental Association. 2020. [Last accessed on April 6, 2020]. Available from: [https://www.ida.org.in/pdf/IDA\\_Recommendations\\_for\\_Dental\\_Professionals\\_on\\_the\\_Coronavirus\\_Threat.pdf](https://www.ida.org.in/pdf/IDA_Recommendations_for_Dental_Professionals_on_the_Coronavirus_Threat.pdf).
- Advisory by ISPPD Head office to all the oral health professionals & Pediatric Dentists. Indian Society of Pedodontics and Preventive Dentistry. 2020. [Last accessed on April 6, 2020]. Available from: <http://www.isppd.org.in/pdfs/PHOTO-2020-03-25-13-23-30.pdf>.
- Summary of ADA guidance during the COVID-19 crisis. American Dental Association. 2020 [Last accessed on April 2, 2020]. Available from: [https://success.ada.org/~media/CPS/Files/COVID/COVID19\\_Int\\_Guidance\\_Summary.pdf?utm\\_source=adaorg&utm\\_medium=covid-resources-lp&utm\\_content=cv-pm-summary-guidance&utm\\_campaign=covid-19](https://success.ada.org/~media/CPS/Files/COVID/COVID19_Int_Guidance_Summary.pdf?utm_source=adaorg&utm_medium=covid-resources-lp&utm_content=cv-pm-summary-guidance&utm_campaign=covid-19).
- Interim Infection Prevention and Control Guidance for Dental Settings During the COVID-19 Response. Centers for Disease Control and Prevention. 2020 [Last accessed on April 2, 2020]. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>.
- Gudi SK, Tiwari KK. Preparedness and lessons learned from the novel coronavirus disease. *Int J Occup Environ Med* 2020;11(2):108–112. DOI: 10.34172/ijoem.2020.1977.
- Peeri NC, Shrestha N, Rahman MS, et al. The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned? *Int J Epidemiol* 2020. dyaa033. DOI: 10.1093/ije/dyaa033.