

Impact of COVID-19 in public health: Prevalence and preventive approaches

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INTRODUCTION

The outbreak of CoVID-19 infection rapidly increases worldwide. Most of the continents affecting from CoVID-19 and still widening its burden disease (Jones DS, 2020; Lai *et al.*, 2020). Along with its fatality rates, CoVID-19 has caused physiological disturbances in the society and termed as “coronophobia”. CoVID-19 with renal failure, severe pneumonia and respiratory syndrome patients have been reported to increase the severity of disease conditions (Sevim *et al.*, 2020). Also, CoVID-19 with cancer patients increase the higher risk of infections. Currently, there is no vaccine or specific treatment against CoVID-19 and drug research centres continuously investigating the potential drug against CoVID-19 (Osama and Amer, 2020). For the past 20 years two major coronavirus epidemics have occurred in public includes SARS-CoV approximately 8000 cases and 800 deaths and MERS-CoV 2,500 cases and 800 deaths and these continuing sporadically (Casella *et al.*, 2020).

CoVID-19 to be the highest degree of contagious and quickly spread human to human. Globally CoVID-19 is a major health issue in many countries. The family of corona viruses, contains a single-stranded RNA viruses (+ssRNA) that can have caused severe respiratory disease (Bin *et al.*, 2020) (6). The pathogenesis of CoVID-19 infection still unclear. Based on the evidences, the corona virus infections originated from animals later spread to humans. CoVID-19 become a pandemic worldwide and world governments working meticulously to provide public awareness and seriously seeking preventive measures to restrict CoVID-19 (Hussin and Siddappa, 2020; Tanu, 2020; Francesco *et al.*, 2020).

There are no drugs or other therapeutics presently approved by the USFDA to prevent or treat CoVID-19. Current clinical management include infection prevention and control measures and supportive care, including supplemental oxygen and mechanical ventilator support when indicated. The recommendations for using hydroxychloroquine, remdesivir and chloroquine to treat

CoVID-19 have been revised based on data from recently published clinical trials and observational cohort studies (NCIRD, 2020).

Based on a preliminary analysis of the data from the randomized evaluation of CoVID-19 recovery study, the CoVID-19 treatment guidelines panel developed recommendations for the use of the corticosteroid dexamethasone in people with CoVID-19 (CDC, 2020).

PRECAUTIONS ON COVID-19 SPREADS

The following standard precautions consistently follow to avoid the contagion of CoVID-19

- Avoid the physical contact when greeting. If the person infected with CoVID-19, the virus passed by shaking hands, touching mouth, eyes and nose.
- Wash the hands regularly.
- When coughing and sneezing, cover mouth and nose with a flexed elbow or a tissue.
- If experiencing of cough and sneezing, avoid close contact with family members, friends and public.
- Avoid unboil meat products and diseased animals to consume as food substance.
- Avoid travel if have a fever and cough and eat only well cooked food.

CoVID-19 has ranged from different stages includes mild, severe and dying. The followings are a major symptom of CoVID-19 (CDC, 2020),

- Fever
- Cough
- Shortness of breath

COVID-19 INCUBATION PERIOD

Incubation period 2-14 days and will be extended possible outliers of 27 days (Guan *et al.*, 2019, Reuters, 2020).

Influence of age, sex and existing medical conditions of CoVID-19

CoVID-19 death rate calculated by number of deaths and the number of cases and this probability is not applicable

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for comorbidity patients (CCDC, 2020; WHO, 2020).

Table 1: Basic protective measures against the COVID-19

Hands washing	Wash with soap and water or using alcohol-based hand rub kills viruses that may be on your hands (Alberto <i>et al.</i> , 2020)
Keep social distancing	During cough the if the droplets contain virus it may chance to transmit others (Mahesh <i>et al.</i> , 2020)
Avoid hands and mouth touching	From the body surface the virus can enter into the body (Mahesh <i>et al.</i> , 2020)
Regulate respiratory hygiene	Respiratory hygiene will protect the people around you (Rahmet <i>et al.</i> , 2020)
Immediate medical attention	Seek medical attention if the feeling of fever and breathing difficulties in recent days (Rahmet <i>et al.</i> , 2020)
Follow up	Must follow the most up to date information about COVID 19 spreads from the national and local authorities (Qian <i>et al.</i> , 2020)
Protection measures	If continue a few weeks of fever, cough and difficulty breathing, seek medical advice promptly as this may be due to a respiratory infection or other serious condition (WHO, 2020)

Table 2: Comparison between other viruses

Virus	Incubation Period
COVID-19	2-14 or 0-24 days
SARS	2-7 days
MERS	5 days (range: 2-14)
Swine Flu	1-4 days (range: up to 7 days)
Seasonal Flu	2days (1-4 range)

Table 3: Age groups and deaths

Age group in years	Death rate in %
80+	14.8
70-79	8.0
60-69	3.6
50-59	1.3
40-49	0.4
30-39	0.2
20-29	0.2
10-19	0.2

Table 4: Pre-existing condition

Pre-existing condition	Death rate
Cardiovascular disease	13.2%
Diabetes	9.2%
Chronic respiratory disease	8.0%
Hypertension	8.4%
Cancer	7.6%

Globally, there have been 9,472,473 confirmed cases of CoVID-19 (fig. 1 and 2), including 484,236 deaths, reported to WHO (WHO, 2020) (as on 26 June 2020).



Fig. 1: Covid-19 confirmed cases

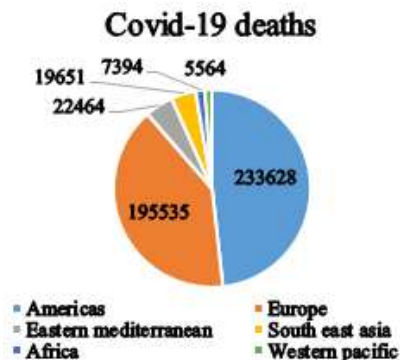


Fig. 2: Covid-19 confirmed deaths

The following tables show (5 – 15b) that CoVID-19 cases and deaths by Country and territory. (WHO, as on 14 February, 2020 (NHC; HCHP, 2020).

Table 5: Country vs CoVID-19 deaths

No.	Country	Deaths
1.	Diamond princess	7
2.	Norway	1
3.	Switzerland	7
4.	USA	41
5.	Germany	6
6.	France	61
7.	Spain	86
8.	S. Korea	67
9.	Iran	429
10.	Italy	1016
11.	China	3176

Table 6a: Country vs CoVID-19 cases

No.	Country	Cases
1	Malaysia	158
2.	Singapore	187
3.	Bahrain	197
4.	Qatar	262
5.	Austria	361
6.	Belgium	399
7.	UK	590
8.	Netherlands	614
9.	Denmark	674
10.	Sweden	687
11.	Japan	691

Table 6b: Country vs CoVID-19 deaths

No.	Country	Deaths
1	Malaysia	0
2.	Singapore	0
3.	Bahrain	0
4.	Qatar	0
5.	Austria	1
6.	Belgium	3
7.	UK	10
8.	Netherlands	5
9.	Denmark	0
10.	Sweden	1
11.	Japan	19

Table 7a: Country vs CoVID-19 cases

No.	Country	Cases
1	Iraq	83
2.	UAE	85
3.	Slovenia	96
4.	Israel	109
5.	Iceland	109
6.	Finland	109
7.	Czechia	113
8.	Greece	117
9.	Hong kong	130
10.	Canada	142
11.	Australia	156

Table 7b: Country vs CoVID-19 deaths

No.	Country	Deaths
1	Iraq	8
2.	UAE	0
3.	Slovenia	0
4.	Israel	0
5.	Iceland	0
6.	Finland	0
7.	Czechia	0
8.	Greece	1
9.	Hong Kong	3
10.	Canada	1
11.	Australia	3

Table 8a: Country vs CoVID-19 cases

No.	Country	Cases
1	Philippines	52
2.	Romania	59
3.	Lebanon	68
4.	Thailand	70
5.	Ireland	70
6.	San Marino	72
7.	India	74
8.	Brazil	77
9.	Portugal	78
10.	Kuwait	80
11.	Egypt	80

Table 8b: Country vs CoVID-19 deaths

No.	Country	Deaths
1	Philippines	2
2.	Romania	0
3.	Lebanon	3
4.	Thailand	1
5.	Ireland	1
6.	San Marino	5
7.	India	1
8.	Brazil	0
9.	Portugal	0
10.	Kuwait	0
11.	Egypt	2

Table 9a: Country vs CoVID-19 cases

No.	Country	Cases
1	Estonia	27
2.	Croatia	27
3.	Argentina	30
4.	Palestine	31
5.	Chile	33
6.	Russia	34
7.	Indonesia	34
8.	Vietnam	39
9.	Saudi Arabia	45
10.	Taiwan	49
11.	Poland	51

Table 9b: Country vs CoVID-19 deaths

No.	Country	Deaths
1	Estonia	0
2.	Croatia	0
3.	Argentina	1
4.	Palestine	0
5.	Chile	0
6.	Russia	0
7.	Indonesia	1
8.	Vietnam	0
9.	Saudi Arabia	0
10.	Taiwan	1
11.	Poland	1

Table 10a: Country vs CoVID-19 cases

No.	Country	Cases
1.	Pakistan	21
2.	Belarus	21
3.	Peru	22
4.	Costa Rica	23
5.	Bulgaria	23
6.	Albania	23
7.	Serbia	24
8.	Brunei	25
9.	Georgia	25
10.	Luxembourg	26
11.	Algeria	26

Table 10b: Country vs CoVID-19 deaths

No.	Country	Deaths
1.	Pakistan	0
2.	Belarus	0
3.	Peru	0
4.	Costa Rica	0
5.	Bulgaria	1
6.	Albania	1
7.	Serbia	0
8.	Brunei	0
9.	Georgia	0
10.	Luxembourg	0
11.	Algeria	2

Table 11a: Country vs CoVID-19 cases

No.	Country	Cases
1.	Macao	10
2.	Bosnia Herzegovina	11
3.	Mexico	12
4.	Tunisia	13
5.	Azerbaijan	15
6.	South Africa	16
7.	Hungary	16
8.	Latvia	16
9.	Ecuador	17
10.	Oman	18
11.	Slovakia	21

Table 11b: Country vs CoVID-19 deaths

No.	Country	Deaths
1.	Macao	0
2.	Bosnia Herzegovina	0
3.	Mexico	0
4.	Tunisia	0
5.	Azerbaijan	1
6.	South Africa	0
7.	Hungary	0
8.	Latvia	0
9.	Ecuador	0
10.	Oman	0
11.	Slovakia	0

Table 12a: Country vs CoVID-19 cases

No.	Country	Cases
1.	Paraguay	6
2.	Moldova	6
3.	French Guiana	6
4.	Armenia	6
5.	Morocco	6
6.	Afghanistan	7
7.	Maldives	8
8.	Malta	9
9.	Colombia	9
10.	North Macedonia	9
11.	Cyprus	10
12.	Senegal	10

Table 12b: Country vs CoVID-19 deaths

No.	Country	Deaths
1.	Paraguay	0
2.	Moldova	0
3.	French Guiana	0
4.	Armenia	0
5.	Morocco	1
6.	Afghanistan	0
7.	Maldives	0
8.	Malta	0
9.	Colombia	0
10.	North Macedonia	0
11.	Cyprus	0
12.	Senegal	0

Table 13a: Country vs CoVID-19 cases

No.	Country	Cases
1.	Channel islands	3
2.	Bolivia	3
3.	Bangladesh	3
4.	Ukraine	3
5.	Sri Lanka	3
6.	Lithuania	3
7.	Reunion	4
8.	Liechtenstein	4
9.	New Zealand	5
10.	Dominican Republic	5
11.	Cambodia	5

Table 13b: Country vs CoVID-19 deaths

No.	Country	Deaths
1.	Channel islands	0
2.	Bolivia	0
3.	Bangladesh	0
4.	Ukraine	0
5.	Sri Lanka	0
6.	Lithuania	0
7.	Reunion	0
8.	Liechtenstein	0
9.	New Zealand	0
10.	Dominican Republic	0
11.	Cambodia	0

Table 14a: Country vs CoVID-19 cases

No.	Country	Cases
1	Saint Martin	2
2.	Jamaica	2
3.	Honduras	2
4.	Ghana	2
5.	Faeroe Islands	2
6	Cameroon	2
7.	Burkina Faso	2
8.	Nigeria	2
9.	Monaco	2
10.	Martinique	3
11.	Cuba	3

Table 14b: Country vs CoVID-19 deaths

No.	Country	Deaths
1	Saint Martin	0
2.	Jamaica	0
3.	Honduras	0
4.	Ghana	0
5.	Faeroe Islands	0
6	Cameroon	0
7.	Burkina Faso	0
8.	Nigeria	0
9.	Monaco	0
10.	Martinique	0
11.	Cuba	0

Table 15a: Country vs CoVID-19 cases

No.	Country	Cases
1	Turkey	1
2.	Trinidad and Tobago	1
3.	Togo	1
4.	St. Vincent Grenadines	1
5.	St. Barth	1
6	Mongolia	1
7.	Vatican city	1
8.	Gibraltar	1
9.	French Polynesia	1
10.	DRC	1
11.	Ivory coast	1
12.	Bhutan	1
13.	Nepal	1
14.	Jordan	1
15.	Andorra	1
16.	Guyana	1

However, till now there is no specific treatment for CoVID-19. If the drugs and vaccine not widely

implemented, it is expected that in the year of 2022, CoVID-19 might have affected most of the world population and kill over 40 million people (Melika *et al.*, 2020; London IC, 2020; Kissler *et al.*, 2020). Although further research is needed to collect the amount of the evidence. This review present global issues of CoVID-19, prevalence and preventive approaches.

Table 15b: Country vs CoVID-19 deaths

No.	Country	Deaths
1	Turkey	0
2.	Trinidad and Tobago	0
3.	Togo	0
4.	St. Vincent Grenadines	0
5.	St. Barth	0
6	Mongolia	0
7.	Vatican city	0
8.	Gibraltar	0
9.	French Polynesia	0
10.	DRC	0
11.	Ivory coast	0
12.	Bhutan	0
13.	Nepal	0
14.	Jordan	0
15.	Andorra	0
16.	Guyana	1

Table 16: Mode of transmission, preventive approaches and therapeutic approaches

Mode of transmission	Preventive approaches	CoVID-19 therapeutic approaches
Droplet and human-to-human transmission (25)	Education, isolation, prevention, controlling the transmission (30)	Empirical antibiotics, antiviral drugs, and systemic corticosteroids are used as treatments. (33)
Contaminated objects Airborne contagion (26)	Home quarantine	Invasive mechanical ventilation (34)
Possible transmission of SARS-CoV-2 from mother to fetus (27,28)	Medical mask (especially N95) or a respirator (especially FFP3) Protective classes, including FFP1, FFP2, and FFP3 (31)	Some medications are not recommended, Hydroxychloroquine and Azithromycin due to potential for toxicity. (35)
Direct contact with mucous membranes such as the eyes, nose, or mouth (29)	Disinfectants, and handwashing (32)	Lopinavir/Ritonavir or other protease inhibitors because of unfavorable pharmacodynamics (36)

CONCLUSION

CoVID-19 is highly contagious and till now there is no specific drugs or vaccine to treat or prevent the infection. Therefore, need to continue the preventive methods and public health awareness until discovering the drugs and an appropriate vaccine. With current drugs, need to add a proper diet and mental support will ultimately be reducing the effect of CoVID-19.

REFERENCES

- Alberto Berardi, Diego R. Perinelli, Hamid A. Merchant, Lorina Bisharat, Iman A. Basheti, Giulia Bonacucina, Marco Cespi and Giovanni F. Palmierib (2020). Hand sanitisers amid CoViD-19: A critical review of alcohol-based products on the market and formulation approaches to respond to increasing demand. *Int. J. Pharm.*, **584**: 119431.
- Bin Chen, Er-Kang Tian, Bin He, Lejin Tian, Ruiying Han, Shuangwen Wang, Qianrong Xiang, Shu Zhang, Toufic El Arnaout and Wei Cheng (2020). Overview of lethal human coronaviruses. *Signal Transduct. Target Ther.*, **5**: 89.
- Cascella M, Rajnik M, Cuomo A, Dulebohn SC and Di Napoli R (2020). Features, Evaluation and Treatment Coronavirus (COVID-19). In: StatPearls. Treasure Island (FL): StatPearls Publishing, pp.1-2.
- Content Source: National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases. Page last reviewed: April 25, 2020.
- Coronavirus disease (COVID-19) advice for the public, WHO February 2020.
- Coronavirus disease (COVID-19) advice for the public, WHO June, 2020
- Coronavirus incubation could be as long as 27 days, Chinese provincial government says - Reuters, Feb. 22, 2020.
- COVID-19 is an emerging, rapidly evolving situation. Public health information from CDC: <https://www.coronavirus.gov>.
- Dong L, Tian J, He S, Zhu C, Wang J, Liu C and Yang J (2020). Possible vertical transmission of SARS-CoV-2 from an infected mother to her newborn. *JAMA*, **323**(18): 1846-1848.
- Francesco Di Gennaro, Damiano Pizzol, Claudia Marotta, Mario Antunes, Vincenzo Racalbutto, Nicola Veronese and Lee Smith (2020). Coronavirus siseases (COVID-19) Current status and future perspectives: A narrative review. *Int. J. Environ. Res. Public Health*, **17**: 2690.
- Guan WJ, Ni ZY and Hu Y, Liang WH, Ou CG and He JX (2020). Clinical characteristics of 2019 novel coronavirus infection in China. *N. Engl. J. Med.*, **382**: 1708-1720.
- Health Commission of Hubei Province (HCHP), China.
- Holshue MLD, Lindquist SL, Wiesman JB, Spitters CE and Wilkerson ST (2020). First Case of 2019 Novel Coronavirus in the United States. *N. Engl. J. Med.*, **382**: 929-936.
- Hussin A. Rothana and Siddappa N Byrareddy (2020). The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J. Autoimmun.*, **109**: 102433.
- Jones DS (2020). History in a crisis – Lessons for covid-19. *N. Engl. J. Med.*, **382**: 1681-1683
- Kissler SM, Tedijanto C, Goldstein E, Grad YH and Lipsitch M (2020). Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. *Science*, pp.860-868.
- Lai CC, Shih TP, Ko WC, Tang HJ and Hsueh PR (2020). Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. *Int. J. Antimicrob Agents*, **55**: 105924.
- Lepelletier D, Grandbastien B, Romano-Bertrand S, Aho S, Chidiac C and Géhanno JF (2020). What face mask for what use in the context of the COVID-19 pandemic? The French guidelines. *Hosp Infect.*, **105**(3): 414-418.
- Liu Y, Ning Z, Chen Y, Guo M, Liu Y and Gali NK *et al* (2020). Aerodynamic characteristics and RNA concentration of SARS-CoV-2 aerosol in Wuhan hospitals during COVID-19 outbreak. *bioRxiv.*, pp 1-9.
- London IC (2020). Report 13: Estimating the number of infections and the impact of non-pharmaceutical interventions on COVID-19 in 11 European countries 2020 March 30 [Available from: <https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/>].
- Lotfi M, Hamblin MR and Rezaeif N (2020). COVID-19: Transmission, prevention and potential therapeutic opportunities. *Clin. Chim. Acta.*, **508**: 254-266.
- Mahesh Jayaweera, Hasini Perera, Buddhika Gunawardana and Jagath Manatungea (2020). Transmission of COVID-19 virus by droplets and aerosols: A critical review on the unresolved dichotomy. *Environ Res.*, **188**: 109819.
- McIntosh K, Hirsch MS and Bloom A (2020). Coronavirus disease 2019 (COVID-19). UpToDate Hirsch MS, Bloom A (Eds) Accessed, pp.1-27.
- National Health Commission (NHC) of the People's Republic of China.
- NIH (2020). NIOH. COVID-19 Treatment Guidelines. <https://covid19treatmentguidelines.nih.gov/introduction/>
- Osama M. Al-Quteimat and Amer Mustafa Amer (2020). The Impact of the COVID-19 Pandemic on Cancer Patients. *Am. J. Clin. Oncol.*, **43**(6): 452-455.
- Qian X, Ren R and Wang Y *et al* (2020). Fighting against the common enemy of COVID-19: A practice of building a community with a shared future for mankind. *Infect. Dis. Poverty*, **9**: 34.
- Rahmet Guner, İmran Hasanoglu and Firdevs Aktaş (2020). COVID-19: Prevention and control measures in community. *Turk J Med Sci.*, **50**(3): 571-577.

- Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) [Pdf] - World Health Organization, Feb. 28, 2020.
- Richardson P, Griffin I, Tucker C, Smith D, Oechsle O and Phelan A (2020). Baricitinib as potential treatment for 2019-nCoV acute respiratory disease. *The lancet.*, **395**(10223): e30-e31.
- Sevim Zaim, Jun Heng Chong, Vissagan Sankaranarayanan and Amer Harky (2020). COVID-19 and multiorgan response. *Curr. Probl. Cardiol.*, 100618.
- Symptoms of Novel Coronavirus (COVID-19) - United States Centers for Disease Control and Prevention (CDC) 2020.
- Tanu Singh (2020). A Review of Coronavirus Disease-2019 (COVID-19). *Indian J. Pediatr.* **87**(4): 281-286.
- The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) - China CCDC, February 17, 2020.
- Tobaiqy M, Qashqary M, Al-Dahery S, Mujallad A, Hershan AA, Kamal MA and Helmi N (2020). Therapeutic management of patients with COVID-19: a systematic review. *Infection Prevention in Practice*, **2**(3): pp 1-26.
- Van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A and Williamson BN (2020). Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *N. Engl. J. Med.*, **382**: 1564-1567.
- Wang X, Pan Z and Cheng Z (2020). Association between 2019-nCoV transmission and N95 respirator use. *Med Rxiv*, pp1-6.
- Zeng H, Xu C, Fan J, Tang Y, Deng Q, Zhang W and Long X (2020). Antibodies in Infants Born to Mothers With COVID-19 Pneumonia. *JAMA*, **323**(18): 1848-1849.