



COVID 2019: GUIDELINES ON INFECTION PREVENTION AND CONTROL FOR HEALTH CARE PROFESSIONALS

<b>Ms.Pabalpreet Kaur</b>	Nursing Tutor, M.M College of Nursing, Mullana
<b>Ms. Pooja Jaswal*</b>	Assistant Professor, M.M College of Nursing, Mullana *Corresponding Author
<b>Ms. Eenu</b>	Assistant Professor, M.M College of Nursing, Mullana

KEYWORDS :

**Introduction:**

Corona viruses are a group of related RNA enveloped viruses that responsible for causing diseases in mammals and birds was first discovered in the 1960s. . Corona viruses are named for the crown-like spikes on their surface.<sup>1</sup> There are four main sub-groupings of corona viruses, (alpha, beta, gamma, and delta). Six corona virus species are known to cause human disease. Four viruses — 229E, OC43, NL63, and HKU1 — are prevalent and typically cause mild symptoms like common cold in immune compromised individuals. The two other strains — severe acute respiratory syndrome corona virus (SARS-CoV) and Middle East respiratory syndrome corona virus (MERS-CoV) — are zoonotic in origin and have been linked to sometimes fatal illness.<sup>2</sup>

In late December 2019, several local health facilities in Wuhan, China reported clusters of patients with pneumonia of unknown etiology. On December 31, 2019, the Chinese Center for Disease Control and Prevention (China CDC) dispatched a rapid response team to affected city to investigate the etiology that was linked to an open seafood and animal market of Wuhan city, China.<sup>3</sup> On January 30, 2020, the International Health Regulations Emergency Committee of the World Health Organization (WHO) declared the outbreak a “public health emergency of international concern” (PHEIC). On 11 February 2020, WHO announced a name for the new corona virus disease: COVID-19. On 11<sup>th</sup> March 2020 WHO made the assessment that COVID-19 can be characterized as a pandemic. As on 30<sup>th</sup> march 2020, there are 801,064 confirmed cases from 200 countries, 38,769 deaths from novel virus, 172,319 total recoveries. China has over 81,518 positive cases while Italy's tally stands over the 101,739 and USA with 164,359 positive cases. In India 1,251 cases positive with novel virus with 32 mortalities<sup>5</sup>

**Transmission:**

The etiology related to outbreak of corona virus has not been clear yet. Initially connection of bat was suspected to be the main cause of transmission to human as at first investigation positive samples had history of visiting to the seafood and animal market in Wuhan city. But some of the cases who were diagnosed had no history to the market.<sup>6</sup>

Spread is thought to occur mostly from person-to-person via respiratory droplets among close contacts and direct or indirect exposure to infected sources. In addition, any infected person, with or without symptoms, could spread the virus by touching a surface. The corona virus could remain on that surface and someone else could touch it and then touch their mouth, nose or eyes. That's why it's so important to try to avoid touching public surfaces or at least try to wipe them with a disinfectant.<sup>7</sup>

**Clinical presentation:**

Based on what has been reported about the incubation period, SARS-CoV-2 may show its symptoms from 2 days to 2 weeks after exposure. Frequently reported signs and symptoms of patients include fever, cough, myalgia or fatigue, and shortness of breath at onset of illness. Among 1,099 hospitalized COVID-19 patients, fever was present in 44% at hospital admission, and developed in 89% during hospitalization. Other less commonly reported respiratory symptoms include sore throat, headache, cough with sputum production and/or hemoptysis. Some patients have experienced gastrointestinal symptoms such as diarrhea and nausea prior to developing fever and lower respiratory tract signs and symptoms. The fever course among patients with COVID-19 is not fully understood; it may be prolonged and intermittent.<sup>8,9,10</sup>

**Case definitions of surveillance:<sup>11</sup>**

**Guidance Outlines on SARS-CoV-2 Infection Prevention and Control Precautions<sup>12,13</sup>**

Suspected case	A patient with acute respiratory tract infection (sudden onset of at least one of the following: cough, fever, shortness of breath) AND with no other aetiology that fully explains the clinical presentation AND with a history of travel or residence in a country/area reporting local or community transmission during the 14 days prior to symptom onset; OR A patient with any acute respiratory illness AND having been in close contact with a confirmed or probable COVID-19 case in the last 14 days prior to onset of symptoms; OR A patient with severe acute respiratory infection (fever and at least one sign/symptom of respiratory disease (e.g., cough, fever, shortness breath)) AND requiring hospitalization (SARI) AND with no other aetiology that fully explains the clinical presentation.
Probable case	A suspected case for whom testing for virus causing COVID-19 is inconclusive (according to the test results reported by the laboratory) or for whom testing was positive on a pan-coronavirus assay.
Confirmed case	A person with laboratory confirmation of virus causing COVID-19 infection, irrespective of clinical signs and symptoms

Close contact	<ul style="list-style-type: none"> <li>• A person living in the same household as a COVID-19 case;</li> <li>• A person having had direct physical contact with a COVID-19 case (e.g. shaking hands);</li> <li>• A person having unprotected direct contact with infectious secretions of a COVID-19 case (e.g. being coughed on, touching used paper tissues with a bare hand);</li> <li>• A person having had face-to-face contact with a COVID-19 case within 2 metres and &gt; 15 minutes;</li> <li>• A person who was in a closed environment (e.g. classroom, meeting room, hospital waiting room, etc.) with a COVID-19 case for 15 minutes or more and at a distance of less than 2 metres;</li> <li>• A healthcare worker (HCW) or other person providing direct care for a COVID-19 case, or laboratory workers handling specimens from a COVID-19 case without recommended personal protective equipment (PPE) or with a possible breach of PPE;</li> <li>• A contact in an aircraft sitting within two seats (in any direction) of the COVID-19 case, travel companions or persons providing care, and crew members serving in the section of the aircraft where the index case was seated (if severity of symptoms or movement of the case indicate more extensive exposure, passengers seated in the entire section or all passengers on the aircraft may be considered close contacts).</li> </ul>
---------------	--

This paper tries to explain guidance outlines on infection prevention and control precaution to be used by health workers, when they are caring patients with suspected or confirmed SARS-CoV-2 infection. As till now there is no effective drug or a vaccine against this virus, management of this pandemic depends on effective prevention and control of disease transmission. These preventive actions include use precautions for contact, droplet and airborne with the effective implementation. These measures include:

**1. Ensuring triage, early recognition, and source control:**

Triage system includes prompt and correct assessment of all patients at the time of admission which facilitate early detection, and control of transmission (isolating patients with suspected case of COVID-19). For the early detection of cases of suspected COVID-19, healthcare setting should:

- Encourage HCWs to have a high level of clinical suspicion;
- Establish a well-equipped triage station at the entrance of health care facility, supported by trained staff;
- Implement the use of screening questionnaires based on the updated case definition of COVID-19
- Paste visual alerts with specific instructions in appropriate language at specific places like entrance, waiting areas, lifts, canteen etc. about preventive measures of SARS-CoV-2
- Encourage all persons including HCWs for hand hygiene, respiratory hygiene, cough etiquettes and appropriate use of PPE
- Ensures fewer crowds

**2. Standard precautions for all patients Standard precautions:**

Ensure that the following respiratory hygiene measures are used:

- Ensure that all patients cover their nose and mouth with a tissue or elbow when coughing or sneezing;
- Offer a medical mask to patients with suspected 2019-

- nCoV infection.
- Perform hand hygiene after contact with respiratory secretions.
- HCWs should apply the WHO's My 5 Moments for Hand Hygiene approach before touching a patient, before any clean or aseptic procedure is performed, after exposure to body fluid, after touching a patient, and after touching a patient's surroundings.
- hand hygiene includes either cleansing hands with an alcohol-based hand rub (ABHR) or with soap and water;
- Alcohol-based hand rubs are preferred if hands are not visibly soiled;
- Wash hands with soap and water when they are visibly soiled.

**3. Specific measures for care of COVID-19 Suspected and confirmed cases**

a. Patient placement (Isolation)

- A suspected or confirm case should be placed in an AIIR (Air-borne Infection Isolation Rooms) if available. A single with attached toilet and bathroom should be used when an AIIR is not available. Room doors should be kept closed.
- In a critical care unit (CCU), the case should be managed in a single cubical with negative-pressure if possible, or, in a neutral-pressure room with the door closed when negative pressure is not available.
- If room with attached Toilet facility is not available, then an exclusive assigned commode should be used.
- It should be cleaned and decontaminated as per recommended protocol or schedule.
- Appropriate arrangements should be done for the safe removal of the bedpan.
- Avoid keeping any unnecessary or extra items or equipment in the patient's room.

b. Visitors

- All visitors should be restricted to essential visitors only; such as parents of pediatric Patients or an affected patient's main career. This should be subject to a local risk assessment having been performed.
- It is suggested to screen all visitors for symptoms before entering the healthcare setting.
- Alternative ways for patient and visitor interactions (e.g. video-call) should be utilized.
- PPE must be made available to visitors, including instruction, demonstration and supervision of correct usage and donning and doffing.

**4. Personal Protective Equipment:** All persons entering the patient room should wear PPE. Donning and doffing of PPE must be done in the sequence as given below :

S. no	Donning	Doffing
1	Full-sleeves gown	Remove gloves and dispose in proper biomedical waste bin and wash hand thoroughly
2	FFP 3 respirator and done fit-checked	Taking out gown by using a peeling motion, fold gown in on itself and place in biomedical waste bin
3	Eye protection (single use goggles or full-face visors)	Remove goggles or visor only by the headband or sides and discard in biomedical waste bin
4	Disposable gloves with tight fitting cuff	Putting off respirator from behind and discard in proper biomedical waste bin. Wash hand thoroughly.

**5. Hand hygiene**

- This is very much effective step and perform it before and after contact to each patient, removal of PPE, contact with patient surrounding or items and disinfection of the environment.
- Perform hand wash with soap and water or use an alcohol hand rub when hands are visibly clean.
- It is strongly advised to all HCWs that they must not wear rings (expect a plain smooth band), wrist watches and jewelry.

**6. Aerosol generating procedures**

- Any procedure that generates aerosols, such as open suctioning, induced cough, bronchoscopy, intubation, extubation and positive-pressure ventilation via a face mask, have a high risk of spread. When these procedures are medically needed, they should be carried out in an AIIR, if available or in a single room with the door closed.
- Only the indispensable and well trained HCWs should be present in procedure room, and all must wear PPE as per recommendation. It is advised to minimized entry and exit from the room during the procedure.
- When an aerosol producing procedure is carried out in the patient's room, then same room should be disinfected 20 minutes after the completion of procedure (as after 20 minutes there would be less than 1% of aerosols then the starting load).
- When an another room is utilized for an aerosol producing procedure room should be left for 20 minutes, then decontaminate prior to use it again.

**7. Use of equipment**

- As far as possible reusable supplies, items (e.g. crockery& cutlery, shaving kit etc.) and equipment should be avoided to minimize the risk of cross contamination and load of items which require be cleaning and disinfecting.
- As per hospital waste management policy, all single use items or equipment must be disposed.
- Re-useable equipment or supplies; if used, it should be cleaned and disinfected as per the instructions of manufacturer prior to leave the room.
- Use exclusively assigned supplies to the patient in the isolation room.
- Use high efficiency filter to protect ventilators.
- Use closed suction system for all cases.

**8. Environmental cleaning and decontamination**

- It is suggested that that a well-trained domestic staff should perform cleaning and decontamination with use of the proper PPE.
- After cleaning with natural detergent, it should be decontaminated by a chlorine based disinfectant solution with a minimum strength of 1000 ppm chlorine availability or as per policy of health care facility.
- The patient room should be cleaned and decontaminated at least once a day.
- Commonly used hand touch surfaces and lobbies should be cleaned at least twice in a day.
- It is strongly advised that cleaning and decontamination of the isolation areas is performed separately to the cleaning of other areas.

**9. Specimens**

- All samples with request forms should be marked with a biohazard label.
- The samples should be double-packed in the same room where sample has been collected by a HCW wearing PPE.
- All samples should be handed over personally to the laboratory by a person who understands the nature of the samples.
- It is strongly suggested to avoid pneumatic tube systems to transport sample.

**10. Transfers of patient to other departments**

- If possible, all diagnostic testing and procedures should be performed in the single negative pressure room with the presence of minimum and essential HCWs.
- Patients should be transferred to other departments only presence of specific clinical needs and after detail discussion with infection control team.
- The transfer of patient to other department includes following procedures:
  - The bed or trolley that utilized to transfer the patient from the room of one department to other department should be decontaminated immediately prior to leaving the patient room by a HCW with protective cloths and PPE.
  - The department where the patient is going to be transferred must be informed in advance.
  - Any unnecessary equipment or item must be removed from the procedure or treatment room.
  - The patient must be shifted directly to and from the procedure or treatment room and must not be kept in a common area
  - The procedure or treatment room, bed, trolley or chair and other used equipment should be cleaned and disinfected immediately after use.
  - Ensure that anyone involved in performing procedure, shifting the patient or staying within 6 feet must wear the PPE.

**11. Caring dead bodies**

- A body bag should be used for transferring the body should be transferred in a body bag and HCWs who involved in handling the body must use PPE.
- As per environmental disinfection protocols decontaminate the outer surface of the body bag and the trolley carrying the body immediately prior to body bag exit from the lobby. This process requires minimum two person wearing all PPE and protective cloths.
- HCWs must remove their protective clothing before leaving the lobby
- HCWs should use all PPE when it is needed to open the body bag in the hospital mortuary.
- It is acceptable to wash or prepare with wearing full PPE. Mortuary and funeral persons must be informed of the biohazard risk.
- When post mortem is needed; it is advised to use safe working techniques (for example manual rather than power tools) with wearing full PPE. If needed use high security post-mortem suites.
- Empty body bags must be disposed of as per regulation of Category-B waste management.

**12. Using environmental and engineering controls**

- These controls address the basic infrastructure of the health care facility.
- These controls aim to ensure there is adequate ventilation in all areas in the healthcare facility, as well as adequate environmental cleaning.
- Both isolation and adequate ventilation can minimize the spread of infection in the healthcare setting.
- Air circulation can be managed in such a way that infections should not be spread inside the hospital and properly drained to environment with least possible transmission.

**13. Reporting within healthcare setting and to local health authorities**

- Implement policies that promptly inform local or state health authorities about suspected or confirm case of COVID-19
- It is suggested to designate team or person from the facility who are responsible for collecting and dissemination of information to public health authorities and HCWs within facility.

**Conclusion:**

COVID-19 is a novel virus. Common signs of infection include respiratory symptoms, fever, cough, shortness of breath and breathing difficulties. It has no specific treatment and vaccination. Hence, prevention of infection is the key element to halt this health problem; which includes training of HCWs, appropriate use of PPE, regular hand hygiene, appropriate waste management, Respiratory and cough etiquettes, regular environment cleaning and awareness in the community.

**References:**

1. Fehr A, Perlman S. Coronaviruses: An Overview of Their Replication and Pathogenesis. *Coronaviruses* [Internet]. 2015 [cited 17 March 2020];:1-23. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4369385/>
2. Coronavirus | Human Coronavirus Types | CDC [Internet]. Cdc.gov. 2020 [cited 17 March 2020]. Available from: <https://www.cdc.gov/coronavirus/types.html>
3. [Internet]. Who.int. 2020 [cited 17 March 2020]. Available from: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
4. Coronavirus Disease (COVID-19) - events as they happen [Internet]. Who.int. 2020 [cited 17 March 2020]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>
5. Novel Coronavirus (2019-nCoV) situation reports [Internet]. Who.int. 2020 [cited 17 March 2020]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
6. COVID-19: investigation and initial clinical management of possible cases [Internet]. GOV.UK. 2020 [cited 17 March 2020]. Available from: <https://www.gov.uk/government/publications/wuhan-novel-coronavirus-initial-investigation-of-possible-cases/investigation-and-initial-clinical-management-of-possible-cases-of-wuhan-novel-coronavirus-wn-cov-infection>
7. Riou J, Althaus C. Pattern of early human-to-human transmission of Wuhan 2019 novel coronavirus (2019-nCoV), December 2019 to January 2020. *Eurosurveillance*. 2020;25(4).
8. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. *JAMA*. 2020 Feb 7. doi: 10.1001/jama.2020.1585
9. Chen N, Zhou M, Dong X, Qu J, Gong F, Hen Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020 Jan 30. pii: S0140-6736(20)30211-7. doi: 10.1016/S0140-6736(20)30211-7
10. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020 Jan 24. pii: S0140-6736(20)30183-5. doi: 10.1016/S0140-6736(20)30183-5.
11. Case definition and European surveillance for COVID-19, as of 2 March 2020 [Internet]. European Centre for Disease Prevention and Control. 2020 [cited 17 March 2020]. Available from: <https://www.ecdc.europa.eu/en/case-definition-and-european-surveillance-human-infection-novel-coronavirus-2019-ncov>
12. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected [Internet]. Who.int. 2020 [cited 17 March 2020]. Available from: [https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-\(ncov\)-infection-is-suspected-20200125](https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125)
13. Sharma SK, Mudgal SK, Panda PK, Gupta P, Agarwal P. COVID-19: Guidance outline on Infection Prevention and Control for Health Care Workers. *Indian J Comm Health*. 2020;32(1):05-13