

INFECTION PREVENTION AND CONTROL - KEY TO SUCCESS IN CONTAINING COVID-19

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ABSTRACT

In the current pandemic of corona viral infection disease, 2019 (COVID-19), the acquiescence for infection prevention and control is necessary at all levels. Therefore, this review article was written with an objective to identify the evidence for infection prevention and control in order to contain COVID-19. In order to minimize the spread of COVID-19, there comes a dire need for taking all necessary measures at community and health care level. From community perspective and for general public awareness to adopt social distancing protocols, involvement of social medias can be helpful. While necessary measures are recommended to be taken in health care setting, for the safety of both the health care professionals (HCPs) and patients. Published evidence had emphasized mandatory wearing of personal protective equipments (PPEs). Amongst all PPEs, the focus for HCPs was to wear N95 mask, gloves, gowns, face shield and goggles. The use of good quality of personal protective equipment (PPEs) was emphasized. For patient's safety wearing of gloves and masks was also accentuated. Proper disinfection of health care settings is recommended to prevent the spread of infection. It is concluded that use of various infection prevention and control measures at community and health care settings are the mandatory steps to control the spread of COVID-19.

Keywords: COVID-19, Healthcare settings, Infection prevention, Personal protective equipment (PPEs).

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History of COVID-19

The sunset of 2019, marked the beginning of a pandemic by new virus i.e. severe acute respiratory syndrome Corona virus - 2 (SARS-CoV-2). Which led the world health organization (WHO) to name the disease it caused as Corona virus disease for the year 2019 (COVID-19). The first case was identified in China, at the end of 2019¹.

WHO Guidance for Infection Prevention and Control (IPC)

The first thing highlighted by the WHO was to identify the ways, which can be helpful to reduce the spread of infection. The focus was given to initiate establishment of National, Regional and Global level efforts in line of guidance provided by WHO infection prevention and control programs (IPC). The top most agenda for the IPC strategies laid by WHO is that no one should catch the infection while delivering or receiving

health care facilities¹.

Steps Recommended by WHO for IPC at Various Levels

Various levels for which is identified starting from emphasis on the healthcare workers (HCWs), doctors, nurses, paramedics, nursing assistants, midwives, physicians, technicians, therapists, phlebotomists, pharmacists, students and trainees. Second level is to identify ways for reducing the community spread. The best identified practice for IPC includes maintenance of hand hygiene by frequent hand washing, use of sanitizers, wearing of gloves and N95 masks while handling the positive cases. Other important measures could be the provision of clean and hygienic environment, having the proper action plan in view to deal with the emergence of increased number of cases, needles, syringes/waste disposal and presence of hospital antibiogram to reduce the spread resistant organisms. This will enable patient safety in several health care premises. Control of the health care-associated infections e.g. surgical site infections (SSIs) is also

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significant in health care-associated infection. The key measures include proper use of sterilization and disinfection techniques. This should be accompanied by ensuring maintenance of asepsis in operating room, and appropriate use of prophylactic antibiotics¹.

Spread of Infection

In maximum cases mode of transmission is via respiratory droplets. However, other modes can be via contact with inanimate things like surfaces, plastic, copper, stainless steel, cardboards etc². Good evidence is available supporting the transmission amongst the persons. Formation of respiratory droplets or aerosols via speaking, coughing, sneezing are the principal source of transmission. These droplets enters the body of another person in close proximity via mouth and nose-ultimately entering the lungs or even through the eyes.

Other transmission modes can be the direct contact with contaminated surfaces, followed by self delivery of microbe by touching the eyes, nose or mouth. The airborne transmission by covering long distances had less supported evidence³. A study report concluded that SARS-CoV-2 remains viable on surfaces for 4-72 hrs approximately^{4,5}. So, it is advised to frequently use hand sanitizers before and after touching the patient⁶. The WHO hand hygiene campaign had a focus on five components i.e change in system, training/education, feedbacks based upon observations, reminders, safe environment and climate. This helped a lot to improve compliance and accountability⁷.

CDC Guidance for IPC

The CDC report for the month of May 2020, showed that the biggest challenge faced by HCWs is to deal with asymptomatic or pre symptomatic cases. Such cases remain hidden and can become the source for infection transmission in health care settings. Therefore for health care surroundings, in the current situation of pandemic wearing of personal protective equipments (PPEs) facemask covering the mouth and nose to contain respiratory secretions is strongly recom-

mended for HCWs and the members of community³.

While for the persons who are not directly related to patient care but can be exposed to infectious agents i.e persons dealing with dietary services, laundry, security, engineering and facilities management, administrative, billing, and volunteer personnel, are recommended to wear the cloth mask. Besides all, the quality of recommended facemask for HCWs and non HCWs, respirators and PPEs must be taken care to prevent the spread of infection³.

For all HCWs following must be ensured to prevent the spread of infection in health care surroundings³:

1. **SOPs to Minimize Chances for Exposures:** The policies should be formulated well before time i.e. standard operating procedures (SOPs) prior to arrival of patient, upon arrival, patients stay and even after the discharge³.
2. **Infection Control of Community Source:** The most important aspect for the reduction in community spread is to identify at risk population i.e. older aged group, immunosuppressed, HCW etc³.
3. **Infection Control at Global Level:** The Global level control involves the collaborative efforts amongst different Nations. This can well be done by establishing the policies solidly. Top most priority should be given to create awareness regarding maintenance of social distancing and wearing of facemask while leaving home³.
4. **SOPs for Patient and Attendants:** Whether a surgical or cloth face mask, its preferred wearing should be ensured for patients and their attendants upon reaching hospital³.
5. **Protocols for Patients Prior to Arrival at Hospital:** The person providing appointments must ensure whether hospital visit is essential or not. Moreover, counselling of patients should be done to inform their consultants on call in case they have any symptom of COVID and a plan for any hospital procedure. So that proper guidance

can be provided to them for protective maneuvers³.

Upon Arrival and Stay in Hospital: The patients must be guided to limit their movement in specific settings. Strict instructions should be focused to wear mask prior to entering the hospital settings for screening of COVID-19. Besides this both for HCWs and patients, guidance should be there to maintain hand hygiene, respiratory hygiene and cough etiquette. Provision of alcohol based hand rub (ABHR)/sanitizers comprising of 60-95% alcohol should be ensured at all necessary places i.e. main entrances, waiting rooms, wards etc. The prioritization should be done for suspected cases based upon severity of symptoms. While for primary evaluation ensure wearing of PPEs preferably in an isolation room. Afterwards advise and segregate the patients either for hospital management or home isolation³.

Patients Placement: A careful and vigilant decision must be taken after evaluation that whether hospitalization is needed or not. For hospitalization, single person isolation rooms should be preferred, having attached bathroom. The Airborne Infection Isolation Rooms (AIIRs), should be reserved for patients undergoing aerosol generating procedures. Besides this patient's movement should only be limited for medical purpose. The preference should be given to perform all procedures in the patient's room followed by proper cleaning afterwards³.

Management with less interaction with Attendants and Visitors: Interaction should only be allowed for limited number of visitors, after thorough screening for fever and COVID symptoms. Other options like video call should be preferred³.

6. SOPs for Healthcare Personnel: For HCW mandatory wearing of proper N95 mask with respirator or in case of deficiency surgical face mask must be worn. While leaving the premises of health care facilities, wearing of ordinary cloth mask should be done. The PPEs are not required for ones who are not directly dealing with

patients. For those only a cloth face mask can suffice the requirement. In case of touching the face mask either for adjustment or any other purpose HCWs must be instructed to follow hand hygiene measures. In view of all this, specific training sessions should be done with HCWs for PPEs selection and use, along with the care for putting on and removing PPEs without contamination³.

Guidance and Sick leave Policies for HCPs: The sick leave policies should be established for HCPs. They should be guided to have self evaluation monitoring to see the presence of fever or any other symptom. In case of fever $\geq 100.0^{\circ}\text{F}$, sick leave must be availed. Screening of all HCPs should be done in the beginning of their shifts in order to contain the spread³.

7. Additional Policies to Reduce Risks for Acquaintance: In view of rapid transmission in community, incorporation telehealth services can be a big step to break the triage of infection transmission. Along with this, separate centers for respiratory virus evaluation should be established, so that patient mixing can be minimized³.

8. Adherence for Sticking to Standard Precautions to Reduce Transmission: The main theory behind this is considering every patient a case of COVID-19, and a probable source for others. So clarity for proper donning (putting on), doffing (taking off), and disposal of any PPE should be there for all HCWs following few points must be given due care for all this³:

- **Maintenance of Hand Hygiene:** The ABHR with 60-95% alcohol for atleast 20 seconds, or frequent hand washing with soap and water for atleast 40 seconds, are the good protective measures³. Similarly wearing of new gloves is recommended for touching every patient. While alcohol or bleach rubbing is recommended before or after touching the inanimate things i.e stethoscope, otoscope, thermometers etc. The waste disposal should be done in waste bin with matching bag and safety precautions for sharps⁸.

- **Personal Protective Equipment:** The details regarding donning/doffing/cleaning,

reuse etc should be clearly circulated amongst all HCWs³.

- **Respirator or Facemask:** The N95 respirator, disposable filtering facepiece respirators, or facemask (if a respirator is not available) must be worn prior entering into the patient room or isolation ward. The reusable respirators i.e. powered air-purifying respirators (PAPRs) must be cleaned and disinfected in accordance with the guidance³.

- **Eye Protection:** A disposable face shield or goggles must be worn prior entering patient's room. They must be removed before leaving specific area. In case of reusable goggles, proper disinfection guidelines should be followed. The personal eye glasses and contact lenses are not at all adequate for protection³.

- **Gloves:** Wearing of clean gloves is recommended prior to entering the patient's room. Immediate changing is mandatory in case the gloves are torn or heavily contaminated. Remove them before leaving patient's room followed by hand hygiene³.

- It was identified that the health system must be strong enough to prevent the spread of COVID-19. A Tanzanian study identified that strict SOPs should be followed for the maintenance of hand hygiene and disinfection procedures in hospital settings. By this it will be ensured that transmission to patients or frontline health workers⁸.

- **Gowns:** Like all PPEs, gowns are also recommended to be worn prior to entering patient's room. Immediate changing and discard is recommended in case it becomes soiled. However, after every use, it is recommended for reusable cloth gowns to be laundered. In case of shortage of gowns, prioritization should be done for aerosol generating procedures, and handling the RT PCR positive cases for COVID-19. The care should be taken more while changing bed linen, dressing, showering, bathing, transferring, providing hygiene, toileting, changing briefs etc³.

- **Precautions While Execution of Aerosol Generating Procedures (AGPs):** Such type of procedures should be performed with great care and caution. Health care professional (HCP) doing the procedure must wear N95 mask or higher-level respirator, PAPRs, and elastomeric respirators, eye protection, gloves, and a gown. The room must be clean and disinfected afterwards³.

- **Collection of Diagnostic Respiratory Specimens:** Collection of specimens for COVID-19 should be done in normal examination room with closed door. Same all precautions as mentioned for AGPs should be under taken. Limited number of HCPs should be involved for procedure³.

9. Implementation of Strict Infection Control Policies: The equipment should be segregated for either the positive or even suspected cases of COVID-19. Proper disinfection procedures should be followed even after the use of dedicated equipment for cleaning and disinfection purpose³.

10. Guidelines for Airborne Infection Isolation Rooms, Respirators and Facemasks: The AIIRS should be single room with negative pressure and a minimum of 6 air changes per hour. This is comparable with 12 air changes per hour which are recommended for newly constructed or renovated areas. The presence of high-efficiency particulate air (HEPA) filter are recommended for such places³.

WHO-UNICEF highlighted that at a community level provision of clean water supply, good sanitation systems can also help to combat the pandemic⁸. The crux of all this is the direly required behavioral change to realize the seriousness of situation and a change to attitude⁹. Here come the significance for training regarding psychological skills besides the technical knowledge for infection prevention and control.

RECOMMENDATIONS

1. Spread of information by various media campaigns is required to create awareness at all levels i.e. community, regional, National,

and Global, that infection prevention is the only way to combat COVID-19 spread.

2. At community level use of facemask should be encouraged along with guidance to maintain social distancing practices.
3. In order to make the morale high of positive cases, psychological support by the attendants and doctors will help speedy recovery of patient.
4. In health care settings, HCWs should wear PPEs while dealing with suspected or confirmed cases.
5. Emphasis on the training of proper use of PPEs, re-training, evaluation and monitoring with an active feedback mechanism.
6. The quality of PPEs must not be compromised.
7. Strict infection control policies should be followed for hospital settings.
8. Frequent use of surface disinfectants should be done in patient's room during and after discharge
9. The presence of high-efficiency particulate air (HEPA) filters is recommended for places such as Airborne Infection Isolation Rooms.

CONCLUSION

It is concluded that use of various infection prevention and control measures at community and health care settings are the mandatory steps to control the spread of COVID-19.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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