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Review Article

Nursing Warriors in Covid-19: Prevention, Precautions and Practice

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Abstract

Novel Coronavirus, which is usually pronounced as COVID-19 is a kind of infected disease. Signs and symptoms include fever, cough and shortness of breath. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome and sometimes death. Currently, there is no definitive treatment or vaccine for COVID-19. In the unparalleled and extraordinary public health emergency in which we find nurses, across the world nurses stand at front line are the most vulnerable for infection. This comprehensive review provides the role and responsibilities of nurses in the management of patients with COVID-19, which starts from the initial assessment (screening desk), care of patients in suspect and critical unit and care of the dead body.

Keywords: *Assessment; Nursing Care; COVID-19; Nursing Staff*

Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), that can affect both humans and animals [1]. The disease was first identified in December 2019 in Wuhan, the capital of China›s Hubei province, and has since spread globally, resulting in the ongoing 2019-20 coronavirus pandemic [2]. Coronavirus infections are respiratory in nature and can range from the common cold with mild symptoms to more severe infections, such as severe acute respiratory syndrome and Middle East respiratory syndrome [1].

After almost 3 months, on March 11, 2020, the World Health Organization recognized it as a pandemic considering its significant ongoing spread in multiple countries across the world [2].

Incidence of COVID-19

Total number of COVID-19 cases as on 10 July 2020 has 12102328 reported globally, out of which confirm deaths are accounted is 551046 and in India is 79380, out of which 276682 cases are still active, 495512 cases have been cured/discharged and 21604 are confirmed deaths [3].

Rajasthan: COVID-19 cases

As of 10 July 2020, cases of COVID-19 have been reported in Rajasthan state is 22563, out of which 5002 cases are still active, 17070 cases have been cured/discharged and 491 are confirmed deaths [4].

Nursing and the novel coronavirus: Responsibilities in a global outbreak

Each Institution or health service must have full responsibility for infection control measures and training staff in infection control and in providing a safe work environment. Since acquiescence with infection control methods may be sub-optimal, hospitals should not rely

on prevailing staff knowledge of or compliance with infection control but must take active steps to train or retrain staff and emphasise the vital importance of the techniques in this condition.

Setting up isolation facility/ward for suspected and confirmed covid-19 patient [5]

The purpose of isolation ward is to control the airflow in the room so that the amount of airborne infectious particles is reduced to a level that safeguards cross-infection of other people within a healthcare setting is highly implausible:

- Post signage's on the door signifying that the space is an isolation ward.
- Eliminate all non-essential furniture and check that, remaining furniture is easy to clean, and does not hold any kind of dirt or moisture.
- COVID-19 patients should be kept in single rooms.
- However, if sufficient single rooms are not available in hospital, beds could be put with separation of at least 1 meter (3 feet) from one another.
- To construct a 10 bed facility, a minimum space of 2000 sq. feet area is required.
- Preferably the isolation ward should have a separate entry/exit and should not situated with post-surgical wards/dialysis unit/ labour room etc.
- Isolation ward should be in a separated area which is not visited by outsiders.
- The entree to isolation ward should be through committed lift/stairs.
- There should be double door entry with changing room and nursing station. Adequate PPE should be available in the changing room with bins to collect disposed PPEs as per the BMWM guidelines.
- Stock the PPE supply and linen outside the isolation area. Setup a trolley outside the door to collect PPE. A checklist may be useful to confirm that all equipment is available.
- Place suitable waste bags in a bin. If possible, use foot pedal bin. Ensure that used bins remain inside the isolation rooms.
- Place a puncture-proof container for sharps disposal inside the isolation area.
- Keep the patient's personal belongings to a minimum. Keep water campers and cups, tissue wipes, and all items essential for attending to personal hygiene within the patient's range.
- The equipment (e.g. stethoscope, thermometer, blood pressure cuff, and sphygmomanometer) should be separated for the patient. Meticulously cleaned and disinfected the equipment before using for care of other patient.
- Any equipment that is required for other patient care should, place in suitable container with a cover outside the door for disinfection or sterilization.
- Ensure that appropriate hand washing facilities and hand-hygiene supplies are available, with alcohol-based hand rub.

- Make sure sufficient room ventilation should be there. A negative pressure in isolation rooms is required for patients requiring aerosolization procedures such as intubation, suction nebulisation). These rooms might have separate air-conditioning and should not part of the central air-conditioning.
- If air-conditioning is not available, negative pressure could also be generated through putting up 3 - 4 exhaust fans which driving air out of the room.
- In hospital, where there is adequate space, natural ventilation may be followed such as isolation facility should have large windows on opposite walls of the room allowing a natural unidirectional flow and air changes.
- The isolation ward should have a separate toilet with proper cleaning and supplies.
- Ensure regular cleaning and proper disinfection of common areas and adequate hand hygiene by patients, visitors and care givers.
- Ensure meticulous daily cleaning of the isolation room or area.
- Visitors to the isolation ward should be restricted. For unavoidable entries, they should use PPE according to the hospital protocol and instructed for proper hand hygiene practices prior to entry into the isolation ward.
- Ensure that visitors consult the health-care worker in charge before being allowed into the isolation areas. Keep a duty roster of all staff working in the isolation areas, for possible outbreak investigation and contact tracing. Healthcare workers posted to isolation ward need to be committed and not allowed to work in other ward.
- Corridors with regular patient transport should be well-ventilated.
- All health care workers involved in patient care should be well trained in the use of PPE.
- Set up a telephone or other method of communication in the isolation ward to permit patients, family members and visitors to communicate with health-care workers.

Caring for a COVID- 19 patient in institutions

Screening desk [6,7]

- All patients reaching the OPD in hospital should pass through Screening Desk and patient should be given a triple layer surgical mask OR advise them that they should put on their own cloth face covering, regardless of symptoms, before entering the facility and instructed to maintain social distancing and practice respiratory hygiene in OPD.
- Screening desk will assess the patients if patient is not having any symptom; he/she will be directed to routine emergency/OPD/ services (as per institute policy).
- Nursing staff should be in full PPE at the screening desk.
- All health care personnel should remain at least 1 - 2 meter away from the patient and practice hand hygiene frequently.
- Fix the physical barriers (glass or plastic windows) at reception areas to reduce close contact between triage personnel and potentially infectious patients.

- Limit and monitor points of entry to the ward.
- Nursing staff posted at screening desk will do the Initial assessment i.e. vital signs and collect the history regarding any comorbidities or ongoing medication.

Transferring a patient from screening desk to covid-19 ward

- If any symptoms like cough, fever, shortness of breath or history of contact with positive patients: Patient will be admitted to COVID Suspect Ward.
- Prior information should be communicated to the admitting ward regarding transfer of patient.
- Patient should be instructed to walk to the designated lift/area following the designated path accompanied by one hospital attendant.
- If any wheel chair/stretcher/lift was used to transfer the patient, it should be disinfected as per protocol.

Nursing care in a COVID suspect ward [6,7]

- Suspect patients should be allotted beds in such a way to maintain the maximum distance as possible.
- Patient should be instructed to continue their routine medications if any for e.g. Diabetes, Hypertension etc.
- Patients should be informed about all the available facilities and are instructed to contact on a given DUTY MOBILE number in case of any problem/need.
- Patients are instructed to maintain hand hygiene frequently especially before and after using water and restroom facility.
- Nursing staff in full PPE should remain inside the ward in a designated area and should enter the ward every 1 - 2 hours for assessment.
- Isolate patients with symptoms of COVID-19 in an examination room with the door closed. If an examination room is not readily available, ensure the patient is not permitted to wait with other patients taking care.
- Integrate questions about new onset of COVID-19 symptoms into daily assessments of all admitted patients. Monitor for and evaluate all new fevers and symptoms consistent with COVID-19 among patients.
- Sample collection for COVID testing will be done by microbiology department.
- Depending upon the test report patient will be transferred to Positive ward or discharged/ quarantined as per institution policy.

Nursing care in a COVID positive ward

- Orient the patient about ward like washroom facility, water facility, about food and stay.
- Patient should change into hospital dress (as per institutional policy) and his/her personal clothing should be sealed in a BMW bag.
- Nursing staff should provide DUTY MOBILE number to the patients on which they can contact in case of any need/assistance.

- Well ventilated (Windows to remain closed but functional exhaust fan should be available as per the size of the ward) [8].
- Specific assessment in case of comorbidity (for e.g. blood sugar in diabetic patients) should be done as per physician order. Administered all routine medicine on time.
- Once the patient has been discharged or transferred, HCP, including environmental services personnel, should refrain from entering the evacuated room until enough time has elapsed for enough air changes to remove infectious particles.
- After this time has elapsed, the room should clean properly with surface disinfection before it resumed to routine use [6].

Patient care in COVID critical care unit

- Staffing - Nurse patient ratio of 1:2 should be maintained which can be modified to 1:1 in case of emergency.
- Patient assessment and care - Patient should be on continuous monitoring and any change in vital parameters should be immediately reported to the physician.
- Administered all prescribe drugs on time.
- While administering medication, nurse should prepare all the medications at a designated place and then go for administering them so as to minimise the duration of stay near the patient.

Care of critically ill patient with COVID-19 [8]

Summary Recommendations

Infection Control:

- For health care workers who are performing aerosol-generating procedures on patients with COVID-19, the COVID-19 Treatment Guidelines Panel (the Panel) recommends using fit-tested respirators (N95 respirators) or powered air purifying respirators rather than surgical masks, in addition to other personal protective equipment (i.e. gloves, gown, and eye protection such as a face shield or safety goggles) (AIII).
- The Panel recommends that endotracheal intubation for patients with COVID-19 be done by health care providers with extensive airway management experience, if possible (AIII).
- The Panel recommends that intubation be achieved by video laryngoscopy, if possible (CIII).

Hemodynamic Support:

- The Panel recommends norepinephrine as the first-choice vasopressor (AII).

Ventilatory Support:

- For adults with COVID-19 and acute hypoxemic respiratory failure despite conventional oxygen therapy, the Panel recommends high-flow nasal cannula (HFNC) oxygen over noninvasive positive pressure ventilation (NIPPV) (BI).
- In the absence of an indication for endotracheal intubation, the Panel recommends a closely monitored trial of NIPPV for adults with COVID-19 and acute hypoxemic respiratory failure for whom HFNC is not available (BIII).
- For adults with COVID-19 who are receiving supplemental oxygen, the Panel recommends close monitoring for worsening respiratory status, and in the event intubation becomes necessary, that the procedure be performed by an experienced practitioner in a controlled setting (AII).
- For mechanically ventilated adults with COVID-19 and acute respiratory distress syndrome (ARDS), the Panel recommends using low tidal volume (Vt) ventilation (Vt 4 - 8 mL/kg of predicted body weight) over higher tidal volumes (Vt > 8 mL/kg) (AI).
- For mechanically ventilated adults with COVID-19 and refractory hypoxemia despite optimized ventilation, the Panel recommends prone ventilation for 12 to 16 hours per day over no prone ventilation (BII).
- For mechanically ventilated adults with COVID-19, severe ARDS, and hypoxemia despite optimized ventilation and other rescue strategies, the Panel recommends a trial of inhaled pulmonary vasodilator as a rescue therapy; if no rapid improvement in oxygenation is observed, the patient should be tapered off treatment (CIII).
- There are insufficient data to recommend either for or against the routine use of extracorporeal membrane oxygenation for patients with COVID-19 and refractory hypoxemia (BIII).

Drug Therapy:

- There are insufficient data for the Panel to recommend either for or against any immunomodulatory therapy in patients with severe COVID-19 disease (AIII).
- In patients with COVID-19 and severe or critical illness, there are insufficient data to recommend empiric broad spectrum antimicrobial therapy in the absence of another indication (BIII).
- The Panel recommends against the routine use of systemic corticosteroids for the treatment of mechanically ventilated patients with COVID-19 without ARDS (BIII).
- In mechanically ventilated adults with COVID-19 and ARDS, there are insufficient data to recommend either for or against corticosteroid therapy in the absence of another indication (CI).
- In COVID-19 patients with refractory shock, low-dose corticosteroid therapy is preferred over no corticosteroid therapy (BII).

Rating of Recommendations: A = Strong; B = Moderate; C = Optional

Rating of Evidence: I = One or more randomized trials with clinical outcomes and/or validated laboratory endpoints; II = One or more well-designed, nonrandomized trials or observational cohort studies; III = Expert opinion

Considerations for inpatient obstetric healthcare settings [9]

These infection prevention and control concerns are for healthcare facilities providing obstetric care for pregnant patients with suspected or confirmed coronavirus disease (COVID-19) in inpatient obstetric healthcare settings including obstetrical triage, labor, delivery, recovery and inpatient postpartum settings.

Prehospital considerations

- Hospital should designate emergency OR and labor room for suspected and confirmed cases of COVID 19.
- Healthcare providers should promptly notify infection control personnel at their facility of the anticipated arrival of a pregnant patient who has suspected or confirmed COVID-19.

During hospitalization

- Pregnant women admitted with suspected COVID-19 or who develop symptoms consistent with COVID-19 during admission should be prioritized for testing.
- Nursing staff who is receiving patient in labor room should use full PPE.
- Healthcare facilities providing inpatient obstetrical care to pregnant women, should limit visitors, who have known or suspected COVID-19 infections.
- Visitors should be limited to those who are necessary for the pregnant woman's well-being and care.
- Use of alternative way such as such as video-call applications on cell phone for communication with patient and visitor.
- Any visitors permitted to labour or delivery should be screened for symptoms of COVID-19 and should not be allowed entry if fever or other symptoms are existing.

Census:

- Census should be clear, complete and comprehensive with detailed information.
- Data should be reported on time and convey to concern authority.

Inventory management

- Only essential articles to be kept inside the ward to decrease the risk of spread of infection.
- Keep only those articles which are easy to clean and disinfect.
- Proper record of PPE should be maintained to prevent the misuse.
- Documentation

COVID-19: Care of dead body [10]

Standard Precautions and Infection prevention control practices to be followed by health care workers while handling dead bodies of COVID.

Training in infection and prevention control practices while care of dead body

All staff who handle dead bodies in the isolation area, mortuary, ambulance and those workers in the crematorium/burial ground should be trained in the infection prevention control practices:

- Removal of the dead body from the isolation ward.
- The health care worker care to the dead body should perform hand hygiene, ensure proper use of PPEs.
- All tubes, drains and catheters on the dead body should be removed.
- Any hole, wound or lesion (resulting from removal of catheter, drains, tubes) should be disinfected with 1% hypochlorite and should be dressed with impermeable material.
- Take precautions while handling sharps such as intravenous catheters and other sharp devices and should be disposed into a sharps container.
- Plug oral, nasal orifices of the dead body to prevent leakage of body fluids.
- If the family members of the patient desires to outlook the body, at the time of removal from the isolation ward, they may be permitted to do so with the use of standard precautions.
- Place the dead body in leak proof plastic bag. The outer surface of the body bag can be decontaminated with 1% hypochlorite. The body bag can be wrapped with a mortuary sheet or sheet provided by the family members.
- All used linen should be handled with standard precautions, put in biohazard bag and the outer surface of the bag is disinfected with hypochlorite solution.
- Used equipment should be autoclaved or decontaminated with disinfectant solutions according to hospital infection control protocol.
- All biomedical waste must be handled and disposed of in accordance with biomedical waste management guidelines.
- The health staff who handled the dead body will doff personal protective equipment and will perform hand hygiene.
- Provide counselling to the family members of the patient and respect their feelings.

Special attention to nurse's protection in COVID-19 [11]

Provide education and training for nurses

Adequate education and training is required to nurses, which includes the use of personal protective equipment (PPE), hand hygiene, ward disinfection, biomedical waste management, sterilization of patient care devices and management of occupational exposure.

Establish a systematic, rational shift schedule

With the rapid increase in patients, which will cause drastic nurse shortages, it is very significant to establish a scientific, reasonable nursing shift schedule in 3 shift duties.

Recommendations for nurses at high risk for infection [12]:

- Protecting health care workers is an important component of public health measures for addressing the COVID-19 epidemic.
- Stop all health care interactions with patients for a period of 14 days after the last day of exposure to a confirmed COVID-19 patient.
- Be tested for COVID-19 if they develop any symptoms indicative of COVID-19.
- Quarantine for 14 days in a designated setting.

Recommendations for health workers at low risk for COVID-19 [12]:

- Self-monitor temperature and respiratory symptoms daily for 14 days after the last day of exposure to a COVID-19 patient. HCWs should call the health care facility if they develop any symptoms suggestive of COVID-19;
- Reinforce contact and droplet precautions when caring for all patients with acute respiratory illness and standard precautions for all patients;
- Reinforce airborne precautions for aerosol-generating procedures on all suspected and confirmed COVID-19 patients;
- Reinforce the coherent, correct, and reliable use of personal protective equipment;
- Apply WHO's "5 Moments for Hand Hygiene" before touching a patient, before any clean or aseptic procedure, after exposure to body fluid, after touching a patient, and after touching a patient's surroundings;
- Practice respiratory etiquette at all times;
- The increase in awareness of personal protection, sufficient PPE, and proper preparedness and response would play an important role in lowering the risk of infection for healthcare workers.

Health care facilities should [12]:

- Provide compensation for the period of quarantine and for the duration of illness (if not on a monthly salary) or contract extension for duration of quarantine/illness.
- Provide review of Infection Prevention and Control (IPC) training for the health care facility staff, including HCWs at high risk for infection after 14-day quarantine period.

Prevent and combat burnout [13]

During the pandemic, positive and negative emotions of frontline nurses interlace and exist. In the early days, negative emotions were dominant and positive emotions appeared simultaneously or gradually [14].

Special interventions to promote mental well-being in health care workers exposed to COVID-19 need to be immediately implemented with nurses and frontline workers requiring particular attention [15]:

- Regular and intensive training for all healthcare providers is necessary to promote preparedness and efficacy in crisis management [16].

- Ensure breaks and adequate sleep [17].
- Exercise regularly and have a healthy diet should be taken.
- Practice relaxation exercises like yoga.
- Make time for yourself and your family.
- Carry out some activities and hobbies unrelated to work

Responsibilities of team leaders/supervisors (nurses) in hospital [18]

To reduce the stress of the health care workers, team leaders are encouraged to:

- Focus on the long-term, ensure as much as training for their staff to fulfil roles.
- Mix and match, ensure that juniors with limited experience work with their senior colleagues Ensure staff rotation from jobs of higher stress to lower stress and vice versa.
- Duty/shift breaks/holidays to be agreed within the team and ensured as far as possible.
- Ensure good quality communication with accurate information updates.
- Have regular team meetings even if it's brief.

Indications for referral for mental health assessment [20]

- Expressing suicidal ideas
- Violent/aggressive behaviour
- Uncontrolled use of alcohol/drugs
- Crying or expressing uncontrollable distress
- Unexplained bizarre behaviour like talking or smiling to self
- Significant deterioration in occupational functioning.

Coping with stress during the 2019-nCoV outbreak ABCDE of self-care in pandemic

- A=About (physically active)
- B=Body (Meet your physiological needs)
- C=Control (Being mindful of our mental processes)
- D=Develop (Post-traumatic growth)
- E=Emotions (Combinative behaviour therapy, Mindfulness based meditation, Progressive muscle relaxation).

Conclusion

The COVID-19 pandemic is now a major global health threat. In spite of these occupational risks and the instant need for health system interventions to support nurses, nursing also has exclusive responsibilities in the COVID-19 outbreak. Nurses will remain at the frontline of patient care, in hospitals and closely involved in assessment and monitoring of outpatient and community settings.

During the outbreak, positive and negative emotions of frontline nurses interlace and exist. Nurses are already fully involved in COVID-19 response and, with suitable support, will be main players in ending the pandemic Self-coping style and psychological support are significant for nurses to preserve mental health.

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Conflicts of Interest

The authors declare no conflict of interest.

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