



Building Capacity of Covid-19 Frontline Health care workers: Experience from Eastern India

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Abstract

Covid-19 outbreak (SARS-Cov 2) which is caused by distinct corona virus an acute infectious disease transmitted via respiratory route. In early stages of the pandemic, training of the frontline health care workers played an active crucial role in restricting the transmission among health care workers. Consequently training was given to all the health care workers (Doctors, Nurses & Supportive staff) of the institute. In this article we share our experiences of training sessions to the health care workers as per the institute Covid-19 standard operating procedures.

Keywords: Covid-19, Health care workers.

Introduction

The index case of COVID-19 in the Indian subcontinent was reported in the month of January 2020 among student returnees from Wuhan, China to Indian state of Kerala. Indian Health care system became alarmed, triggering infection control practices against a potential COVID-19 outbreak. Bihar, the second most populous of states witnessed its first COVID-19 case when a 38 years old resident of Munger District admitted at AIIMS Patna tested positive for Covid-19. The most common symptoms exhibited by the patient were fever, cough, and shortness of breath,

myalgia & fever. With the first positive case, the institute created a separate COVID-19 unit with a capacity of thirty beds in addition to already functional specialty and super specialty units. On March 11, 2020, the World Health Organization declared the Covid-19 outbreak a Pandemic. For management of Covid-19 at AIIMS, Patna, a central team was formed for administrative decisions and clinical guidance.

Separate teams with specific functions were created for clinical management of Covid-19 patients admitted in the hospital.

SL.No	Clinical Teams	Roles & Responsibilities
1	Team A	To run flu corner, Covid-19 screening OPD.
2	Team B1	Responsible for sampling of all suspected cases of Covid-19
3	Team B2	Responsible for treatment of stable suspected patients at Covid-19 isolation area
4	Team B3	Responsible for treatment of Covid-19 suspected Pediatric patients
5	Team C	Provides consultation of acutely sick patients admitted in any other Covid-19 area
6	Team D	Responsible for admitting stable Covid-19 confirmed cases
7	Team E	Responsible for post death management of Covid-19 patients
8	Team F	Responsible for lab tests to confirm Covid-19 positivity(RTPCR)

Training Team consisted of Medical faculty, Nursing faculty & Infection control Nurse to ensure that every health care providers involved in care of suspected or confirmed covid19 infection is oriented and trained on various aspects of care, responsibilities and safety of themselves & other health care workers. Training was conducted as per the training schedule. Separate Covid-19 rosters of Health care workers (Faculty, Resident doctors & Nursing officers) were created for each area and it was mandatory that each health care worker undergo necessary orientation & training before their duty to ensure safety of themselves & others.

Objectives of the Session

The objectives of the training session are as follows:

- To enhance a well-coordinated, planning& monitoring of response interventions at institute level and enhance timely sharing of situation updates with all relevant stake holders (Doctors, Nurses& other health care workers).
- To identify and test high risk Covid-19 exposures among health care workers.
- To prevent human to human transmission among close contacts of health care workers.
- To integrate Covid-19 transmission prevention components in existing infection control protocols.

Methods

Prevention & control of Covid-19 transmission among health care workers was the central theme of the training while due weightage was accorded to standard safety precaution as well. Daily training schedule was drawn for the period of 31st March 2020 to June 10th 2020. The transmission of Covid-19 was prevented mainly by following standard & transmission based precautions.

The components of Training module were:

- Hand Hygiene
- Personal Protective Equipment (PPE)

- Environmental cleaning & disinfection
- Biomedical waste Management
- Spill Management

Hand Hygiene

Hand Hygiene can reduce the spread of pathogenic microorganisms to patients & health care workers (WHO, 2009). The training module of hand hygiene were developed based on following steps 1. Collaborative Planning 2. Searching essential resources 3. Effective delivery

1. Collaborative Planning

Collaborative planning prevents mismatches in expectations & priorities between Trainers & Trainees. The Planning team comprised of Medical Faculty, Nursing Faculty & infection control nurses to design of content and activity plans for meeting various needs of healthcare workers. When the trainers started training program, scope of hand hygiene in Covid-19 outbreak were suggested. For example a task of hand hygiene when, how& why to do hand hygiene. The planning team latter reviewed following questions to evaluate teaching tasks

1. What was the content of hand hygiene?
2. What was the learning mode (videos or practical sessions) of hand hygiene?
3. Do all health care workers support hand hygiene in prevention of Covid-19.

The above said questions reflected in teaching content, learning modes & tasks of trainers in preparing hand hygiene training module

2. Searching essential resources

After extensive search of resources regarding hand hygiene in various databases, resources in electronic platform such as World health organizations (WHO, 2009) were given prime importance in the training module. The training module also had instructional videos, live practical sessions, and Power Point slides to help health care workers promote hand hygiene (for example washing hands with soap & water, and rubbing hands with alcohol based hand rub).

In the step of searching essential resources, trainers reassessed the three reviewing questions

which were discussed in step 1. The first question reflects the content of hand hygiene ie moments of hand hygiene. This is an approach by WHO to highlight the key moments to perform hand hygiene in order to prevent transmission of microbes in health care facilities. The five moments of Hand Hygiene are

- Before touching a patient
- Before doing a procedure
- After a procedure or body fluid exposure risk
- After touching patient
- After touching patient surroundings

The second question was regarding learning mode of hand hygiene. Live practical sessions & instructional videos were demonstrated regarding steps of Hand Hygiene. Discussions were also done in two important aspects such as when to use hand rub or wash hands with soap & water. The third question were regarding support of health care workers in promotion of hand hygiene in Covid-19 units. The arrangements regarding availability of hand rubs in donning & doffing area & Covid-19 units were done for promotion of hand hygiene

3. Effective delivery

Live practical sessions provided effective mode of delivery of hand hygiene. Live practical sessions had improved the learning outcomes of health care workers .The practical sessions comprised of demonstration of six steps of hand hygiene followed by redemonstration of each steps of hand hygiene by health care workers. At the end of the training session, to assess the learning outcomes of hand hygiene a 20 item questionnaire in which hand hygiene was one among the component were circulated among health care workers.

This class room approach provided real time interaction between health care workers & the trainers. This approach helped in promotion of hand hygiene in Covid-19 units of the hospital.

Personal Protective Equipment’s (PPE)

1. Effective implementation of PPE

Health care workers should implement appropriate personal protective equipment (PPE) regarding

contact & droplet precautions based on recommendations by WHO. For health care workers in ICU, advanced protection may were required during routine intensive care as air borne transmission may happen because of Aerosol generating procedures. In our experience, most protective choices were made and the zero medical infection rates was treated as top priority that all health care workers were equipped from head to toe. To lower the incidence of adverse events, sequences of donning& doffing PPE were carefully developed based on above selections through group discussions & consensus was reached among the teams.

The policy of wearing PPE within the institute were as follows:

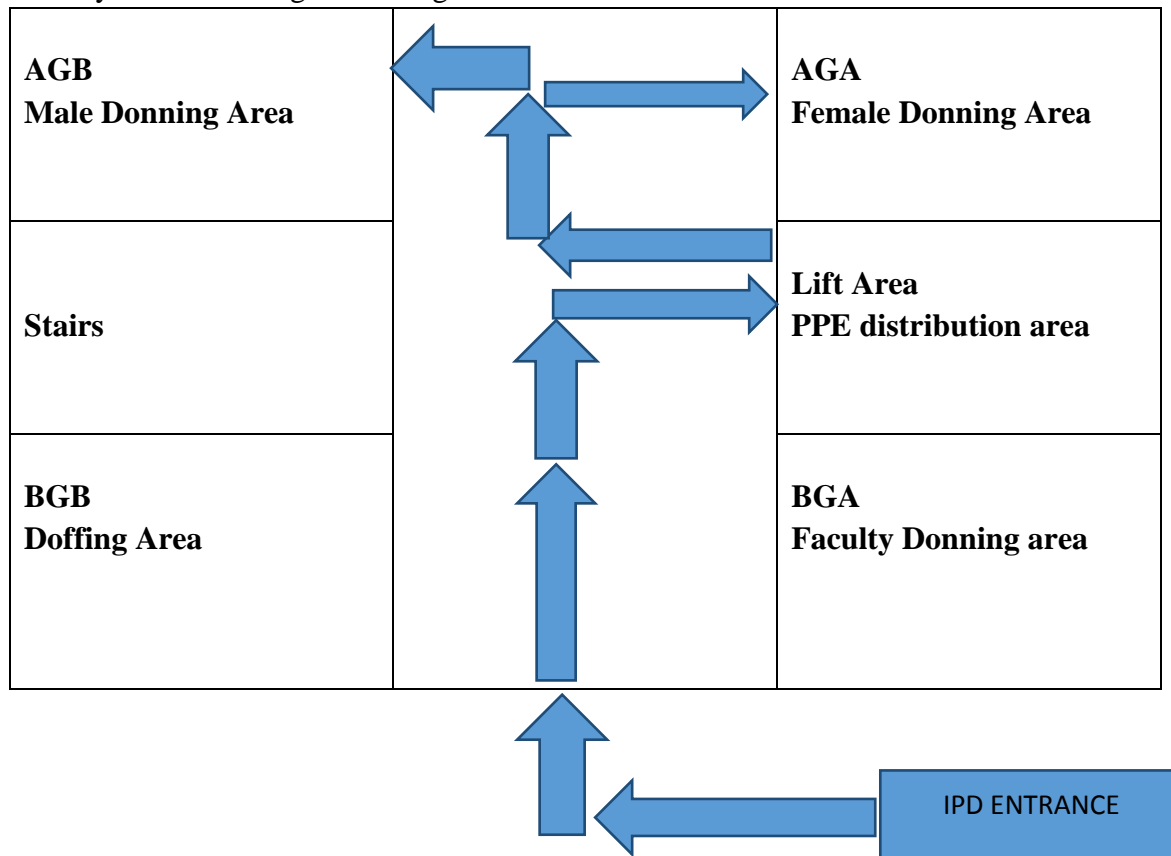
Table 1: PPE selection for covid & non-covid units

CATEGORY	RISK	LOCATION	PPE USED
A	High risk	COVID ICU (AGP) COVID OT Specimen collection COVID LAB	N-95 MASK and full PPE
B	Moderate risk	COVID WARD COVID isolation room COVID triage area involving touching or examination	Surgical mask and full PPE
C	Low risk	Nursing station COVID triage area not involving touching or examination Non-COVID wards and OPDS (handling pts with respiratory symptoms)	Surgical mask and gloves
D	No risk	Non-COVID wards and OPDS (not handling pts with respiratory symptoms)	No mask

2. Donning & doffing PPE under double channel structure

The wards were reconfigured into double channel structure before accepting Covid-19 patients. In this design the wards were divided into several working areas according to cleanliness and moving lines of the patients and medical staff were fixed. The patient care area was identified as contaminated, and all staff was fully equipped with PPE before entering the buffer area. There was separate donning & doffing areas for health care workers. There were reasonable shift rotations as per the tolerable shift length to prolong the use of PPE. In six hours shift duty, health care workers avoided eating, watering & toileting.

Figure 1: Layout of Donning & Doffing Area



Biomedical Waste Management

Amidst the Covid-19 outbreak the scenario has worsened as evidenced by some initial experience, with piles of personal protective equipment (PPE) accumulating in the hospitals. In spite of the guidelines by World Health Organization and Ministry of Health & Family Welfare, GOI regarding the rational use of PPE for Covid-19 health care settings were experiencing high demand of PPE from all categories of health care workers owing to fear of infection. This often resulted in misuse of PPE in many occasions where by generating huge quantities of BMWs which are difficult to store & transport with limited resources & manpower. Added to this disposal of single use surgical masks along with general waste also added to the menace. As a result of Covid-19 pandemic in India, Central Pollution Board, Ministry of Environment, Forest & Climate has published guideline for management of waste generated during treatment/diagnosis/quarantine of Covid-19 patients. As per the guideline our has advocated

the use of double layered bags, mandatory labelling of bags as “COVID-19 “waste ,regular disinfection of trolleys ,separate registers were maintained for record keeping of waste generated from Covid-19 units, in addition to recommendation of BMW management rules, 2016. Training Team has conducted regular training program for all health care workers for BMW management .These steps in combination with strict adherence to norms had ensured us for better handling of Covid-19 outbreak in the hospital.

Environmental Cleaning & Disinfection

Cleaning helps to remove pathogens or significantly reduce their load on contaminated surfaces and is essential first step in any disinfection process. Before cleaning session it was instructed to use fresh cloth. Equipment’s used for isolation areas for patient with Covid-19 were color coded & separated from other equipment. It was instructed to use fresh hypochlorite solution on a daily basis or for each

cleaning shift. Buckets used for cleaning were washed with detergent, rinsed, dried and stored inverted to drain fully when not in use. High touch surfaces were cleaned every four hours. All the high touch surfaces, floor, walls, toilet, corridor & non-critical equipment were disinfected with 1% hypochlorite.

Transmission Based Precautions

Additional droplet & contact precautions were followed in transmission based precautions. These measures protected health care workers & other patients from cross infections with in the hospital.

Contact Tracing

On April 15, 2020 a tested positive Covid-19 case had created panic among health care workers of the institute. This was because the patient was attended by many health care workers in non-covid areas of the hospital before being admitted in the Covid-19 suspect ward. Most of the health care workers working in the non Covid-19 area of the hospital demanded testing and 14 day home quarantine. Quarantine of many health care workers was not possible because it will result in hindrances of various services rendered by the institute. So for combating the problem the institute developed contact tracing algorithm & contact investigation form for health care workers which determined level of exposure, need for testing & quarantine. The conditions of High risk & low risk exposure formulated based on existing literatures. Separate mode of actions were also defined for High risk & low risk exposures based on existing literatures. Using the designed contact investigation form 28 suspected contacts of Covid-19 were interviewed among which 7 were found to have high risk exposure. All high risk exposures were home quarantined for 5 days along with their direct contacts and were advised to self-monitor themselves for Covid-19 compatible symptoms. None of the high risk contacts developed Covid-19 compatible symptoms, and they all tested negative on 5th day after exposure and immediately joined duties after that. The low risk exposure contacts continued to

work & self-monitor for Covid-19 symptoms. As per the training schedule around 1317 health care workers have undergone training on infection prevention & control of Covid-19 which included Senior Residents (89), Junior Residents(107), MBBS Interns(16), Clinical Instructors/Tutor in Nursing(11), Senior Nursing officers(66), Nursing officers (767) Physiotherapists(12), Sanitary Inspectors(3), Hospital attendants(59), Sanitation supervisors(7) & Housekeeping staff (259).

The limited movement and no mass gathering guideline led to virtual training of Resident Doctors & Nursing officers at the comfort of their work areas & homes as long as they had access to internet, laptop or desktop.

A 20 item questionnaire were sent to all the health care workers who took part in training session via social media platforms. The questionnaire was composed of questions which were equally distributed to all domains of standard safety precautions. Data collection was done through online questionnaire which took about 20 minutes to complete. After completing the post test, answers were automatically tallied in an Excel table in a Google form document. Around 600 Health care workers completed the post test.

Results

The data were analyzed and interpreted. Around 81% of Health care workers had good knowledge regarding infection prevention & control of Covid-19.

Limitations of Training

Training was limited to the health care workers currently working at the institute. Pretest were not taken from health care workers who have undergone training.

Conclusion

Training concluded that the health care workers were very anxious regarding Covid-19 outbreak. Post test scores of the training indicated that the health care workers including Doctors, Nursing officers & other health care workers had good

knowledge regarding infection prevention & control of Covid-19.

All information provided in this paper is to strengthen the clinical practice in tertiary care settings and to better protect health care workers from Covid-19 infections.

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Conflict of Interest

The author has declared that there is no potential conflict of interest with respect to the research, authorship and/or publication of this article.

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