

Leveraging Innovative Training Technologies for Health Care Workers: Preparing, Privileging and Responding to Novel-Corona Virus 19 Pandemic Challenges and Opportunities in Tertiary Care Hospitals in India

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Abstract

Exclusive training of health care workers regarding working instructions for the care of Covid-19 patients and Covid -19 ward is essential. With the help of simulation-based training and e-learning platforms via mobile app (Daksh), the training programmes were executed and implemented. All the safety precautions were adhered to. This project aimed to train all the nursing staff about the working instructions for taking care of Covid-19 patients. The main objectives were: to ensuring a smooth work process in Covid-19 wards; safety of health care workers by giving them adequate E-learning and simulation-based training and; clinical privileging of the staff nurses for better delivery of quality patient care in Covid-19 departments, thereby ensuring patient safety and patient satisfaction. The project was implemented via E-learning platform Daksh, which a standard platform by Elsevier Nursing Skills for nurses to learn and grow. Thirty one working instructions with the video material were created and uploaded in portal Daksh. More than 3,500 staff nurses were trained via this portal within a stipulated time. All the e-learning training data can be instantly retrieved from the portal for further analysis.

In India, the first case of coronavirus pandemic was reported on 30 January 2020 [Wikipedia, 2020 (a); 2020 (6)]. Coronavirus is the largest RNA virus from the family coronaviridae from the coronaviridae family, Subfamily Orthocoronavirinae. order Nidovirales, and realm Riboviria (WHO, 2020). Covid-19 has many similarities with the severe acute respiratory syndrome (SARS), Ebola, and even influenza. Covid-19 infection is also called SARS-Cov-id-19 (Wikipedia, 2020 a).

India being a developing country, the Ministry of Health & Family Welfare paid special attention to this pandemic. Several measures have been initiated to control the incidence and prevalence of Covid-19. To respond to a rapidly changing situation at Max health care, we initiated specialised training for all our staff including medical, paramedical, and skilled workforces. With the help of simulation-based training and e-learning platforms via a mobile app, the training programmes were implemented. The Department of Nursing Quality Education and training team (NQET) developed 31 working instructions for all the Nurses working in Max Health Care. The working instructions and the instructional videos

were uploaded on our e-learning platform. Groups were created according to the different Max Hospitals assigned to all the employees on war footing. Within 72 hours, all the staff had to complete the modules followed by hands-on training by simulation. WHO safety guidelines for Covid-19 were followed while arranging the simulation training (Lu et al, 2020; Ministry of Education, China 2020).

Challenges Unique to Novel Corona virus

The purpose of this war-based simulation and technology-assisted training is to prepare the nursing force to take care of Covid-19 patients in the clinical setting. It ensures the smooth work process and safety of the health care workers. Clinical privileging of the staff nurses ensures delivery of quality patient care in Covid-19 departments by ensuring patient safety and patient satisfaction. All the modules illustrate and summarise the current measures taken to respond to the emerging need for technology-enhanced learning and simulation during the Covid-19 outbreak preparation in our health care setting and the potential challenges during the initiation phase.

Max Health care being the second leading hospital chain in India, initiated the standardised e-learning platform to train the Nursing staff apart from traditional classroom-based training. The NQET team developed 31 easy to understand work instructions for all the Nurses working in Max Health Care. The

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novelty of this e-learning platform-based application is to ensure 100 percent compliance to the training of all the nursing staff with to privilege the nursing workforce to work in Covid areas. Central to the concept is the learner self-motivated an objective while working.

The Strategies for Training of Health Care Workers

Preparation of working instructions for care of Covid-19 patients: Thirty-one working instructions were prepared for the nursing task force to work in Covid-specific areas. Guidelines were prepared by Ministry of Health and Family Welfare, as per WHO recommendations. Each working instruction emphasises the proper and appropriate use of personal protective equipment (PPE) to ensure the safety of health care workers. The working instructions are uploaded on the online learning management system DAKSH. It ensured the ready availability of training material both to the trainer and learner. The modules were further assigned to each nurse with a mandate to complete within the time frame. In the exit test for each module, the staff had to score 80 percent marks. Need-based working instructions has its video for learning purpose to minimise the classroom training with following features.

1. Challenging regulations to restrict personal contact for infection control that reduces face-to-face teaching and learning across all branches of our hospital.
2. Sudden increase of workload among HCWs and the duty of the health care workers are changed to 6 hours per day. Clinical teaching hours were reduced.
3. The critical and non-critical care areas of the hospital are converted for screening, isolation, and treatment of covid-19 patients on a war footing.
4. HCWs being called to the frontline for taking care of Covid-19 patients should be trained to reduce the further outbreaks since very few instructors are available to provide clinical teaching and feedback for health care providers during this pandemic situation.
5. Routine training like in-service education sessions and skill training sessions in all our hospitals were suspended.
6. The training emphasised on the appropriate use of personal protection as human to human transmission has been reported.
7. Small group simulation-based training has been initiated to nurses and other health care workers regarding donning and doffing of PPE with the improved understanding of the virus, especially its contagion and increased reports on HCWs being infected;

many HCWs expressed concern and the need to have more knowledge to protect them.

8. The role of training on the use of PPE becomes apparent. Although donning and doffing of gowns exist in the medical and nursing undergraduate curriculum, it was considered important to brush up HCWs on the same. Further training needs is also being identified gradually as more clinical features of Covid-19 are being discovered.

Clinical Privileging of Nurses

All the nurses working in Max Health Care underwent training on the 31 working instructions within the stipulated time. Based on their completion of modules privilege form was electronically generated. The copy of the privileged form was electronically generated and downloaded by the central NQET team. The nurses work in their assigned area as per privilege.

Online Learning: Platform for Learning and Growing with Emerging Choices

An online access course is suitable for improving knowledge and critical thinking (WHO, 2020). This online learning methodology is being taken more seriously, even becoming compulsory in certain institutions. Webinars play a vital role in sharing new knowledge, providing instant interactive sessions followed by clarification. Many open courses are provided by Government, NGOs, Universities, and private organisations with continuing learning credit hours.

Simulation: Future of New Education System

Simulation training has grown exponentially in India. Government-approved simulation-based training centres were established all over the country. The

Table 1: Allotment of Covid-19 working instructions to different Max units

S. No	Facility name	Total enrolled	Total assigned	Total completed	Percentage completed
1	Bhatinda	112	2032	2032	100
2	Dehradun	294	4378	4378	100
3	Gurugram	124	3021	3003	99
4	Max Smart	390	7259	7119	98
5	Max@Home	138	27	27	100
6	Mohali	389	6310	6173	98
7	Panchsheel - North	33	476	424	89
8	Patparganj	649	8881	8714	98
9	Pitampura	5	135	108	80
10	Saket -East	453	7749	7580	98
11	Saket -West	403	7371	7132	97
12	Shalimar Bagh	479	7423	7346	99
13	Vaishali	581	9751	9662	99

primary purpose of this training is to improve the knowledge, skill, application, and critical thinking of the health care worker. However, the central focus of those simulations was to meet the educational needs of different training programmes or supplement specific curricula. Training needs identification, and structured scripted simulation training has become a powerful method for future training. This is the era of simulation because of the Lack of availability of actual clinical settings and actual patients and scarcity of good institutions. Simulation ensures patient safety and provides a safe learning and training environment for health care workers to develop practical skills to deal with the situations.

Different simulation programmes have worked together and with other departments in their institutions to develop simulation curricula. A comprehensive list for simulation-based training activities include: Hand hygiene; Wearing and removing protective masks/respirators; Wearing and removing sterile gloves; Wearing and removing disposable goggles/ face shields; Donning and doffing of isolation gown and protective coveralls; Protection classification based on guidelines and so on.

These activities were delivered to HCWs in relevant departments. Particular simulations in specific settings such as intensive care, emergency, and operating rooms were conducted. They addressed the following aspects:

- Patient management at emergency triage.
- Team dynamic (especially after donning of PPE).
- Patient transportation Collection of virology sample from nasopharynx and oropharynx
- CPR in Covid-19 patient (AHA based)
- Airway management of patients infected with COVID-19.
- Extracorporeal membrane oxygenation.
- Pre-assessment and triage against infectious diseases, though documented as a national policy,

Table 2: Module wise allocation to Nursing staff and percentage completed

S. No	Working Instructions (WI)	Total staff assigned	Not Completed	Completed percentage
1	Covid-19- Urinary catheterisation and catheter care	4071	4	99.90
2	Covid-19-Nebulisation	4071	2	99.95
3	Covid-19- Isolation precautions	4071	3	99.93
4	Covid-19- Biomedical waste Management	4071	4	99.90
5	Covid-19- Wi- Intra hospital transfer	4071	5	99.88
6	Covid-19- Care of dead body	4071	5	99.88
7	Covid-19- Oxygen administration	4071	1	99.98
8	Covid-19- Inter hospital transfer	4071	7	99.83
9	Covid-19- IV Cannulation	4071	4	99.90
10	Covid-19- Nasogastric tube insertion and feeding	4071	2	99.95
11	Covid-19- Nursing care of patient with Covid -19	4071	3	99.93
12	Covid-19- Medication administration and management	4071	2	99.95
13	Covid-19- Personal hygiene	4071	6	99.85
14	Covid-19- Vitals monitoring	4071	4	99.90
15	Covid-19- Sample collection	4071	5	99.8
16	Covid-19- PPE for aerosol-generating procedure	4071	3	99.93
17	Covid-19- PPE for non-aerosol generating procedure	4071	1	99.98
18	Covid-19- Equipment cleaning and disinfection	4071	2	99.95
19	Covid-19- Food handling	4071	0	100
20	Covid-19- Spill management	4071	0	100
21	Covid-19- MELS Algorithm in patients with potential or confirmed COVID -19	4071	0	100
22	Covid-19- Donning	4071	0	100
23	Covid-19- Doffing	4071	0	100
24	Covid-19- Cleaning of toilets	4071	5	99.8
25	Covid-19- Equipment cleaning	4071	1	99.98
26	Covid-19- Ambulance transfer	4071	3	99.93
27	Covid-19- Home quarantine	4071	1	99.98
28	Covid-19- Oral and ET suction procedure	4071	0	100
29	Covid-19- Convalescent plasma therapy	4071	0	100
30	Covid-19- Administration of Remdesivir	4071	0	100

have often been overlooked in clinical practice and training.

These kinds of trainings enhance the skills of the triage HCWs and help to build confidence and reducing anxiety. The simulation also provides opportunities for systems probing for potential hospital hazards, such as an outdated hospital or departmental algorithms that could not accommodate the COVID-19 outbreak, poor team dynamics, HCWs unfamiliarity with critical procedures while wearing PPE; or helping organisational decision making (such as establishing separate routes for transporting infected patients) by using simulation as a testing approach.

Table 3: Potential challenges and possible solutions for Simulation and technology-enhanced training during Covid-19

Training approaches	Challenges	Possible solutions
Online Learning 1. Work instructions as per standard guidelines via Daksh 2. Work instruction-based videos	- Continuous reinforcement by the management to foster the health care workers to finish the assignments in time - The proactiveness of the staff - Problems with the mobile phone and issues with the internet connectivity - Limited access to Daksh platform via Mobile - Learner progress monitoring - Knowledge-based learning, not only clinical skill	- Online group discussions via social network services - Periodic electronic display mail (EDM) in all the workstation computers and Sampark (Hospital announcement application) - Coordination with the central Information technology team (IT Team) Intranet access via mobile phone is provided to access the online learning portal using their employee Id as the login password - Installation of the mobile MHC -Daksh application, ID creation and activation - Exit test after each work instructions and minimum 80% score to move for next - Each work instruction has a video following those sessions on a virtual lab/practical learning platform
Simulation 1. Training focuses on clinical practice/application skills 2. Focused on specific patient management skills 3. Adaptive training for working in unfamiliar working environments	- Limited training resources and a large number of health care workers that require training - Limited availability of well-experienced instructors and trainers - Limited time for content delivery and simulation - Increased chances of infection. - Skill degradation over time	- Reuse of equipment and materials for training - A qualified and experienced skill pool was created for training - Self-learning of theory via Daksh platform and more time dedicated for simulation - Health check-up initiated before training and self-protection items were given; Oral Vitamin C and multivitamin was given and small group training was initiated in all the areas - Train the trainer were initiated for repeated practice mechanism

Recommendation and Limitations

There are advantages of simulation in the Covid-19 outbreak setting as well as limitations. First, simulation can never reproduce nor replace clinical circumstances; facilitators must debrief after simulation to help learners make meaning of their simulation experience relative to real clinical environments. Second, simulation is resource consuming, in time, human resources and medical supplies, especially during the current acute phase of a disease outbreak. Third, the face-to-face manner of delivering simulation sessions brings potential infection risks for instructors and learners.

Conclusion

Effective use of planned structured simulation is the future of skill enhancement training. Simulation and online learning enhanced by technology have already played a role in dealing with the Covid-19 outbreak. Simulation-based learning is universally recognised as the best way for learning and developing new skills and brainstorming. Emphasis should be put on the desired outcome and the quality of such learning informed by learning theories/principles. Quality assurance approaches should be taken, continuous efforts should seek more organisational support collaboration, and experience should be shared across institutions to help more to understand and make better preparation regarding the spread of the Covid-19 outbreak and other potential pandemics.

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