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Evaluation of simulation skills of healthcare workers at a tertiary care center: A perspective towards coronavirus disease 2019 (COVID-19) third wave preparation

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Abstract:

BACKGROUND: Simulation-based training for healthcare providers was established as an efficacious training tool to sharpen the performance skills of nontechnical team as necessary for the prevention of errors and adverse events in the pandemic. To tackle this third wave, our institute started preparations with a faculty development course of simulation-based learning to evaluate participants' knowledge and skills and their attitudes and feedback.

MATERIALS AND METHODS: As part of the simulation workshop, a module was developed to train the staff on recognizing and responding to acute coronavirus disease 2019 affecting adults and children. Case-based scenarios were provided in the application. Pretest and posttest questionnaires were administered to all trainees. The questionnaires included questions on knowledge, skills confidence and attitude marked on a 5-point Likert scale. Data were entered and analyzed using the Microsoft Excel 2018. Qualitative variables were expressed as percentages, whereas mean and standard deviations were computed for quantitative variables. Paired *t*-test was used to test the difference between pre and post test scores; $P < 0.05$ was taken as significant value.

RESULTS: A total of 296 participants were included in the study. A statistically significant increase in knowledge and skills confidence scores was found from pre-test to post-test. The most significant improvement was found in the assessment of pediatric hemodynamic status and the management of fluid and electrolytes. The most interesting benefit to the participants was the acquisition of knowledge about the proper use of technology after the faculty development course.

CONCLUSIONS: Such workshops play a crucial role in training healthcare workers, especially as preparation for the pandemic. Most participants suggested that there should be such workshops at regular intervals to enhance their skills confidence in handling emergency situations in the clinical settings.

Keywords:

Coronavirus disease 2019, health personnel, simulation training

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Introduction

The novel coronavirus disease 2019 (COVID-19) created global concern for all healthcare services. COVID-19 pandemic presented many challenges from December 2019 as no one knew the correct management/treatment, especially during the peak times. To support all countries, the World Health Organization with the Department of Health Security

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Preparedness at the Headquarters developed various COVID-19 tabletop exercises and drill packages under health emergency preparedness simulation exercises to strengthen existing plans, procedures, and capabilities to manage the current and future COVID-19 outbreaks.[1] India has experienced two waves with peaks and is now expecting a third wave.[2] The third wave is the effect of the virus on the social health determinants and the repercussions on future generations.[3] The virus is expected to worsen health inequities resulting in serious adverse economic consequences for[4] both adults and children.

Most nations across the world were ill prepared for the pandemic for several reasons: the underestimation of the virus and the overall outbreak, lack of an updated crisis management plan; absence of basic medical amenities even in city-based hospitals; and lack of investment in public health to deal with crises. A recent report pointed out that with decentralization of costs, hospital spending is reduced. However, this has not been the case in the Indian scenario.[5] COVID-19 is an emergency and all patients need to be taken care of and no patient can be turned away from the hospital. This disease is like an accident or any other life-threatening condition. Emergency departments work 24 × 7 at very high-operating costs.[6]

The COVID era has resulted in an overburdened health sector in which healthcare workers (HCWs) need to be vigilant always and have aptly acquired the designation of healthcare warriors as healthcare is put on a war footing. Several studies in the recent years have shown that the number of people referred to the emergency unit of the hospital had risen tremendously even before the pandemic.[7,8] However, the definition of emergency and nonemergency services varies from region to region; patients are triaged with different models to receive healthcare.[8]

During a severe pandemic, our options therefore for crisis handling are very limited. This makes planning and preparedness crucial. Simulation-based training (SBT), an ideal method for healthcare providers, is known as a viable, efficacious training tool, particularly for the honing of nontechnical team working skills essential for the prevention of error and adverse events.[9] Simulation is a process that replicates patient care scenarios in an environment close to reality.[10] The benefits of simulation-based education were very well explained by Moslehi *et al.,* in their systematic review that reinforced the development of rapid diagnosis, improvement in treatment processes, better understanding of professionalism, improved team work, and competency skills and thereby added value to the healthcare system.[11] Carla Nye's use of Kirkpatrick's model of evaluation of nursing education in advanced practice simulation has had a positive impact at level 1 (reactions) and level 2 (changes in knowledge, skills, and attitude).[12] Substantial evidence for ebola emergency preparedness of frontline healthcare professionals with a significant increase in mean scores of clinical skills was acquired in a simulation environment primarily in performing clinical procedures, wearing personal protective equipment in the correct manner, and managing physical and environmental changes.[13] Even in the Indian set up, this type of training has been an asset in continuing medical education to measure the readiness and effectiveness of emergency response plan during the COVID-19 pandemic.[14]

SBT is an educational design that is feasible and adaptable to policy changes at institutional or national levels designed according to the time available, resources, educational objectives, and targeted stakeholders. This helps to identify the gaps in the protocol and fill them promptly.[15] It plays an important role in rapid responses to pandemic like COVID-19 in refining the protocols, practice changes, deal with obstacles encountered during training, and put in remedial measures.[16] This pandemic helped us somehow to understand the gaps in the existing medical infrastructure and resources which needed immediate attention.

With this in mind, Employees State Insurance Corporation (ESIC) hospital developed a preparedness training module on the requirements using the simulation technology to train all HCWs to tackle the pandemic. This research project was aimed at evaluating the HCWs' knowledge, skills confidence, and attitudes toward simulation-based learning as a part of a faculty development course in the management of COVID-19 adult and pediatric patients with acute disease.

Materials and Methods

This was a facility-based study using a quantitative method to evaluate simulation-based workshop for all healthcare professionals of the Institute by the Medical Education Unit of ESIC Medical College on its premises from October 15, 2021, to October 22, 2021, as part of the preparation for the third wave of the pandemic. This simulation modality was for all healthcare professionals enrolled in the workshop. Ethical approval was obtained from the Institutional Review Board vide letter number ESICMC/SNR/IEC-F381/09-2021 dated 08/10/2021, and informed written consent was taken from all participants.

HCWs such as doctors, residents, interns, nursing staff, other paramedical staff, and Ayurveda, Yoga, Naturopathy, Unani, Siddha, and homeopathy (AYUSH) doctors who attended and were willing to participate were

included in the study. Faculty members of pediatrics, anesthesia, and emergency medicine departments and HCW who were absent for the workshop or were unwilling to participate were excluded from the study.

A predesigned and pretested emergency preparedness model was developed by name (those in the preparedness) and was tested for quality and application by five different experts from emergency trauma and anesthesia with more than 10 years of work experience in handling patients in the coronary care unit and intensive care unit apart from trauma surgeries. An open invitation was sent to all HCWs in and around ESIC Medical College, Hyderabad, India. It was made official through WhatsApp groups, E-mails and fliers, and requests to alternative medicine related medical colleges in the city of Hyderabad, explaining the agenda of the training program. All those who agreed to participate and had been involved in the previous wave of COVID-19 or anticipated to be a part of the emergency team for the next wave of pandemic were involved in the training. Although the invitation was for all irrespective of their specialties, owing to COVID-19 restrictions and responsibilities of the staff at their respective centers, a total of 350 applications were received. The final sample size for the training sessions was 330 out of the 350.

This workshop was mainly designed to train all HCWs working in different areas to ensure their capability in dealing with the emergency of COVID-19 affected patients during the anticipated peak. As part of the workshop, a simulation module was designed to train staff to recognize and respond to acute seriously ill COVID-19 adults and children. Consent was obtained from all the healthcare professionals who volunteered to participate in the training program. Before the simulation sessions, participants were given free access to online materials through a mobile phone application by mapping them to their E-mail IDs. Later, they were trained by the facilitators from pediatrics, anesthesia, emergency departments, and trainers from the surgical company on mannequins on case-based scenarios. Pretest and posttest questionnaires were prepared by the principal investigator and peer reviewed by all the members of the institutional medical education unit for content validity.

Reliability analysis gave a Cronbach alpha value of 0.763 for questions related to knowledge, 0.933 for skills confidence, and 0.881 for attitude-related questions. The questionnaire comprising four questions on knowledge and 4 questions on attitude was marked on a 5-point Likert scale rated from disagree to agree and 12 questions related to skills confidence rated from not confident to highly confident from previous studies.[17-19] All the participants were trained for 4 h a day in groups of 6–8 at eight stations. The details of the training program stations were as follows: pediatric basic life support training, adult basic life support training, intravenous arm and blood collection, pediatric and adult units, defibrillator usage, ventilation training, virtual patient table, and neonatal continuous positive airway pressure (CPAP) which had an infant cardiopulmonary resuscitation trainer, pediatric multivenous intravenous training arm kit, Laerdal neonatal intubation trainer, full-body simulator for pediatric emergencies, new-born tetherless simulator co-created with the American Academy of Pediatrics to enhance and meet the precise learning objectives of neonatal resuscitation protocols[20] and also cardiopulmonary resuscitation for adult and critical care. Two experts trained in handling emergencies were stationed at each station. Training at each station lasted for 30 min plus 5 min of reinforcement. Two case-based scenarios were introduced and hands-on training given. Their knowledge and later skills confidence and attitude were assessed and scored posttest. Comments on areas that were the most interesting and least interesting were sought for incorporation and implementation in the future faculty development programs.

Data were managed by means of coding and scoring and allotted for all the quantitative variables using the Microsoft Excel 2018 and analyzed. The frequency distribution was calculated and expressed in terms of percentages. Each Likert item was evaluated and stated using means and combined to form comprehensive section scores which were stocked out of 100 to give connotation. Normality of the distribution was checked using the Shapiro–Wilk test and was found to be normally distributed. Therefore, paired *t*-test was used for inferential statistics and a $P < 0.05$ was taken as significant value. Only the participants who had pre and posttest questionnaires were considered for the paired analysis. Mean difference of greater than one was taken into consideration to predict the areas of improvement in the components of skills confidence score of pre- and posttest.

Results

A total of 330 participants took part in our simulation sessions, 296 of whom completed their pre and posttest questionnaires for paired analysis. Therefore, there were 296 participants consisting of 14 (5%) as faculty, 27 (9%) as senior residents, 34 (11.5%) as junior residents, 92 (31%) nursing staff, 49 (16.5%) AYUSH interns and postgraduates, and 80 (27%) MBBS Interns [Figure 1]. They were posted to COVID-19 isolation wards, general medicine, obstetrics and gynecology, broad specialties, subspecialties such as nephrology, gastroenterology and oncology, Ayurveda Samhita and Siddhant, and Kayachikitsa. The mean age

of our participants was 29.22 ± 4.93 years (minimum 23 years and maximum 48 years). Paired sample *t*-test was performed for pre- and postcomparison of the mean scores. Mean score for pretest of knowledge was 18.08 ± 3.30 and posttest was 19.06 ± 2.22, which was a statistically significant increase with $P = 0.0001$ (S); pretest of skills confidence was 41.87 ± 15.52 and posttest was 51.67 ± 11.30 with $P = 0.00002$ (highly significant); whereas mean scores of attitudes at pre- (17.96 ± 4.48) and posttest (19.12 ± 2.45) were not significant with $P = 0.053$ [Figure 2]. Questions on attitude depicted an impact of a good method of learning clinical skills, communication skills, and predicting important areas for preparedness for emergency.

The components of skills confidence score were the highest with mean difference of greater than one, mainly in three items: assessment of hemodynamic status, management of fluids and electrolytes, and neonatal CPAP, which was statistically significant after posttest. The smallest difference was seen in the placing of an IV cannula. Other components with significantly higher scores were also found after the simulation session, as detailed in Table 1.

No significant correlation was found in the analysis of age groups and experience with the mean scores of knowledge, skills confidence, and attitude. Thus, age or years of experience did not influence the outcome of learning.

The area that showed the most promise for simulation in faculty development course on future emergencies was "*Learning to use the Technology properly*" suggested by 126 (42.5%) and the area of least interest was "*grading simulation*" reported by 119 (40.2%). Suggestions were made to incorporate more of such workshops in the curriculum, and proper evaluation methods adopted for assessment, assessment of quality, correlation and avoidance of errors in clinical practice by presenting

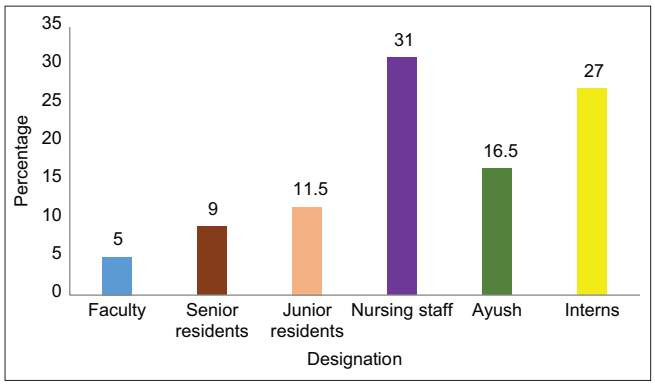

Figure 1: Enrollment of participants for simulation-based training during COVID-19 third wave preparedness (2021)

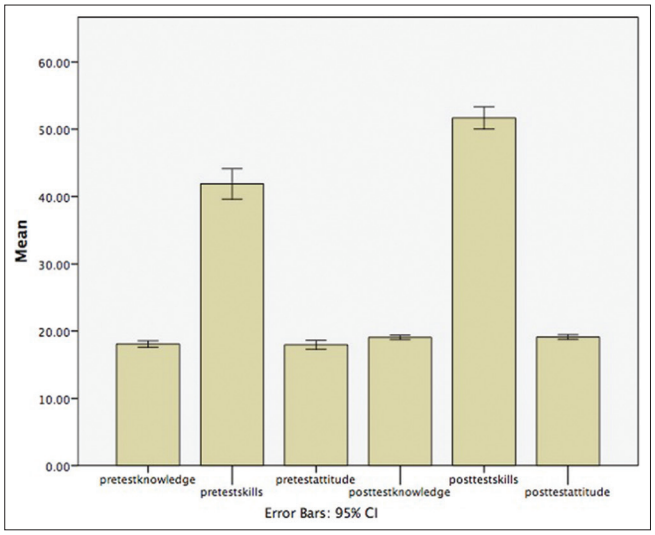

Figure 2: Comparison of pre- and posttest mean scores of knowledge, skills confidence, and attitudes regarding simulation-based training for COVID-19 third wave preparedness (2021). CI: Confidence interval

Table 1: Components of skills confidence scoring among the study participants of simulation-based training for coronavirus disease 2019 third wave preparedness (2021)

Skills confidence score	Pretest score Mean±SD	Post Test score Mean±SD	Difference	*P*-value
Providing ventilation	3.54±1.56	4.43±0.91	0.89	0.0001
Assessing mental status	3.83±1.41	4.16±1.21	0.33	0.001
Assessing perfusion	3.61±1.60	4.38±1.04	0.77	0.0001
Recognizing respiratory distress	3.93±1.46	4.54±0.89	0.61	0.0001
Providing oxygen	3.90±1.54	3.95±1.33	0.05	0.680
Neonatal CPAP	2.78±1.796	4.10±1.20	1.32	0.0001
Assessment of pediatric hemodynamic status	2.78±1.71	4.34±3.98	1.56	0.00003
Recognizing and treatment of cardiogenic shock	3.56±1.57	4.13±1.23	0.57	0.0001
Management of fluids and electrolytes	3.17±1.72	4.59±0.97	1.42	0.00001
Usage of defibrillator	3.85±1.60	4.46±1.14	0.61	0.0001
Doing chest compressions	3.87±1.61	4.83±0.66	0.96	0.0002
Placing an IV cannula/line	4.60±1.17	4.86±0.67	0.26	0.005

CPAP=Continuous positive airway pressure, IV=Intravenous

more case scenarios for practice and increasing the time spent at each substation.

Discussion

Owing to the ongoing COVID-19 pandemic, it is crucial for our HCWs to be trained to recognize an emergency and respond effectively. The ideal method of training is by SBT. This eliminates the uneasiness of medical care experts by improving their vision, strengthening their credentials, and removing unnecessary risks to patients. Trainers must, therefore, be skilled in SBT if they are to help enhance the performance of learners.[21] The online training material provided to the participants through mapping increased their knowledge, and the training session, especially during this crisis, sensitized them to various scenarios and improved learning and performance. Mistakes were detected and analyzed during simulated repetitions of those mistakes.

The study included participants from clinical, nonclinical, AYUSH, and other healthcare professionals and showed a statistically significant increase in knowledge and skills confidence after the simulation sessions. The component skills with the highest difference after the session included the assessment of pediatric hemodynamic status, management of fluids and electrolytes, and neonatal CPAP. An item with the lowest difference was the placing of the IV cannula. There was no correlation of age or experience on the learning outcome of our participants. About 42.5% favored "*learning to use technology more*" with the incorporation of more of such workshops in the curricula, but about 40.2% were "*not in favor of grading*" during the assessment of simulation.

Erick *et al*., in their infection control training program on endotracheal intubation for 1415 hospital staff found that simulation as a method of learning had a positive response from 88% and overall positive response of satisfaction in 90%. This method was extensively used to train all healthcare staff.[22]

Foong *et al*., in their study of doctors and nursing staff illustrated verification and advancement of course and teaching of staff through prompt relaying of lessons learned from preceding sessions to all staff. This indicated improved performance.[23]

Kabi *et al*., in their SBT program on COVID-19-related airway management reported its effectiveness in improving knowledge and skills with a higher median score in the immediate seven days posttraining test (online) compared to baseline. They reported that team performance in terms of role clarity, closed-loop communication, and idea acceptance improved tremendously during the successive scenarios.[24]

Chowdhary *et al*., in their SBT intervention training program found a statistically significant increase (P = 0.0001) in the knowledge on shockable rhythm and defibrillation and also noted a significant increase in the skill score of nurses.[25]

Similar to this study, Sharma *et al*., in their quasi-experimental study found that intervention through video-assisted teaching-learning led to a significant level of improvement of knowledge.[26] Babu *et al*., reported highly significant values in mean pre- and posttest scores of doctors, nurses, and other healthcare professionals in a mock drill on patient registration post-SBT during the COVID-19 outbreak.[14]

Most of the literature highlighted an increase in knowledge, skills performance, confidence, and satisfaction. However, Patterson *et al.,* reported that 77% of the HCWs showed 0% improvement regardless of running *in situ* simulations for over 1 year. They recommend that after training, these HCWs need to be made to attend to the patients in the next emergency.[27] All these variations, therefore, stress on the need to reinforce learning by immediate use and implementation of the acquired skill and regular reinforcement. Hence, training should be frequent; training modules prepared and regularly upgraded when different waves and variants of the pandemic suddenly emerge. One of the limitations was time constraint, because of COVID-19 duties of the HCWs. Furthermore, the questionnaire had more components in skills confidence than on knowledge and attitudes as the study focus was mainly on competency skills.

Further follow-up of participants is required to achieve the long-term goal and establish and implement comprehensive assessment methods of all three domains at regular intervals. This can be addressed in future studies.

Conclusion

This study depicted an increase in skills confidence scoring among the participants and provided a unique opportunity to include faculty development courses in the curriculum at regular intervals. The areas of improvement were the assessment of pediatric hemodynamic status and management of fluids and electrolytes. This would also ensure that newly qualified doctors go through the case scenarios useful for the clinical application and development of skills and as life-long learners improve their clinical competencies in the treatment of affected adults and children with acute disease during the pandemic.

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Conflicts of interest

There are no conflicts of interest.

References

1. Copper F, Njenge H, Bell A, Charles D, Vedrasco L, Chungong S. COVID-19 Simulation Exercises Program – Drills for Vaccine Deployment. Report No: 1. Geneva: World Health Organization; 2021. p. 21. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/training/simulation-exercise. [Last accessed on 2021 June 01].
2. Mandal S, Arinaminpathy N, Bhargava B, Panda S. Plausibility of a third wave of COVID-19 in India: A mathematical modelling based analysis. Indian J Med Res 2021;153:522-32.
3. Major LE, Machin S. COVID-19 and Social Mobility. Centre for Economic Performance. London School of Economics and Political Science. Houghton Street, London, UK; 2020. p. 1-14. Available from: http://cep.lse.ac.uk/pubs/download/cepcovid-19-004.pdf. [Last accessed on 2021 Jun 10].
4. Banks J, Karjalainen H, Propper C. Recessions and Health: The Long-Term Health Consequences of Responses to the Coronavirus. London, UK: Institute for Fiscal Studies; 2020. p. 1-8. Available from: https://www.ifs.org.uk/publications/14799. [Last accessed on 2021 Aug 22].
5. Dougherty S, Lorenzoni L, Marino A, Murtin F. The impact of decentralisation on the performance of health care systems: a non-linear relationship. Eur J Health Econ. 2021:1-11. Epub ahead of print. Available from:https://doi.org/10.1007 s10198-021-01390-1. [Last accessed on 2021 Dec 12].
6. Delshad V, Shirazi FB. The effectiveness of participation-based education on nurse performance in hospital Triage at disaster. Med Sci 2019;23:404-9.
7. Byars DV, Tozer J, Joyce JM, Vitto MJ, Taylor L, Kayagil T, *et al*. Emergency physician-performed transesophageal echocardiography in simulated cardiac arrest. West J Emerg Med 2017;18:830-4.
8. Ajami S, Ketabi S, Yarmohammadian MH, Bagherian H. Waiting time in emergency department by simulation. Stud Health Technol Inform 2011;164:196-200.
9. Walker ST, Sevdalis N, McKay A, Lambden S, Gautama S, Aggarwal R, *et al.* Unannounced *in situ* simulations: Integrating training and clinical practice. BMJ Qual Saf 2013;22:453-8.
10. Gaba DM. Do as we say, not as you do: Using simulation to investigate clinical behaviour in action. Simul Healthc 2009;4:67-9.
11. Moslehi S, Masoumi G, Barghi-Shirazi F. Benefits of simulation-based education in hospital emergency departments: A systematic review. J Educ Health Promot 2022;11:40.
12. Nye C. State of simulation research in advanced practice nursing education. Annu Rev Nurs Res 2020;39:33-51.
13. O'Keeffe DA, Bradley D, Evans L, Bustamante N, Timmel M, Akkineni R, *et al.* Ebola emergency preparedness: Simulation training for frontline health care professionals. MedEdPORTAL 2016;12:10433.
14. Babu MV, Arumugam MK, Debnath DJ. Simulated patient environment: A training tool for healthcare professionals in COVID-19 era. Adv Med Educ Pract 2021;12:579-85.
15. Aldekhyl SS, Arabi YM. Simulation role in preparing for COVID-19. Ann Thorac Med 2020;15:134-7.
16. Pan D, Rajwani K. Implementation of simulation training during the COVID-19 pandemic: A New York hospital experience. Simul Healthc 2021;16:46-51.
17. Franklin AE, Burns P, Lee CS. Psychometric testing on the NLN Student Satisfaction and Self-Confidence in Learning, Simulation Design Scale, and Educational Practices Questionnaire using a sample of pre-licensure novice nurses. Nurse Educ Today 2014;34:1298-304.
18. Cummings CL, Connelly LK. Can nursing students' confidence levels increase with repeated simulation activities? Nurse Educ Today 2016;36:419-21.
19. Turatsinze S, Willson A, Sessions H, Cartledge PT. Medical student satisfaction and confidence in simulation-based learning in Rwanda – Pre and post-simulation survey research. Afr J Emerg Med 2020;10:84-9.
20. SimnewB. User Guide. Laerdal Medical. American Academy of Paediatrics; 2019. p. 1-36. Available from: https://cdn.laerdal.com/downloads/f5535/user_guide_for_simnewb_tetherless. [Last accessed on 2021 May 03].
21. Piryani RM, Piryani S, Shrestha U, Acharya A, Kanskar S, Shahi M, *et al.* Simulation-based education workshop: Perceptions of participants. Adv Med Educ Pract 2019;10:547-54.
22. So E, Chia NH, Ng G, Chan O, Yuen SL, Lung DC, *et al*. Multidisciplinary simulation training for endotracheal intubation during COVID-19 in one Hong Kong regional hospital: strengthening of existing procedures and preparedness. BMJ simulation & technology enhanced learning 2021;7:501-9. Available from https://doi.org/10.1136/bmjstel-2020-000766. [Last accessed on 2021Nov 20].
23. Foong TW, Hui Ng ES, Wee Khoo CY, Ashokka B, Khoo D, Agrawal R. Rapid training of healthcare staff for protected cardiopulmonary resuscitation in the COVID-19 pandemic. Br J Anaesth 2020;125:e257-9.
24. Kabi A, Dhar M, Arora P, Bhardwaj BB, Chowdhury N, Rao S. Effectiveness of a simulation-based training program in improving the preparedness of health care workers involved in the airway management of COVID-19 patients. Cureus 2021;13:e17323.
25. Chowdhary D, Gopichandran L, Garg R, Baidya DK. To assess the effectiveness of simulation teaching of defibrillation on the knowledge and skill of nurses working in the critical care unit of a Tertiary Care Teaching Institute: Prospective, randomised study. Indian J Cont Nsg Edn 2020;21:185-92.
26. Sharma R, Mohanty A, Singh V, Vishwas AS, Gupta PK, Jelly P, *et al.* Effectiveness of video-based online training for health care workers to prevent COVID-19 infection: An experience at a tertiary care level institute, Uttarakhand, India. Cureus 2021;13:e14785.
27. Patterson MD, Geis GL, Falcone RA, LeMaster T, Wears RL. *In situ* simulation: Detection of safety threats and teamwork training in a high risk emergency department. BMJ Qual Saf 2013;22:468-77.