

Original Research Article

Evaluation of effectiveness of COVID-19 training of tertiary health care workers

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ABSTRACT

Background: Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus experience mild to moderate respiratory illness and recover without requiring special treatment. Older people or patients with co-morbidities have been observed to develop a serious illness. Figures from health resources and media reports show high proportion of infection rates and deaths amongst the health care workers (HCW). Thus, a training was conducted to assess the knowledge of the health care workers regarding coronavirus infection and their preparedness to fight against the ongoing pandemic.

Methods: A cross sectional study was conducted at Indira Gandhi Government Medical College, Nagpur. This study was carried out from 26th March to 24th April 2020. Total 486 participants (health care workers) who were present at the time of pre-test and post-test during the training were included.

Results: In the present study, all the 486 participants filled the pre-test and post-test forms. The mean pre-test and post test scores of all the participants were found to be 17.73 (± 5.004 SD) and 20.93 (± 5.033 SD) respectively. The difference between the means was observed to be significant.

Conclusions: This study reflects that the training was quite effective which is evident from the pre-test and post-test assessment among the health care workers. But there is a need to create higher level of awareness amongst the younger group of doctors as they are the backbone of health care system.

Keywords: COVID 19, Post-test, Pre-test, Training

INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer have been observed to develop serious illness.¹ There have been around 35,88,773 confirmed cases and 2,47,503 deaths worldwide due to Covid-19 till date (6th May 2020).²

The first case was reported on 12th December 2019 in Wuhan, China.³ The patient in consideration had symptoms like cough, fever and dyspnoea.⁴ Since then, cases of 2019 (n-Cov), has been rising exponentially in around 215 countries all around the world and has become a widely spread pandemic.⁵ COVID-19 is spread by human-to-human transmission through droplet, fomites and direct contact and has an incubation period of 2-14 days.⁶ As of now there is no definite treatment for this disease, thus, its prevention is being given higher importance by following basic practices like hand hygiene, maintaining a distance of 1 meter and wearing masks and gloves.

It has been observed that the health care-associated infection (HAI) is much higher in developing countries as compared to developed countries.⁷ Health care associated infections refer to those which arise in hospitals, clinics and where the health care workers are prone to develop infections.⁸ Novel coronavirus is an evident example of such kind of infections. This highly contagious virus is an added hazard for the healthcare system apart from the burden of extended work hours, fatigue, burnout and stress.⁹ It is well known that transmission of this disease among Health care workers occurs due to lack of space and ventilation, dearth of personal protective equipment and high viral load.¹⁰ But these reasons are combined with inadequate knowledge about the infection control practices among the health care workers. Complete knowledge of a disease can lead to certain changes in attitudes and practices of health care workers and incorrect attitudes and practices have been proved to be directly proportional to the increase in infection.¹¹ WHO has also started several online training sessions and webinars on COVID-19 in various languages to implement the use of preventive strategies, including raising awareness and training HCWs for management of this pandemic.¹² Historically it has been witnessed that, lack of communication and knowledge among HCWs have hindered the efforts of getting the situation under control, thus leading to an unexpected increase in mortality.¹³ This had also led to the rapid spread of infection in hospitals.^{14,15}

Worldwide, as millions of people stay at home to minimise the transmission of virus, health care workers (HCW) are prepared to do the exact opposite. They are going to the clinics and hospitals, putting themselves at a high risk of COVID-19. Figures from health resources and media reports show a high proportion of infection rates and deaths amongst the health care workers. Health care providers are the important resources who need to be safeguarded. And, training is an activity that can help HCW's to protect themselves from this infection.

Thus, under these circumstances, this study was conducted in order to impart training about the epidemiology, microbiology, prevention and control and treatment of Covid-19 to the health care workers of a tertiary health care institution in Nagpur. Along with this, the effectiveness of the training programme was evaluated by pre-test and post-test sessions. This was done to assess the knowledge of the participants regarding coronavirus infection and their preparedness to fight against the ongoing pandemic.

METHODS

Study design and setting

It was a cross-sectional study. The study was conducted in the Department of community medicine, Indira Gandhi Government Medical College and Hospital, Nagpur from 26th March to 24th April 2020.

Study participants

A total of 486 participants were included in this study. Health care providers like professors, associate professors, assistant professors, residents and interns were the study participants. They participated in one day training program on Covid-19. Also, Medical officers of public health participated in this training course. The training was taken in batches. Use of mask and more than 2.5 meter social distancing was maintained during the sessions.

Inclusion criteria

All the 486 participants who were present at the time of pre-test and post-test were included.

Data collection tool

A pre-designed and pre-structured validated questionnaire was used in this study. Same questionnaire was used for pre and post-test assessment. This questionnaire consisted of 30 questions regarding epidemiology, microbiological aspects, prevention and treatment of COVID-19.

Study procedure

Investigator in this study was instrumental in planning, coordination and implementation of study. As a part of capacity building program for health care workers (HCW) to prevent themselves from acquiring infection and transmission of COVID-19 while providing health care to other patients, colleagues, family and society, Ministry of health and family welfare (MOHFW), Government of India has designed a schedule for COVID-19 training.¹⁶ Similar topics and contents were used in this training program.

During training, senior faculty of community medicine had taken a session on epidemiology of coronavirus infection and methods of its prevention. Faculty from Microbiology explained about the morphology, testing protocols for COVID-19 and biomedical waste disposal. Faculty from Medicine had taken sessions on approach to suspected patient, clinical presentation of the disease, management and discharge criteria in detail. Anaesthesia department had organised hands on training of oxygen therapy, ventilator therapy and intubation. Before the session, pre-test questionnaires were distributed among the participants. They had been given a duration of 10 minutes for completing the questionnaire. After the completion of questionnaire, training was started which included lectures and demonstrations regarding all the procedures in different sessions starting from steps of hands washing and donning and doffing of personal protective equipment. Practical demonstrations on mannequin were also performed for intubation. At the end, post-test and feedback was taken. Evaluation of questionnaire was done by independent evaluator without

knowing the objectives of the study and state of evaluation like pre or post-test.

Statistical analysis

Data was analyzed using Microsoft excel and SPSS version 21 for windows. Mean scores of pre-test and post-test were calculated. Significance was found out using Mann-Whitney test. P value of <0.05 was considered as significant.

RESULTS

In all, 486 health care workers participated in the present study. Figure 1 shows that all the study participants (100%) responded and filled the pre-test and post-test study tool. Out of the total 486 participants, majority 161 (33.2%) were the medical resident doctors; followed by intern trainees 134 (27.6%), 120 (24.6%) of the participants belonged to the teaching staff comprising of professors, associate professors and assistant professors and the rest 71 (14.6%) were the medical officers. Around 43.6% of the participants were involved in the care of COVID-19 patients.

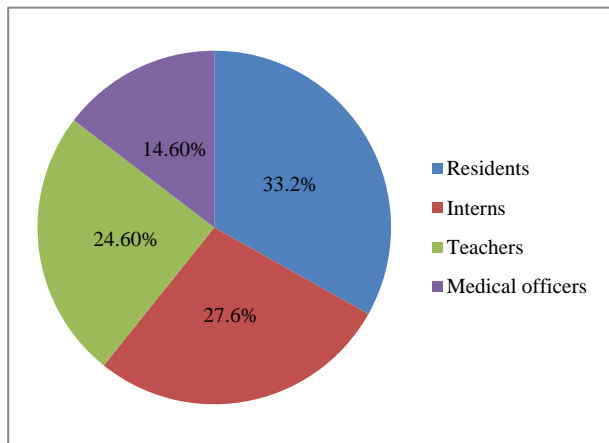


Figure 1: Distribution of the participants.

Table 1: Pre and post test scores (number range).

Number range	Pre-test (n=486) N (%)	Post-test (n=486) N (%)
0-5	18 (3.7)	5 (1)
6-10	46 (9.4)	16 (3.3)
11-15	141 (29)	44 (9)
16-20	157 (32.3)	131 (27)
21-25	91 (18.8)	217 (44.7)
26-30	33 (6.8)	73 (15)

Table 1 shows that in the pre-test questionnaire, out of 486 participants, 18 (3.7%) scored ranging from 0 to 5, 46 (9.4%) scored from 6 to 10, 141 (29%) scored from 11 to 15, 157 (32.3%) scored from 16 to 20 which was maximum, 91 (18.8%) of the participants scored from 21 to 25 and the remaining 33 (6.8%) scored the highest

score range of 26 to 30. In the post-test questionnaire the number of participants whose score ranged from 0 to 5, 6 to 10, 11 to 15, 16 to 20, was reduced to 5 (1%), 16 (3.3%), 44 (9%) and 131 (27%) respectively. On the other hand, the number of participants falling in the higher score ranges of 21 to 25 and 26 to 30 rose to 217 (44.7%) and 73 (15%) respectively.

Table 2: Comparison of pre-test and post test scores of all the participants.

Total participants	Mean	SD	P value
Pre-test	17.7366	5.00439	0.000
Post test	20.9300	5.03301	
Residents			
Pre-test	17.0062	4.44058	0.000
Post-test	20.0435	5.44558	
Interns			
Pre-test	17.1269	5.04032	0.000
Post-test	19.5075	5.29398	
Teachers			
Pre-test	18.8333	5.26337	0.000
Post-test	22.1167	4.03594	
Medical officers			
Pre-test	18.3944	4.91784	0.000
Post-test	22.3099	4.53114	

The mean pre-test and post-test scores of all the participants at 95% confidence interval were 17.73 (±5.004 SD) and 20.93 (±5.033 SD) respectively. The difference between the means was found to be significant by using Mann Whitney test (p=0.000) The mean pre-test and post test scores of all the individual groups that is residents, interns, teachers and medical officers are mentioned in Table 2. All the differences were found to be significant (p<0.005).

Table 3: Comparison of pre-test and post-test scores of all the participants on the basis of different questions.

	Mean	SD	P value
Epidemiology			
Pre-test	5.9691	1.77760	0.000
Post test	7.1111	1.57428	
Microbiology			
Pre-test	2.0082	0.7063	0.000
Post-test	2.2119	0.96021	
Prevention			
Pre-test	4.0720	1.87137	0.000
Post-test	5.7305	1.65579	
Treatment			
Pre-test	1.2613	0.70902	0.000
Post-test	1.4979	0.61510	
Stages of COVID-19			
Pre-test	0.5576	0.63552	0.003
Post-test	0.6728	0.63730	

DISCUSSION

The present study constitutes 486 participants out of which 33.2% were the post graduate residents from different departments, 27.6 % were the interns, 24.6% of the participants were the teachers like professors, associate professors and assistant professors and the rest 14.6% were the medical officers. These particular groups of health care workers were included in the training as nearly half of them (43.6%) were working at the frontline for the management of coronavirus infection. This was similar to the study conducted by Zhou et al in Henan China where around 42.59% of the participants were on the frontline.¹⁷ It was necessary to check their knowledge on different aspects of COVID-19 such as its epidemiology, testing facilities in the city, prevention methods and treatment in view of making productive changes in the present health care system for the streamlined management of the pandemic, thus the pre-test and post-test sessions were conducted. It was also essential to create awareness among the health care workers for their well-being as well as the patients. Similar study was conducted by Bhagvathula et al among 453 health care workers to check their knowledge and perceptions about Covid-19.¹⁸ Another study conducted by Modi et al included 1562 health care workers in Mumbai metropolitan region in view of checking their knowledge regarding COVID-19 which was similar to our study.¹⁹

The present study showed that 18.8% of the participants scored from 21 to 25 and around 6.8% scored the highest score range of 26 to 30 in the pre-test. On the other hand the number of participants falling in the higher score ranges of 21 to 25 and 26 to 30 rose to 44.7% and 15% respectively when the post-test session was conducted. This portrays that the training was effective as it succeeded in imparting the knowledge about COVID-19 to health care workers in an efficient way. Similar study was conducted by Shrivastava et al where it showed that pre-test and post-test is an effective way of imparting knowledge and creating awareness among the participants on a particular topic as the number of participants falling in the higher number range rose in the post-test as compared to the pre-test.²⁰

In the present study ,the mean pre-test and post test scores of all the participants at 95% confidence interval were 17.73 (± 5.004 SD) and 20.93 (± 5.033 SD) respectively. The difference between the means was found to be significant ($p=0.000$). The mean pre-test and post-test scores of all the individual groups that is residents, interns, teachers and medical officers were calculated and all the differences were found to be significant. Similar findings were observed in studies conducted by Shrivastava et al and Chan where it showed a significant difference between the means of pre-test and post-test scores of the participants.^{20,21} Our study also shows that, the highest increase in scores from pre-test and post-test was observed to be in teachers and medical officers

followed by post-graduate residents. The lowest increase was found out to be in the interns. This might be due to the fact that teachers and medical officers are more experienced and awareness regarding the COVID-19 among them is more as compared to residents and interns. Similar findings were seen in the study conducted by Zhou et al which showed that knowledge regarding COVID-19 was more profound in doctors with more experience in respect to their work front.¹⁷

In the present study, the scores allotted to all the questions under different headings like epidemiology, microbiology, prevention of COVID-19, its treatment and knowledge about its stages in pre-test and post-test were compared and all the respective differences were found to be significant. The highest increase from mean pre-test and post-test score was observed to be in the questions under the heading of epidemiology that is from 5.9691 to 7.1111 followed by questions on prevention of the infection (from 4.0720 to 5.7305). Similar findings were observed in the study conducted by Bhagvathula et al where majority of the health care workers (87%) were aware that that washing hands with soap and water could help to prevent COVID-19 transmission and 84.3% of the participants had adequate knowledge about the epidemiology of the disease.¹⁸

CONCLUSION

Thus, this study reflects that the training was quite effective which is evident from the pre-test and post-test assessment among the health care workers. But there is a need to create higher level of awareness amongst the younger group of doctors such as post-graduate students and the interns as they are the backbone of health care system and playing a major role in the combat against this pandemic. It is also recommended to conduct such training sessions with a more practical approach in order to create a concrete task force to manage this infection.

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