

# Impact of Training Module for paramedics in Disinfection (MoPDis) of COVID-19 on Knowledge, Attitude, and Practices Scores among Health-care Workers of a Tertiary Care Hospital in India

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## ABSTRACT

**Introduction:** Health-care workers (HCWs) need to have adequate knowledge, the right attitude, and should practice disinfection procedures diligently. The study aimed to assess the knowledge, attitude, and practice (KAP) of HCWs and the role of training in KAP of HCWs. **Materials and Methods:** The study population consists of all HCWs undergoing training for disinfection. A structured training module for paramedics, i.e., module for paramedics in disinfection (MoPDis), was designed. The knowledge, attitude, and practice were assessed before and after the training. **Results:** A total of 183 male HCWs participated in the study. The mean age of the participants was  $31.33 \pm 6.8$  years and ranges from 21 to 49 years. The mean years of experience were  $11.5 \pm 7.1$  years. The mean pretraining and posttraining scores were  $8.1 \pm 2.4$  and  $10 \pm 1.9$ , respectively. The score increases from 53% pretraining score to 66.6% posttraining score. Age, experience, and specialty did not have any association with the gain in knowledge. **Conclusions:** The training program had significantly increased the KAP levels of the HCWs and hence may improve disinfection practices in hospitals, thus preventing the spread of infection.

**KEYWORDS:** Attitude, coronavirus disease 2019, disinfectants, health-care workers, knowledge, attitude, and practice, training

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## INTRODUCTION

The role of appropriate disinfection practices in a hospital has assumed greater significance in the context of the present pandemic.<sup>[1]</sup> The transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) may be contained if proper disinfection practices are in place, especially in the health-care setting. As per the present evidence, coronavirus disease 2019 (COVID-19) is transmitted mainly through close physical contact and respiratory droplets, while airborne transmission is possible during aerosol-generating medical procedures. At the time of publication, the transmission of the COVID-19 virus had been most likely linked to contaminated environmental surfaces in available studies due to consistent findings about environmental contamination in the vicinity of infected cases.<sup>[2]</sup> The Centers for Disease Control and Prevention, Atlanta, also in its latest update on October 5, 2020, has

written that most of the SARS-CoV-2 infections spread through close contact.<sup>[3]</sup>

Disinfection measures aim to reduce any role that fomites might play in the transmission of COVID-19 in health-care and nonhealth-care settings. Environmental surfaces in health-care settings include furniture and other fixed items inside and outside of patient rooms and bathrooms, such as tables, chairs, walls, light switches and computer peripherals, electronic equipment, sinks, toilets as well as the surfaces of noncritical medical equipment, such as blood pressure cuffs, stethoscopes, wheelchairs, and incubators. In nonhealth-care settings,

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environmental surfaces include sinks and toilets, electronics (touch screens and controls), furniture, and other fixed items, such as countertops, stairway rails, floors, and walls. The surfaces which are touched more often known such as doorknobs and light switches are known as high touch surfaces and may require frequent disinfection.<sup>[4]</sup>

Environmental surfaces are more likely to be contaminated with the COVID-19 virus in health-care settings where certain medical procedures are performed.<sup>[5]</sup> Therefore, these surfaces, especially where patients with COVID-19 are being cared for, must be properly cleaned and disinfected to prevent further transmission. Similarly, this advice applies to alternative settings for isolation of persons with COVID-19 experiencing uncomplicated and mild illness, including households and nontraditional facilities.

Like other coronaviruses, SARS-CoV-2 is an enveloped virus with a fragile outer lipid envelope that makes it more susceptible to disinfectants compared to nonenveloped viruses such as rotavirus, norovirus, and poliovirus.

The study aimed to assess the knowledge and attitude of health-care workers (HCWs) and evaluate their self-reported practices regarding disinfection along with measures carried out by them during disinfection procedures. This study also assesses the impact of module for paramedics in disinfection (MoPDis) on the knowledge, attitude, and practice (KAP) scores in HCWs.

## MATERIALS AND METHODS

The study was conducted among paramedics of a tertiary care hospital in western Maharashtra. All paramedics of the institute were delegated to undergo training in disinfection procedure for COVID-19, formed study population. A structured training module for paramedics, i.e., module for paramedics in disinfection (MoPDis), was prepared. The content of MoPDis included lecture presentations, videos, live demonstrations, and practice under observation.

A structured questionnaire, based on the WHO/ICMR standard guidelines for disinfection procedures against COVID-19, was developed to assess pre- and post-KAP score. The questionnaire had three parts: demographic details, mode of transmission, and disinfection procedure. There were a total of 15 questions. One score was allocated to each right answer and 0 to the wrong answer. Content validity was examined by a panel of experts. The questionnaire was administered pre- and posttraining among all participants. The current study

was approved by the institutional ethics committee, vide their file number IEC/2020/311.

Pre- and posttraining results were coded and analyzed to find the impact of training. The data collected were compiled in a Microsoft Excel sheet. The continuous variables were described as mean and standard deviation, and the categorical variables were described as numbers and percentages. A paired *t*-test was used to assess KAP scores before and after the MoPDis training module. StataCorp 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP was used for data analysis.  $P < 0.05$  was considered statistically significant.

## RESULTS

A total of 183 HCWs responded giving information in the structured format. The demographic characteristics of the participants are shown in Table 1. They were all males. The mean age of the participants was  $31.33 \pm 6.8$  years and ranges from 21 to 49 years. The mean years of experience were  $11.5 \pm 7.1$  years [Table 1].

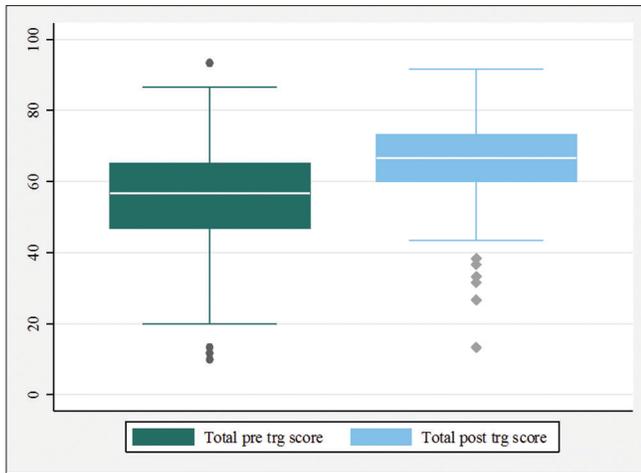
Maximum participation was from the laboratory, blood transfusion, radiology, and community medicine departments, while minimum participation was seen from the anesthesia, endoscopy, pH, ophthalmology, and radiotherapy departments [Table 1]. For statistical analysis, three groups contain paramedics associated with clinical specialty ( $n = 41$ ), those with laboratory and radiological experience ( $n = 83$ ), and those with other subjects ( $n = 59$ ).

The mean pretraining score was  $8.1 \pm 2.4$ . The mean posttraining score was  $10 \pm 1.9$ . The difference was statistically significant ( $t^{[182]} = -8.5$ ;  $P < 0.001$ ; paired *t*-test). The mean increase was  $1.9 \pm 3.1$ . The score increases from 53% pretraining score to 66.6% posttraining score [Figure 1]. There was a 13.6% increase in KAP on disinfection against COVID-19 posttraining. There was no difference among three paramedic groups ( $F [1,181] = 2.07$ ,  $P = 0.15$ ). Although the older age and higher experience were

**Table 1: Sociodemographic characteristics of the participants ( $n=183$ )**

Characteristics	Description
Age (mean±SD)	31.33±6.8
Experience (mean±SD)	11.50±7.1
Category of paramedics, $n$ (%)	
Clinical duties (direct patient care)	41 (22.4)
Laboratory science (including radiology)	83 (45.4)
Other paramedics (not involved in direct patient care)	59 (32.2)

SD: Standard deviation



**Figure 1:** Score before and after training

associated with increased KAP, the same was not statistically significant (coefficient for linear regression for age and years of experience = 0.04,  $P = 0.15$ ). The same is depicted in Figure 2.

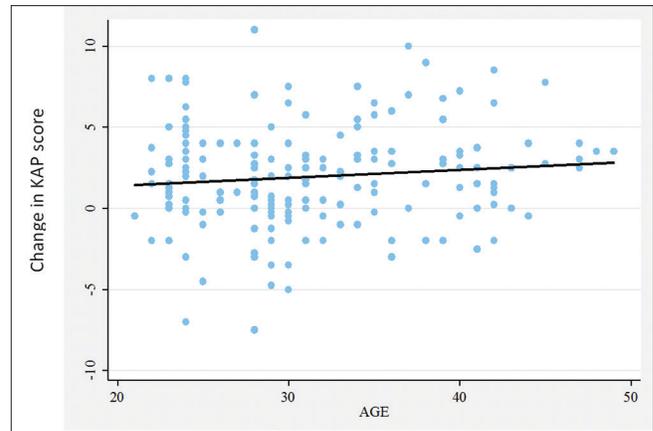
## DISCUSSION

The study reflects the levels of the knowledge, attitudes, and the self-reported practices of the HCWs toward disinfection measures against COVID-19. The study showed an increase in the level of KAP of the participants after the MoPDis. Infection prevention and control including disinfection procedure is essential for the prevention of COVID-19 infection in health-care facilities. Paramedics form an important group of personnel in implementing and observing disinfection procedure

The training and retraining of these personnel is must for imparting current knowledge, encouragement, and quality control. Various courses on training in disinfection procedure have been started by MoHFW in India as well as WHO.<sup>[6,7]</sup> These courses started by MoHFW and WHO though give flexibility to the individual to learn at own pace and time yet are not suitable for just in time training. All paramedics need to be trained in the basic and bare essentials in the same manner. In this regard, this MoPDis was designed. The construct validity of the module needs to be established objectively by measuring the increase in KAP of the participants pre- and posttraining

The study showed more than a 10% increment in KAP about disinfection among paramedics after the MoPDis. A similar immediate increase in knowledge of disinfectants among nurses is shown by studies elsewhere.<sup>[8]</sup>

We also study the effect of age and experience in increase in knowledge and found that the increments are not associated with age or years of experience.



**Figure 2:** Change in knowledge, attitude, and practice score as per age

Increasing age is often associated with declining cognitive skills or decreased capacity to learn the motor skill. However, the finding suggests a slightly better performance of aged people. This may be due to two reasons: first, the age range in the study was from 21 to 49 years, in which the cognitive decline was negligible, and second, it is the novel disease might have aroused the interest alike in all the age groups. The same may be true across all the specialties. However, similar results have been documented earlier.<sup>[9]</sup> The different specialties of paramedics also did not have any effects on increase in KAP.

This training about disinfectant is important and beneficial in the prevention of nosocomial infection in hospitals.<sup>[10]</sup> Training in these aspects can go in a long way in improving the hospital infection control practices and also in the prevention of COVID-19. The WHO has advocated regular training for disinfectant and also has online courses for infection prevention and control for novel coronavirus (COVID-19).<sup>[7]</sup>

## Limitations of the study

The study has certain limitations. First, this was a single-center study and among male participants has limited external generalizability. Second, behavior changes if any after the training are not assessed, and the long-term impact of the training in terms of reduction of infection of COVID-19 or other infections could not be assessed.

However, in times of pandemic objectively assessing the short-term impact of the knowledge is also essential. Firstly to have faith in the training, secondly to emphasize the need of regularly updating about the practice of disinfection. These training schedules can form the basis of training at regular intervals.

## Recommendations

The finding in the study shows that the KAP about disinfection among the HCWs increased posttraining

irrespective of specialty and age. The results of the study also emphasize the positive impact of an on-time training program. Hence, it is recommended that all HCWs in hospital care settings may undergo training in disinfective procedure to know the timing and correct procedure as to reduce the probability of the spread of close contact from COVID-19.

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### Conflicts of interest

There are no conflicts of interest.

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