

Strategy to prevent infection from Covid-19 among security officers of tertiary care centre: A preexperimental study

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ABSTRACT

Background: The extensive spread of Covid-19 pandemic globally became the main cause of concern for everyone, including security officers working in a health care setting. **Objective:** To assess the effectiveness of instructional module for Covid-19 prevention among hospital security officers. **Methods and Materials:** A preexperimental study was conducted at a tertiary care hospital from North India. A total of 344 security officers were selected by the convenient sampling technique. A self-structured knowledge and practice questionnaires and instructional module were developed based on the guidelines released by World Health Organization, Centre for Disease Control and Prevention and Ministry of Health and Family Welfare. Knowledge and practice were pretested, followed by the implementation of a video cum discussion instructional module for Covid-19 prevention. A posttest of knowledge and practice assessment was done after 7 days by using the same questionnaire. Descriptive and inferential statistics were used to compute and analyse the data. **Results:** The mean age of participants was 29.5 ± 2.25 ; most participants (75%) were male security officers. Knowledge and practice scores improved after the implementation of instructional module as mean scores of pretest to mean posttest scores had shown a significant difference ($P = 0.00$). In practice, instructional module was significantly effective, except for touching hair again and again, as it could be a source of covid-19 infection. **Conclusion:** This study finding highlights the significance of training security officers about the prevention of Covid-19.

Keywords: Covid-19, hand hygiene, health care personnel, health education, masks, pandemics, social distance

Introduction

COVID-19 first case notice in December 2019 in Wuhan, China, which now declared as sixth public health emergency or pandemic by the World Health Organization (WHO) on 30 January 2020.^[1] Globally, this pandemic affected more than 200 countries and still rolling in number, which is again a big trouble for mankind.

Health care workers (HCWs) are key persons in the pandemic situation who play a crucial role in diagnosis, treatment, specific protection and health promotion.^[2]

In the era of COVID-19 pandemic, primary health care physicians, nurses, paramedics, pharmacists, housekeeping staffs and other health care professional (HCWs) working as frontline workers are vulnerable to this infection. This new strain of COVID-19 virus^[3] has been found in human being in the year 2019 and not before it.^[4] It broadly infects vertebrates, especially humans, along with birds, bats, snakes, mice and wild animals.^[5]

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Due to the highly contagious nature of COVID-19 virus, HCWs are at higher risk for infection along with the burden of physical, fatigue, burnout, psychological as well as extended working hours.^[6,7] HCWs are a bridge between the population and the health system. These always provide salient deep pockets for each nation around the world to achieve *Health for all*. Strategically, training and meticulously using resources and HCWs not only provide continuous and safe patient care but also help to control any disease outbreak.^[8-10]

Security officers working in a hospital come in close contact with patients, thus, are at high risk of infection.^[11] WHO has also initiated various online training session's material for HCWs on COVID-19 to strengthen knowledge regarding preventive strategies, including awareness and training of HCWs in preparedness for COVID-19.^[11] It is important to train HCWs, front line warriors, that the distance (at least 1 m), face mask, hand hygiene and eye protection are the most effective ways of preventing Covid-19 transmission.^[12] Knowledge and awareness programs are helpful to discontinue the chain of transmission of COVID-19 disease and decrease morbidity among HCWs, primary close contacts and other vulnerable group like geriatric, children, pregnant mothers and chronic-infected patients with comorbidities.^[13]

To the best of our knowledge, the first research study done in North India for assessing the effectiveness of the instructional module on COVID-19 prevention among security officers of the hospital. The main aim of the study was to assess its effectiveness on knowledge and practice for COVID-19 prevention among security officers who are working at the tertiary care hospital.

Materials and Methods

Study design

A preexperimental study with one group pre and posttest design was used to compare the difference in the level of knowledge and practice about COVID19 prevention before and after instructional module among security officers working in a tertiary care teaching institute.

Participants

The study adopted a convenient sampling technique to draw 344 security officers who were available during the data collection period.

Ethical considerations

Ethical approval was obtained from the institutional ethics committee vide with letter no. AIIMS/IEC/20/347. The participants were well informed about the purpose of the survey. Informed written consent was obtained from each participant. Confidentiality of information and anonymity of the participants were maintained.

Study tools

The instructional module was used in this research study which was self-developed by the team of expert from the department

of microbiology, community and family medicine, and nursing after reviewing recent guidelines and instructions from WHO,^[14] Centre for Disease Control and Prevention^[15] and Ministry of Health and Family Welfare on COVID-19 prevention.^[16] The instructional module content and questionnaires were translated from English to Hindi language by an expert, and a video was developed, which was again reviewed by the same experts.

Data collection

The data collected with the help of a semistructured questionnaire consists of: *Tool I* – Demographic Profile, which was used to collect the background information of the security officer such as age, gender, educational status and years of experience in the profession.

The tool II – Structured knowledge questionnaire regarding the prevention of COVID-19. The structured knowledge questionnaire consisted of 15 multiple choice items with one correct answer for each, and a structured self-reported questionnaire consisting of seven items that focused on hand hygiene practices, use of mask, social distancing and other general areas on COVID-19 prevention practices. Seven experts validated the tool, suggested retaining only 10 items. Pretesting was done among five participants, and there was no difficulty to understand the test items. The knowledge scores were categorized as good (7–10), average (4–6) and poor (0–3). The reliability of questionnaire was computed by the test–retest method ($r = 0.85$).

Participants were made into small groups of 20 members conveniently and asked to report in a designated hall in medical college by maintaining social distancing for data collection and implementation of instructional module. Every day four groups were called (a total of 80 members), each group was given 60 min; in the first 20 min, voluntary informed consent was taken, followed by pretest of knowledge and self-reported practices on prevention of COVID-19 by the participants. In the next 40 min, the prevalidated instructional module on the measures to prevent the Covid-19 infection was shown by video along with demonstrations on hand hygiene, use of mask and how to maintain social distancing with patients and their relatives. After 7 days' gap of the instructional module, posttest knowledge and self-reported practice was conducted by using the same questionnaire.

Statistical analysis

Data were entered in the Excel spreadsheet; SPSS v23.0 was used for descriptive and inferential statistics.

Results

Out of 344 security officers who participated in the study, 145 (42%) were between 31 and 40 years, and mostly 259 (75%) were male. Almost half of the participants, 142 (06%), had secondary level of educational qualification, and 229 (66%) of them working for more than 12 months in the present institution. [Table 1].

Overall mean knowledge score gain of security officers regarding COVID19 infection was from 6.69 ± 1.27 to 8.38 ± 1.35 , which was highly significant ($P = 0.000$). The areas where the participants' knowledge maximum increased was in areas related to precautions followed while using the lift (33%) and areas of social distance to be followed for COVID-19 prevention (27%). On the contrary, minimum enhanced areas of knowledge were clinical symptoms of COVID-19 (7%), the minimum time duration for washing hands with soap and water (10%), cleaning time gap for high touch area (8%) and place for the disposal of used mask in the hospital (7%) [Table 2].

The mean practice score of Covid-19 infection prevention among participants was gained from mean pretest score 6.25 ± 0.43 to mean posttest score 6.59 ± 0.49 , which was found to be significant at $P = 0.000$. Mean practice gain (4%) related to touching their hairs without cleaning their hands was not statistically significant ($P = 0.075$) [Table 3].

Multiple binary logistic regression showed that female gender (vs male gender with OR – 1.33 and P value 0.009) and age of 21–40 years (vs 41–60 years with OR – 1.52 and $P = 0.008$) were found significantly associated with touching the face with clean hands. Female gender (vs male gender with OR – 3.52 and $P = 0.022$) was found significantly associated with maintaining social distancing when dealing with patients/relatives in pretest practices [Table 4].

Discussion

The outbreak of COVID-19 happened in China first in December 2019,^[17] and the disease has been cascading across the globe till date, including India. As per the WHO guideline, health care professional, being direct or indirect caregivers, must know Covid-19^[18] and its preventive measures. Security officers are the key persons who come in contact with the patient and their relative before care health professional.

Majority (79%) of security officers were aware of regarding clinical symptoms of Covid-19. On the other hand, two-third had known about quarantine time, social distancing, washing the hands with soap and water, when to do hand washing with soap and water, a total time duration for hand cleaning with hand rub, how to dispose used mask and wearing of PPE, and if not appropriately followed, there could be a risk of getting infection and spread of COVID-19 transmission.

Inadequate knowledge of general precaution to prevent COVID19, security officers could be a key person who comes in contact with the disease easily and increase the risk for cross-infection among community and hospital staff as well. Bielicki J.A. *et al.*^[19] stated in their study to do risk assessment and training HCWs is the best strategy to prevent COVID-19 infection in the hospital.

Instructional module teaching increase knowledge of security staff significantly for COVID-19. By having adequate knowledge

Table 1: Demographic profile of security officers (n=344)

Variables	f/Mean±SD	%
1. Age		
21-30 years	107	32
>31-40 years	145	42
>40-50 years	75	21
>50-60 years	17	05
Mean age (in years)	29.5±2.25	
2. Gender		
Male	259	75
Female	85	25
3. Education		
Primary	109	32
Secondary	142	42
Graduate	71	20
Postgraduate	22	06
4. Work Experience		
>6 months	48	14
7-12 months	67	20
<12 months	229	66

Table 2: Comparison of pretest and posttest knowledge of security officers (n=344)

Knowledge Question	Pretest Mean±SD	Posttest Mean±SD	95%CI Min, Maxi	t	P
K1	0.79±0.40	0.86±0.34	[-0.09], [-0.04]	-5.07	0.000
K2	0.69±0.45	0.88±0.32	[-0.22], [-0.14]	-8.85	0.000
K3	0.63±0.48	0.90±0.29	[-0.30], [-0.21]	-11.02	0.000
K4	0.74±0.43	0.84±0.36	[-0.12], [-0.06]	-5.93	0.000
K5	0.62±0.48	0.70±0.45	[-0.11], [-0.05]	-5.72	0.000
K6	0.62±0.48	0.81±0.39	[-0.22], [-0.14]	-8.76	0.000
K7	0.77±0.41	0.84±0.36	[-0.09], [-0.04]	-5.07	0.000
K8	0.50±0.50	0.83±0.37	[-0.38], [-0.28]	-13.12	0.000
K9	0.66±0.47	0.79±0.40	[-0.15], [-0.08]	-6.90	0.000
K10	0.62±0.48	0.90±0.28	[-0.32], [-0.23]	-11.06	0.000
Total	6.69±1.27	8.38±1.35	[-1.79], [-1.57]	-30.01	0.000

CI - Confidence interval; SD - Standard deviation; Significant at 0.05 level by using paired "t" test

K1...What are the clinical symptoms of Covid-19?
K2...In case of contact with Covid-19 positive/suspected person, what will be the minimum quarantine time?
K3...What would be the minimum social distance for covid-19 prevention?
K4...What is the minimum time duration for washing the hands with soap and water?
K5...What would be the cleaning time gap for high touch area?
K6...When will you wash the hands with soap and water?
K7...Disposal of hospital used mask should be done at?
K8...What precautions you will keep in mind while using a lift?
K9...What is the minimum time duration for washing the hands with alcohol-based hand-rub?
K10...What you will put off while entering in Covid-19 area?

of high-touch areas cleaning and how to use a lift, we can make the hospital environment safe and clean. Security staff are key persons who attend any patients first before they come to OPDs. So, educating security staff by instructional module and filling knowledge gap areas play a great significance in this COVID-19 scenario. There are many factors, including hospital management support, institutional culture, physical infrastructure equipment and training, reported by Houghton *et al.*^[20] in their analysis to practice infection prevention and control. It is important to take care of all these aspects separately for all employees working in a hospital setting.

A similar study done in a tertiary care centre found that video-assisted teaching–learning through virtual platforms was

Table 3: Comparison of practices of security officers for COVID-19 prevention (n=344)

Practice Question	Pretest Mean±SD	Posttest Mean±SD	95% CI Min, Max	t	P
P1	0.68±0.46	1.00±0.00	[-0.36], [-0.26]	-12.61	0.000
P2	0.86±0.34	0.90±0.29	[-0.09], [-0.01]	-1.78	0.075
P3	0.64±0.34	0.90±0.31	[-0.08], [-0.02]	-3.14	0.000
P4	0.86±0.34	0.92±0.27	[-0.10], [-0.01]	-2.33	0.020
P5	0.88±0.31	0.94±0.23	[-0.09], [-0.01]	-2.46	0.014
P6	0.88±0.31	0.93±0.23	[-0.09], [-0.01]	-2.46	0.014
P7	0.88±0.31	1.00±0.00	[-0.14], [-0.07]	-6.62	0.000
Total	6.25±0.43	6.59±0.49	[-0.41], [-0.27]	-9.70	0.000

CI - Confidence interval, Significant at 0.05 level by using paired "t" test

P1... Are you using mask properly, covering nose and mouth?

P2... Do you have habit of touching face and hairs again and again without cleaning hand?

P3... Are you cleaning hands after touching any object?

P4... Are you cleaning hands with soap and water before and after taking food?

P5... Are you maintaining social distancing (2 m) when dealing with patients/relatives?

P6... Are you, using elevator with necessary precautions (like instead finger using elbow)?

P7... Are you following general instructions while working in Covid-19 area?

Table 4: Multiple binary logistic regression of various factors associated with practice towards COVID-19

Variables	OR (95%CI)	P
P1: Touching the face		
Gender (male vs. female)	1.32 (1.02, 1.72)	0.009
Age (21-40 years vs. 41-60 years)	1.52 (1.11, 2.11)	0.008
P5: Maintaining social distancing when dealing with patients/relatives		
Gender (female vs. male)	3.52 (1.19, 10.40)	0.022

effective (P value < 0.001) in training health care personnel on infection prevention and control practices during the COVID-19 pandemic. The pretest knowledge score of HCWs was found 38.8% compared to the posttest knowledge score of 70%, which was found to be statistically significant in the improvement of knowledge scores (P value < 0.001) through video-assisted teaching-learning.^[21]

Another study from a tertiary care centre found that the training of HCWs regarding coronavirus infection and their preparedness to fight against the ongoing pandemic was effective with a significant difference in mean pretest knowledge score 17.73 (± 5.004 SD), and posttest knowledge score 20.93 (± 5.033 SD).^[22]

In the present study findings, only two out of three security staff followed good practices for COVID-19 prevention. COVID-19 has spread rapidly from Wuhan city to worldwide; therefore, every employee working in a hospital where COVID-19 patients are treated must take extra precautions to control its infection.

Many security staff were not followed precautionary measures to prevent COVID-19 infection, such as incomplete steps in hand hygiene, touching their face and hairs. The instructional module teaching has failed to improve significantly from pre- to posttest practice scores; therefore, after posttest, security officers were sensitized and reeducated to avoid frequently touching face or hair. These findings suggested to the public health policymakers of the country to again recognize target groups like

security officers, police officers and housekeeping staffs (*Safayi Karmachari*) and train them regarding COVID-19 prevention. As per epidemiological studies, India is expecting a huge number of COVID-19 cases in the coming future.^[23]

So, it is essential to empower all-health professionals, including primary health care physician, nurse, technician, housekeeping staffs, drivers, security officers, police officers, with adequate knowledge and practices regarding the prevention of COVID-19 infection and maximise the human resources to serve patients and society without getting infection.

The finding of demographic variables shows an association with practices. The female security officers of age between 21 and 40 years followed good practices such as regularly performing hand hygiene, only touching their face after doing hand hygiene and maintaining social distance on-duty. A similar finding was reported in a study that the female security staff always maintain social distancing when dealing with patients/relatives.^[24] In another study, findings revealed that health education programme helped to improve positive attitude and congruous practices to prevent COVID-19 infection in the general population.^[25] There is uncertainty about vaccination for Covid-19 at present; hence, education and prevention of infection is one of the best suitable measures.

Conclusions

COVID-19 is a newer viral unexpected outbreak and linked with numerous practices in prevention of its transmission. It is the important responsibility of primary health care physicians and other health care professional to train the security officers to improve knowledge and practice levels of Covid-19 infection prevention. The level of knowledge of security officers about prevention of COVID19 infection was associated with the levels of practice. Some of the behavioral modification was needed, as touching of hair repeatedly was reported by female security officers even after training. Each personnel working inside the hospital or outside have equal responsibilities to mitigate the spread of Covid-19 infection.

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Conflicts of interest

There are no conflicts of interest.

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