

Effect of COVID-19 Pandemic on Awareness on Prevention of Spread of Infective Respiratory Secretions among Resident Doctors

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ABSTRACT

Introduction: Respiratory infections including Coronavirus Disease-2019 (COVID-19) infection spread through droplet infections. Hence standard precautionary measures like handwashing and use of masks are essential to prevent transmission of these infections in healthcare setting.

Aim: To determine the effect of COVID-19 pandemic on awareness level of resident doctors on prevention of spread of infective respiratory secretions.

Materials and Methods: This cross-sectional study was conducted among two subsequent batches (year 2019-20 and 2020-21) of resident doctors at a medical college hospital, from February 2020 to September 2020. The 2019-2020 batch of resident doctors worked as residents from March 2019 to March 2020 and were considered as pre COVID-19 batch. The 2020-2021 batch of resident doctors had their training period from April 2020 to April 2021 and were

considered the COVID-19 batch. A pretested semi-structured questionnaire consisting of 14 questions to evaluate the awareness on prevention of spread of infective respiratory secretions was administered. The responses were evaluated, marks awarded and summated.

Results: There were 121 respondents in the pre COVID-19 batch making the response rate 85%. There were 112 respondents in the COVID-19 batch, with a response rate of 86%. The mean (standard deviation) score obtained by the COVID-19 batch was 9.91 ± 3.42 which was significant higher than that obtained by the pre COVID-19 batch which was 7.1 ± 1.83 . The score obtained by COVID-19 batch for 11/14 questions was significantly higher compared to the pre COVID-19 batch.

Conclusion: A significant improvement was seen in the knowledge level in prevention of spread of infective respiratory secretions among resident doctors after the onset of the COVID-19 pandemic.

Keywords: Coronavirus disease 2019, Handwashing, Mask, Personal protective equipment

INTRODUCTION

Respiratory infections are common reasons for seeking medical care. They can spread through droplet infections. Standard precautions like handwashing and use of gloves and masks are the primary strategies for minimising transmission of healthcare related infections [1-3]. These measures are to be adopted while providing care to all individuals in hospitals regardless of their complaints. Lack of standard precautions among healthcare personnel in hospitals has become a major concern in the spread of respiratory infections. In addition, healthcare personnel are at increased risk of infection during pandemics like COVID-19. A basic tool to reduce their infection rates, thus reducing the spread of pandemic, is the proper use of Personal Protective Equipment (PPE) [4]. Appropriate use of PPE by healthcare personnel has been shown to reduce transmission of COVID-19 among them.

When the COVID-19 pandemic struck India in March 2020, a variety of preplanned pandemic control strategies were implemented, including infection control practices in hospitals across the country. Resident doctors were actively involved in the treatment of COVID-19 patients and suspects. Contact and droplet precautions should be followed by nurses and resident doctors caring for patients with COVID-19 at all times [5-7]. Given the pandemic situation, any patient presenting to the hospital for any complaint is a suspect and should be approached with utmost care and precaution.

Adequate knowledge is a prerequisite for ideal practice and hence it is important to assess the knowledge level of resident doctors who constitute the basic workforce of the hospital. This study was conducted with the objective of determining the effect of COVID-19 pandemic on awareness level of resident doctors on prevention of spread of infective respiratory secretions.

MATERIALS AND METHODS

A cross-sectional study was conducted among two subsequent batches of resident doctors (year 2019-20 and 2020-21) of a Medical College Hospital, Chennai, Tamil Nadu, India from February 2020 to September 2020. The study was commenced after obtaining approval from the Institutional Ethics Committee (IEC) (Letter numbered 324/2020). The 2019-2020 batch of resident doctors worked as residents from March 2019 to March 2020 and were considered as pre COVID-19 batch. The 2020-2021 batch of resident doctors had their training period from April 2020 to April 2021 and were considered the COVID-19 batch. All the 142 residents of 2019-2020 batch and 130 residents of 2020-2021 batch were approached for the study.

Study Procedure

Resident doctors were briefly explained about this study. Those who consented participated in the study. A pretested, semi-structured, self-administered questionnaire in English with open-ended questions (on hand hygiene, cough etiquette, patient placement, use of PPE, and quarantine) was distributed to the resident doctors as Google forms and they were asked to fill the questionnaire. The Google forms were sent to all the participants by the principal investigator. The pre COVID-19 batch of residents filled up the forms in March 2020 and COVID-19 batch in May 2020. Residents were given 2-week time to return the filled forms. The questions used in the study and their answers are given in the [Appendix-1].

The responses obtained from the resident doctors were evaluated like answer sheet with the practical guidelines for infection control in healthcare facilities by World Health Organisation (WHO) as key [8]. Each question was allotted one mark and if the answer had more than one point, each point was awarded a fraction of mark depending on the number of points. The resident was awarded one

full mark for a question, if the answer was correct and complete; there was no negative marking. The marks obtained for all 14 questions were summated and each participant awarded a score.

STATISTICAL ANALYSIS

Data was analysed using statistical software Statistical Package for the Social Sciences (SPSS) version 24.0. Categorical variables were expressed in proportions, while numerical variables were expressed as mean (standard deviation). The means were compared between both groups with Student's t-test and level of significance was fixed at 5%.

RESULTS

There were 121 respondents in the pre COVID-19 batch making the response rate 85%. There were 112 respondents in the COVID-19 batch, with a response rate of 86%. The pre COVID-19 batch comprised 51.9% and COVID-19 batch 48.1% of total respondents. Among them 118 were females and 115 males, the male female ratio being 1:1.03. The mean score obtained by the COVID-19 batch was higher than that obtained by the pre COVID-19 batch [Table/Fig-1].

Batch	n	Mean±SD	p-value
Pre COVID-19	121	7.1±1.83	<0.001
COVID-19	112	9.91±3.42	

[Table/Fig-1]: Comparison of total scores in both groups.

When the marks obtained for individual question by the residents of both groups was compared, it was apparent that score obtained by COVID-19 batch was significantly higher compared to pre COVID-19 batch for 11/14 questions. These results are depicted in [Table/Fig-2]. The questions whose responses significantly improved include the most common route of spread of respiratory infections, WHO's five moments of hand washing, procedures capable of generating aerosols transmitting respiratory pathogens, how far should an acute respiratory symptomatic patient placed from others, ways to educate patients and caregivers about respiratory hygiene and cough etiquette, ideal patient placement, precautions to be used while using a mask, proper disposal of mask, the recommendations for airborne infection isolation room, quarantine and alternative to hand washing [Table/Fig-2].

Q. No.	Question	Pre COVID-19 n=121	COVID-19 n=112	p-value
		Mean±SD	Mean±SD	
1	Common route of spread of respiratory infection	0.81±0.39	0.95±0.21	<0.001
2	Standard infection control precaution preventing transmission by direct contact	0.83±0.37	0.77±0.41	0.22
3	WHO five moments of hand washing	0.57±0.34	0.68±0.40	0.02
4	Respiratory hygiene and cough etiquette	0.70±0.37	0.78±0.30	0.09
5	Personnel protective equipment to be used	0.54±0.27	0.54±0.17	0.9
6	Aerosol generating procedures	0.22±0.18	0.51±0.26	<0.001
7	How far should an acute respiratory symptomatic patient be placed from others	0.14±0.35	0.62±0.47	<0.001
8	Methods to educate the patients about respiratory hygiene	0.34±0.26	0.63±0.79	<0.001
9	Ideal placement of patient with acute respiratory infection	0.05±0.21	0.29±0.46	<0.001
10	Precautions to be taken while using a mask	0.41±0.28	0.80±0.30	<0.001
11	Proper disposal of mask	0.25±0.30	0.74±0.50	<0.001

12	Airborne infection isolation room recommendations	0.24±0.26	0.39±0.34	<0.001
13	Quarantine	0.47±0.31	0.72±0.30	<0.001
14	Alternative to hand washing	0.80±0.40	0.92±0.27	0.01

[Table/Fig-2]: Comparison of scores of individual questions between both groups.

DISCUSSION

The present batch, 2020-21 namely the COVID-19 batch of resident doctors were more aware of methods of prevention of spread of infective respiratory secretions when compared to the previous, 2019-20 namely pre COVID-19 batch of resident doctors. The pandemic has clearly resulted in a significant increase in knowledge level of resident doctors in these aspects.

Awareness that respiratory infections spread through droplet infection, standard infection control precaution being hand hygiene, WHO's five moments of hand washing, the procedures capable of generating aerosols capable of transmitting respiratory pathogens and respiratory hygiene and cough etiquette were improved in the COVID-19 batch. Majority had identified intubation, Continuous Positive Airway Pressure (CPAP), Bronchoscopy, suctioning, Ryle's tube insertion, nebulisation as the procedure producing aerosols. COVID-19 batch were aware that the acute respiratory infection patient should be placed 1-2 metre away from others and single room occupancy is ideal than the pre COVID-19 batch of resident doctors. There was a positive impact of COVID-19 on the awareness of different personnel protective equipment to be used. The COVID-19 batch of resident doctors posted to care for COVID-19 patients has adequate knowledge about the precautions to be used while wearing a mask and about its proper disposal compared to the pre COVID-19 batch of resident doctors. Both pre COVID-19 and COVID-19 batch of resident doctors have identified sanitiser as the alternative to hand washing. The knowledge of pre COVID-19 batch of resident doctors about the airborne infection isolation room was comparatively less compared to that of present batch of resident doctors. The COVID-19 pandemic has also improved the knowledge level of resident doctors about quarantine.

Though training on mode of spread of respiratory infections, infection control practices and personal protective equipment constitute an essential component of medical training curriculum, the awareness of resident doctors on these aspects remain suboptimal [9]. The silver lining of the pandemic is the importance of these standard precautions are re-emphasised and disseminated across the healthcare personnel, which is an encouraging development.

The reasons for improvement in awareness level include the fact that training on infection control practices were reinforced after the outbreak and there was a greater perceived threat to the healthcare personnel and their family from a serious disease, namely COVID-19 [10,11]. In addition, mass media and social media were flooded with information on prevention of spread of infective respiratory secretions which could have made additional impact on the knowledge level of the resident doctors.

A similar study done in Hong Kong following Severe Acute Respiratory Syndrome (SARS) epidemic showed an improvement in number of undergraduate medical students practicing handwashing and wearing masks following the epidemic [12]. On the contrary, a Singapore study did not show any impact on knowledge and perception of hand hygiene and infection control practices of final year medical students following H1N1 pandemic [13]. The probable reason for this indifference was the fact that H1N1 results in a milder disease when compared to SARS or COVID-19.

Limitation(s)

The limitation of this study was that it was designed to evaluate the knowledge level of resident doctors and did not evaluate the practice. It needs to be borne in mind that improvement in knowledge level does not always culminate in better practices which is the prerequisite for prevention of spread of infection and

containment of pandemic. Better practices require an ideal role model and better peer behaviour, in addition to improvement in knowledge level [14].

CONCLUSION(S)

A significant improvement was seen in the knowledge level on prevention of spread of infective respiratory secretions among resident doctors after the onset of COVID-19 pandemic. This could be considered as positive impact of COVID-19 infection on the knowledge of healthcare providers. This pandemic has taught everyone many lessons exemplified by the knowledge of spread of respiratory infection and its preventive practices to be adopted. This can have far reaching positive consequences beyond the pandemic.

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[APPENDIX-1]**Questions used in Study and their Answers**

1. What is the most common route of spread of respiratory infections?
Droplet infection, Airborne.
2. What is the standard infection control precautions to prevent transmission by direct contact?
Handwashing
3. When handwashing must be performed? (WHO 5 moments of hand washing)
 - a) Before touching a patient
 - b) Before clean/aseptic procedure
 - c) After body fluid exposure
 - d) After touching a patient
 - e) After touching patient surrounding
4. What is respiratory hygiene and cough etiquette?
Precautions taken to prevent spread of respiratory secretions like, covering mouth and nose while coughing or sneezing by using tissue or handkerchief. Washing hands or using a hand sanitiser after coughing and sneezing.
5. What are the PPE to be used during the procedures?
Gloves, goggles, mask, apron, gown, boot/shoe cover, cap.
6. What are procedure capable of generating aerosols capable of transmitting respiratory pathogens?
Nebulisation Bronchoscopy Intubation
Suctioning of ET tube Sputum examination
7. How far should an acute respiratory symptomatic patient placed from each other?
Optimum spacing between beds is 1-2 meters.
8. How can we educate the patients and attender about respiratory hygiene and cough etiquette.
Posters, role play, health education, signage boards
9. What is ideal patient placement?
Place each patient in a single room
10. What are the precautions to be used while using a mask?
Wash hands and dry
Use the clean mask and do not touch the inner surface of the mask
Ensure the mask is fitted properly
If glasses are worn, fit the upper edge of the mask under the glasses.
11. How should the mask be disposed?
Handle only the strings while removing the mask.
Discard in appropriate bag and wash hands.
12. What are the recommendations for airborne infection isolation rooms?
Place patient in a single room with negative airflow pressure.
The air should be discharged to the outdoor or specially filtered before it is circulated to other areas of healthcare facility.
Doors to be kept closed.
Anyone entering the room must wear N95 mask.
13. What is quarantine?
Limitation of freedom of movement of such well persons or domestic animals exposed to communicable disease for a period of time not longer than the longest usual incubation period of the disease.
14. What is the alternate to handwashing?
Use of hand sanitiser.