ORIGINAL RESEARCH ARTICLE
pISSN 0976 3325 | eISSN 2229 6816
Open Access Article
www.njcmindia.org
DOI: 10.5455/njcm.20200630061357

Standard Precautions for COVID-19: An Insight into the Awareness of Post Graduate Trainee Doctors Working At a Tertiary Level Dedicated COVID Hospital

Rupa Sharma[1], Gopal Lal Bunkar[2], Peeyush Damor[3], Anuja Vashistha[4], Pratap Bhan Kaushik[5]

Financial Support: None declared
Conflict of Interest: None declared

How to cite this article:
Sharma R, Bunkar GL, Damor P, Vashistha A, Kaushik PB. Standard Precautions for COVID-19: An Insight into the Awareness of Post Graduate Trainee Doctors Working At a Tertiary Level Dedicated COVID Hospital. Natl J Community Med 2020;11(7):280-285

Author's Affiliation:
[1]Sr. Professor; [2]Professor; [3]Third Year Resident; [4]Second Year Resident; [5]Lecturer in Statistics, Dept. of Community Medicine, RNT Medical College, Udaipur

Correspondence
Dr. Rupa Sharma
Rupa30@gmail.com

Date of Submission: 30-06-2020
Date of Acceptance: 09-07-2020
Date of Publication: 31-07-2020

ABSTRACT

Background: The rapid and extensive spread of the COVID-19 pandemic is a major concern for healthcare profession. Standard Precautions (SP) are the key to contain the spread. Adherence to existing SP is mostly user dependent and it is affected by their awareness. The Post Graduate (PG) trainee doctors are the immediate caregivers in a Dedicated COVID Hospital. The objective was to assess their awareness of SP , identify gaps in knowledge to help in future capacity building.

Methodology: The cross sectional study was conducted in June 2020 at RNT Medical College, Udaipur, Rajasthan on 115 PG trainees from all streams. The questionnaire was adapted from standard COVID-19 Outbreak Guidelines from MoHFW , India and Centre for Disease Prevention and Control (CDC) Descriptive statistics were performed based on the percentage of correct answers.

Results: Majority (54.8%**)** had only average awareness of SP . 62.6% displayed correct awareness of hand hygiene while it was much less for respiratory hygiene (12.2%),PPE donning16(13.9%)and doffing16(13.9%) and other elements of SP.

Conclusions: Average and lesser awareness of SP elements among PG trainees is a matter of great concern, This indicates the need for frequent on going trainings on SP to be incorporated in the curriculum of the PG training program.

Key Words: COVID-19, Standard Precautions, Awareness, Post Graduate Trainee Doctors

BACKGROUND

COVID-19 was declared a pandemic by the World Health Organization (WHO) 11-3-2020.[1] The rapid and extensive spread of the COVID-19 pandemic has become a major cause of concern for the healthcare profession. A report from India states that Health Care Workers (HCW) are 33 times more vulnerable to COVID-19 than common public.[2] This is because of the multiple routes of transmission of the virus and their close and frequent contact with the confirmed or suspected cases. 31 doctors and three nurses had died in India due to Covid-19 By May 30 , who were either treating or had unknowingly exposed themselves to Coronavirus patients..[3] Many exposures among doctors, paramedical staff, patients and visitors in health care facility can be prevented by careful adherence to existing Standard Precautions (SP).

Standard Precautions are the minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where health care is delivered.[4] The elements of SP for COVID-19 are: Hand hygiene, Respiratory Hygiene(etiquettes) , Use of personal protective equipment (PPE) according to risk , Safe injection practices, sharps management and injury prevention, Safe handling and disinfection of patient care

equipment , Environmental cleaning and safe management of body fluid spillages, Safe handling and cleaning of soiled linen and Safe disposal of clinical waste.[4] The adherence to SP is mostly user dependent and it is affected by their perception. Despite the availability of detailed guidelines, the knowledge and compliance with SP vary among HCWs. Studies [4,5] mention that the differences in knowledge of SP among health care workers may be influenced by their type of training .

The Post Graduate (PG) trainees are qualified medical graduates, they are the immediate caregivers in a Dedicated COVID Hospital , they come in close contact with the suspected and confirmed cases hence their abiding by the SP is the key to contain the spread. In this context the present study aims to assess the post graduate trainees doctors' awareness of SP for COVID-19 and identify gaps in awareness which will help in planning capacity building program in order to improve their perception and practice.

MATERIAL AND METHODS

A Hospital Based descriptive cross-sectional study was conducted at RNT Medical College and Associate Groups of Hospitals, Udaipur (Raj) in the month of June 2020 after obtaining approval from the Institute Ethics Committee. This hospital is designated as a Tertiary Level Dedicated COVID Hospital. The teaching hospital has total 2210 beds of which 608 beds have been dedicated for COVID care only with 108 beds in ICU, in a separate newly constructed five story Super Speciality Block (SSB) converted into a COVID-19 Block.

Post Graduate Trainee Doctors (PGs) from all streams who had been posted at least once in the COVID-19 Block (SSB) and consented to participate were the subjects for the study. The PG students currently posted in the COVID-19 Block and those quarantined after the posting were excluded from the study. All Post Graduate (PG) Trainee Doctors had been imparted training on Standard Precautions with demonstration and video display by the Hospital Infection Control Task Force before assigning duties in COVID-19 Block. A total 115 PG trainees consented for participation and were included in the study (RR = 82.6%).

Data was collected from the subjects on a pretested self-administered questionnaire. The questionnaire was drafted in two parts. The First part was semi structured, designed to collect demographic details of the subjects. The second Part: was a structured questionnaire with 28 multiple choice questions (MCQ) designed to collect data on awareness of the subjects regarding Principles of SP, Hand Hygiene, Use of Personal Protective Equipment (PPE) according to the risk, Respiratory Hygiene, Disinfection of reusable patient care equipment, Disinfection of soiled linen, Cleaning and disinfection of environment, and waste management

The questions were adapted from standard COVID-19 Outbreak Guidelines from MoHFW, India and CDC Guidance for Health Workers [6,7,8]

The purpose of the study was explained to each subject before administration of the questionnaire, confidentiality of the information assured.

The data was coded and entered on MS Excel, a score of one was assigned for a correct answer and zero for an incorrect answer for the second part of the questionnaire. Assuming good awareness of subjects as they are qualified MB;BS doctors , knowledge score ≥ 21was considered "good " , 14-20"average " , ≤ 14 " less than average" Mean with Standard Deviation were calculated for age and knowledge level. The results were analysed statistically with Chi-square test for any association between General Characteristics and knowledge and awareness. Statistical Package for Social sciences (SPSS) version 16 was used, p value <0.05 was considered as significant.

Table1: General Characteristics of the Post Graduate (PG) Trainee Doctors (N=115)

General Characteristics	PG Doctors (%)
Gender	
Male	75 (65.2)
Female	40 (34.8)
Total	115 (100)
Age in Years	
25-29	58 (50.4)
30-34	50 (43.5)
35-39	6 (5.21)
40 and above	1 (0.9)
Total	115 (100)
Pursuing Degree/ Diploma	
MD	60 (55)
MS	52 (41.3)
Diploma	3 (3.8)
Total	115 (100)
Type of Stream	
Clinical	101 (87.8)
Para Clinical	8 (6.9)
Pre Clinical	6 (5.2)
Total	115 (100)
Past Experience of service in govt health centres	
< 3 years	24 (20.9)
3-5 years	16 (13.9)
>5 years	6 (5.2)
Nil*	69 (60)
Total	115 (100)
Received formal induction training before posting in COVID-19 Block	
Yes	110 (95.7)

*Fresher PG Trainees

RESULTS

Out of the 115 subjects 75(65.2 %) were male , majority, 58(50.4%) were in 25-29 years age group and only one subject was above 40 years of age. Mean Age was 29.8±2.5 years. Most subjects 101 (87.8%) were from clinical streams. Only 8(6.9%) and 6(5.2%) were from Para clinical and pre clinical streams respectively. Majority, 69(60%) were fresher PG trainees with no past experience of service at government health centres. 24(20.9%) had experience of less than three years. Almost all subjects10(95.7%) had received one formal induction training on Hospital Infection control and Standard Precautions for COVID-19 before posting in COVID-19 Block (Table 1).

Majority of subjects had correct knowledge of Hand Hygiene and Disinfection of COVID-19 patient care reusable equipment 72 (62.6%) and 69 (60%) respectively. More subjects from clinical streams as compared to pre and Para clinical streams were aware of these elements of standard precautions **(p value< 0.05**).

Table 2: Frequency and Percentage of Post Graduate Trainee Doctors with Correct Awareness of Elements of Standard Precautions for COVID-19

Elements of Standard Precaution	Post Graduate Trainee Doctors			χ^2 value (df=1)	p value
	Clinical streams (n=101) (%)	Pre and Para Clinical Streams (n=14) (100)	Total (N=115) (%)		
Hand Hygiene	68 (67.3)	4 (28.7)	72 (62.6)	7.88	**0.004**
Respiratory Hygiene	11 (10.9)	3 (21.4)	14 (12.2)	1.27	0.258
PPE	22 (21.8)	5 (35.7)	27 (23.5)	1.32	0.249
Safe injection practices	35 (34.7)	2 (14.3)	37 (32.2)	2.33	0.126
Disinfection of reusable Patient care equipment	65 (64.5)	4 (28.6)	69 (60)	6.56	**0.010**
Environment Cleaning	32 (31.7)	4 (28.6)	36 (31.3)	0.05	0.813
Safe Handling and Cleaning of Soiled Linen	16 (15.8)	0	16 (13.9)	2.57	0.108
Bio Medical Waste Management	16 (15.8)	3 (21.4)	19 (16.5)	0.278	0.597

Figures in parenthesis indicate percentage

Table 3: Distribution of Post Graduate Trainee Doctors according to their correct awareness of PPE use

Correct knowledge of	Post Graduate Trainee Doctors			χ^2 value (df=1)	P value
	Clinical streams (n=101) (%)	Pre and Para Clinical Streams (n=14) (100)	Total (N=115) (%)		
Limited reuse of N 95 Respirator[†]	39(38.6)	4(28.6)	43(37.4)	0.530	0.467
Appropriate PPE according to risk of exposure	27(26.7)	4(28.6)	31(27)	0.021	0.884
Steps of PPE Donning	11(10.9)	5(35.7)	16(13.9)	6.236	**0.012**
Steps of PPE Doffing	36(335.6)	6(42.9)	42(36.5)	0.276	0.599
Checking PPE before Donning and Doffing	69(68.3)	9(64.3)	78(67.8)	0.0916	0.762

Figures in parenthesis indicate percentage; [†] CDC Guidance for Health Workers[8]

Table 4: Association of Level of Knowledge of Standard Precautions for COVID-19 with General Characteristics of Post Graduate Trainee Doctors

General Characteristic	Level of knowledge[‡]			Total (N=115)	χ^2 value	df	p value
	Good (n=38)	Average (n=63)	Below Average (n=14)				
Gender							
Male	22(57.9)	41(65.1)	12(85.7)	75 (65.22)	**3.49**	2	**0.745**
Female	16 (42.1)	22 (34.9)	2(14.3)	40 (34.78)			
Age in completed years							
<30	19(50)	33 (52.4)	6(42.9)	58 (50.43)	**0.419**	2	**0.810**
≥30	19(50)	30(47.6)	8(57.1)	57 (49.56)			
Past Experience in years, of service in government health centres							
Nil	25 (65.8)	38 (60.3)	6(42.9)	69(60)	**9.726**	4	**0.0453**
< 3	10 (26.3)	16 (25.4)	2 (14.9)	28 (24.34)			
≥3	3 (7.9)	9 (14.3)	6 (42.9)	18 (15.66)			
Post Graduate Streams							
Clinical streams	38(100)	63(100)	0	97(84.3)	**19.321**	1	**0.001**
Pre and Para Clinical Streams	0	0	14(100)	14(12.2)			

Figures in parenthesis are percentage; [‡]score : good= ≥ 21 , average= 14-20, less than average ≤14

One third subjects were aware of safe injection practices and environmental cleaning in Triage area and COVID-19 isolation block, 37 (32.2%) and 36 (31.3%) respectively. Only one fourth subjects, 27 (23.5%) knew how to use PPE. Safe Handling and Cleaning of Soiled Linen of COVID-19 patients and COVID-19 Biomedical Waste management were known to even less , 16 (13.9%) and 19 (16.5%) respectively with no difference between subjects from clinical streams and pre and Para clinical streams. (p value>0.05) (Table 2).

Correct awareness of limited reuse of N95 Respirator was displayed by only 43 (37.4%) subjects. Appropriate PPE according to risk of exposure was known to 31 (27%) subjects and 78 (67.8%) subjects were aware that PPE must be checked before donning and doffing. One third, 42(36.5%) subjects knew correct steps of doffing PPE and only 16(13.9%) knew correct steps of donning PPE more from Pre and Para Clinical Streams (p value 0.012) (Table 3).

Majority of the subjects, 63 (54.8%**)** had average knowledge of standard precautions for COVID-19. Mean knowledge score was 14.79±2.22.

Only one third subjects, 38 (33.0%) had good knowledge. Knowledge level was inversely proportional to work experience, 25/38 (65.8%) fresher PGs with no past experience of government service had better knowledge **(p value= 0.0453).** less than average knowledge was observed in 14 subjects from pre and Para clinical streams while none from clinical streams.**(p value= 0.001 (Table 4)**.

DISCUSSIONS

COVID-19 infection spreads rapidly from person to person by multiple routes, breaking the chain of infection at any one point can contain infection. Following Standard Precautions (SP) while attending COVID-19 confirmed or suspected cases in a hospital setting protects both health care workers and the patients and meets IPC goals[9] successfully. Awareness improves perception and better perception improves practice of SP .Studies have shown that lower knowledge score is associated with negative perception and lack of adherence to SP[10]

Post Graduate (PG) Trainee doctors are at the forefront in a Dedicated COVID Hospital. There are a very limited studies that document awareness of doctors on SP for COVID-19 and in this context, to the best of our knowledge, this is the first study done on PG Trainee doctors in India.

At the study Dedicated COVID Hospital separate duty doctors were assigned for each COVID-19 Cohort Nursing Wards to minimize cross infection. The three shifts of duty and mandatory post- duty quarantine of 14 days required a lot of man power, therefore PG Trainees from all streams, clinical as well as pre and Para clinical were assigned these duties on rotation.

Majority of subjects, 63 (54.8%) had only average awareness of SP for COVID-19. Overall Mean knowledge Score was 14.79±2.22. Contrary to these findings, Mudedla et al (2014) [4] have reported good knowledge in 63.3% doctors. This disparity is because of the fact that doctors at the study hospital were not imparted training on infection prevention and control before the COVID-19 Pandemic and had been given only one induction training on Hospital Infection Control and SP for COVID-19 before being assigned duty in the COVID -19 Block.

Awareness varied between PG trainees from clinical streams and those from Pre and Para Clinical streams at this Dedicated COVID Hospital. Majority, 63(62.8%) of subjects from clinical streams had average knowledge, level of knowledge of subjects from other streams was even lesser. The difference was significant for the elements of SP like hand hygiene and disinfection of reusable patient care equipment where subjects from clinical stream displayed better awareness. In-service PG trainees with past work experience limited to Rural Primary Health centres also displayed significantly less awareness of SP

Correct Hand Hygiene practices play a crucial role in preventing the spread of infection. The WHO "Five Moments of Hand Hygiene" defines key moments when healthcare providers must carry out hand hygiene.[11] Majority 72 (62.6%) of subjects had correct awareness of hand hygiene. This is contrary to findings from a tertiary care teaching hospital at Kolhapur (2019) [12] , where it was found to be in 27.28% resident doctors only. The difference is because of the fact that Hand Hygiene along with Respiratory Hygiene (Etiquettes) and Social Distance was highlighted as preventive measure right from the time when COVID-19 was declared a pandemic. Surprisingly, Respiratory Hygiene (Etiquettes) were known to only 14 (12.2%) subjects. Similarly Respiratory Etiquette was reported by only 21% of doctors in a Nigerian study (2017)[13]also.

In view of the rising magnitude of the pandemic and possible shortage of supply, CDC[7] has recommended limited re-use of N95 respirators when supplies are running low and issued guidelines for the same. Only 43 (37.4%) subjects were aware of these re-use guidelines for N95 Respirator.

Personal protective equipment (PPE) are very important in protecting health care personnel in COVID-19 Isolation rooms and Triage area as they

have to examine the patients and it's not possible to maintain a distance of one meter or more from the patients always , so they are at high risk of acquiring the infection. When removing contaminated equipment such as gowns, gloves, medical masks, and eye protection worn in contaminated or high-risk environments, it is necessary to prevent further contamination and infection[14] , therefore an awareness of appropriate PPE requirement and knowledge of correct sequence of "donning and doffing" of PPE are very important. In the present study this knowledge was dismal , only about one third subjects, 42(36.5%) had a correct knowledge of these aspects of PPE, correct steps of donning were known to even less of them, 16(13.9%). These findings support the need for well planned trainings on PPE use and live and video demonstrations on PPE donning and doffing. More subjects from Pre and Para Clinical Streams had correct knowledge of donning PPE (p value 0.012) . This observation needs support from other studies in this direction as the pool of subjects from Pre and Para Clinical Streams in the present study was small (14/115).

Reusable Patient care equipment like Stethoscope, BP instrument etc. are commonly used for multiple COVID-19 patients in each Cohort Nursing Ward by doctors and nurses. Disinfection of these reusable equipment is important as they come in direct contact with multiple patients and are potential vector for spread of COVID-19 and other HAI. Cleaning of stethoscopes with 70% ethyl or isopropyl alcohol after every use is recommended by CDC[7]. In the present study, disinfection of COVID-19 Patient care reusable equipment was known to 69 (60%) subjects only.

Hospital environment is a source of transmission of COVID-19 and other HAI , there is documented evidence that environmental cleaning reduces the rates of HAI.[15] Only one third (31.3%) subjects were aware of protocol for environmental cleaning, correct strength of Hypochlorite solution and its preparation and even less16 (13.9%) were aware of safe handling and cleaning of soiled linen which is crucial in containing cross infection . This is because doctors have never been directly involved in environment cleaning and cleaning of soiled linen , these are the responsibilities of the housekeeping staff and sweepers with nurses being the supervisors, but now, in view of Novel Corona virus being spread by fomites and droplet nuclei, the duty doctors must be aware of these elements of SP , so that they can monitor the staff , protect themselves and help in checking cross infection in the COVID-19 Isolation Wards.

COVID-19 Biomedical Waste in a hospital setting if not managed properly becomes a Bio Hazard. . Central Pollution Control Board (CPCB) [16] has issued guidelines for COVID-19 Biomedical waste segregation at healthcare facilities having isolation wards for COVID-19 patients these include using double layered bags, mandatory labelling and colour coded bins for the management of waste generated during the diagnostics and treatment of suspected and confirmed COVID-19 patients. This element of SP for COVID-19 infection control was known to only a few subjects 19 (16.5%) in this study. This means that most of the PG trainee doctors may probably dispose off biologically hazardous COVID-19 waste like N95 mask, contaminated PPE, etc. Randomly in any waste container and this may assist in spread of infection. A Study done before the COVID-19 Pandemic among the medical practitioners in Northwest Delhi (2017) [17] has also observed a lack of knowledge and awareness of biomedical waste management.

CONCLUSIONS

The PG Trainee Doctors had only average awareness of elements of SP for COVID-19, even less in PG trainees from pre and Para clinical streams. This would lead to inadequate practice and not only expose them to the risk of contracting COVID-19 but also a vector for its spread. This indicates the need for well planned trainings with audio-visual aids and demonstrations on SP, particularly for donning and doffing the PPE. The PG Trainees from pre and Para clinical streams should also be enrolled for these trainings as they are the 'manpower in reserve' during emergencies like COVID-19 pandemic. Well designed training when incorporated in the PG training curriculum will improve awareness hence practice and will control cross infections of COVID-19 in hospitals.

LIMITATIONS

The study assessed awareness, any correlation between awareness and practice could not be studied as practice could not be observed due to limited access to the COVID-19 Block.

REFRENCES

1. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. (2020).Available at https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-, Accessed June 4, 2020
2. The Hans India, e paper . Health Workers at 33 times high risk of COVID infection. Available at http://epaper. thehansindia.com/c/52407596Accessed June 29 ,2020
3. Deccan Chronicle. 31 doctors, 3 nurses have died of Covid-19 Available at ; https://www.deccanchronicle.com/ na-

tion/in-other-news/300520/31-doctors-3-nurses-have-died-of-covid-19.htmlAccessed June 29,2020

4. Mudedla S, Tej W L, Reddy K T, et al . A study on knowledge and awareness of SP among health care workers at Nizam's institute of medical sciences Hyderabad, J Nat Accred Board Hosp Healthcare Providers [serial online] 2014 [cited 2020 Jun 4];1:34-8. Available from: http://www.nabh.ind.in/text.asp?2014/1/2/34/151296Accessed June 27, 2020
5. Vaz K, Mudedla S, Tej WL, Reddy KT, Sowribala M. Knowledge, awareness and compliance with universal precautions among health care workers at the university hospital of the west Indies, Jamaica. Int J Occup Environ Med 2010; 1:171-8.
6. National Centre For Disease Control . COVID -19 Outbreak – Guidelines for Setting up Isolation Facility/Ward .. Available at https://ncdc.gov.in/WriteReadData/l892s/42417646181584529159.pdfAccessed June 27 , 2020
7. Centre for Disease Control and Prevention . Information for healthcare professionals. (2020). Available at: https://www.cdc.gov/coronavirus/2019-ncov/hcp/index.html Accessed June 28,2020
8. WHO document on Hand Hygiene (Hand hygiene: why, how & when. (2020) Available at :https://www.who.int/gpsc/5may/Hand_Hygiene_Why_How_and_When_Brochure.pdf. Accessed June 6,2020
9. WHO, Emergencies preparedness, response. Infection prevention and control in health care. Available at https://www.who.int/csr/bioriskreduction/infection_control/en/ Accessed June6,2020
10. Refeai SA, Kamal NN, Ghazawy ER, et al . Perception and barriers regarding infection control measures among healthcare workers in Minia city, Egypt. Int J Prev Med 2020;11:11.
11. Modi P D, Nair G, Uppe A, et al. (April 02, 2020) COVID-19 Awareness Among Healthcare Students and Professionals in Mumbai Metropolitan Region: A Questionnaire-Based Survey. Cureus 12(4): e7514. doi:10.7759/cureus.7514
12. Kumar P, Arun&Chougale, Dr. (2019). Hand-Hygiene awareness and Compliance from a tertiary care teaching hospital, Kolhapur. journal of Medical Science And clinical Research. 7. 10.18535/jmscr/v7i3.179.
13. Anne C Ndu and Sussan U Arinze-Onyia, Standard precaution knowledge and adherence: Do Doctors differ from Medical Laboratory Scientists? Malawi Med J. 2017 Dec; 29(4): 294–300
14. M. Zhang, M. Zhou, F. Tang, et al , Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. The Journal of Hospital Infection, VOLUME 105, ISSUE 2, P183-187, JUNE 01, 2020
15. Joseph NM, Sistla S, Dutta, et al. Role of intensive care unit environment and health-care workers in transmission of ventilator associated pneumonia. J Infect DevCtries 2010;4:282-91
16. NDTV. Guidelines Issued For Handling Of Waste Generated During COVID-19 Patient's Treatment. Available at https://swachhindia.ndtv.com/guidelines-issued-for-handling-of-waste-generated-during-covid-19-patients-treatment-43734/ Accessed June6,2020
17. Mor, Rahul & Singh, Sarbjit&Bhardwaj, Arvind. (2017). Exploring the awareness level of biomedical waste management: Case of Indian healthcare. Management Science Letters. 7. 467-478. 10.5267/j.msl.2017.7.004.