

Assessment of Skill with Regard to Standard Precautions after Foundation Course for Medical Undergraduates of a Government Medical College in Visakhapatnam

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ABSTRACT

BACKGROUND

In compliance with Medical Council of India (MCI) recommendation, a month-long foundation course was introduced for the first time in Andhra Medical College for first year MBBS students of 2019 batch during August 2019. The aim of the study was to assess skill in standard precautions among first year MBBS students after foundation course.

METHODS

An observational cross-sectional study was carried out among first year MBBS students who attended basic skill training sessions on universal precautions as a part of their foundation course in a Government Medical College, Vishakhapatnam, who were admitted during the academic year 2019. In the present study, objective structured clinical examination (OSCE) is used in order to assess the skill. Students were asked to demonstrate 5 selected skills of standard precautions i.e. hand washing, wearing of cap, mask, apron and gloves. Their performance was noted in the checklist provided and was assessed accordingly. Data obtained from checklist was entered into excel sheet and was expressed in percentages. The difference in skill acquisition between boys and girls was tested for statistical significance using chi-square test.

RESULTS

Out of the 94 students who participated in the study, 54 % were boys and 46 % were girls. Only 19 % of students have demonstrated all the 5 skills correctly. Majority of the students i.e. 71 % were able to demonstrate 7 steps of hand washing correctly. About 44 % of the students demonstrated the donning of gloves correctly. About 66 % of students demonstrated the technique of wearing operation theatre mask correctly. Regarding wearing of surgical cap, 70 % of students did it correctly. 83 % of students demonstrated donning of apron correctly. In all skill demonstrations, boys performed better than girls and this difference was found to be statistically significant except in case of donning of apron.

CONCLUSIONS

The study findings indicate that imparting skill training to first year students has been beneficial to the students in terms of gaining skills related to universal skills. However, most of the students haven't yet got the desired competence in all the procedures. Repeated training in their early clinical exposure may help them to develop the skills further.

KEYWORDS

Foundation Course, Standard Precautions, First Year MBBS Students

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BACKGROUND

One major health hazard associated with health care professionals is occupational exposure to blood-borne pathogens through contact with human body fluids.¹ Little is known about the global burden of percutaneous injury among health-care workers. However, a 2005 report estimated that worldwide more than 3 million occupation-related percutaneous injuries occur annually.¹ This results in an estimated 16,000 hepatitis C, 66,000 hepatitis B, and 200 to 5000 human immunodeficiency virus (HIV) infections annually.²

Standard Precautions include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any setting in which healthcare is delivered.³ These include: hand hygiene; use of gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure; and safe injection practices.³ Despite detailed guidelines, the knowledge and understanding of standard Precautions among HCWs even in developed countries has been found to be inadequate.⁴ In India, several studies have shown the incidence of NSI in HCW ranging from 40 % to 80 % and mostly seen in doctors.⁵

Over the past many years medical education curriculum is getting refined so as to equip students for the ongoing academic and technical challenge in accordance with the need of community. From the year 2019 MCI has made it mandatory to attend all first professional MBBS students to attend Foundation course of one month before entering into medical school. This includes an introduction to the course structure, skill learning methods and technology usage.⁶ Skills module that includes skill sessions such as basic life support, bio medical waste, first aid and universal precautions that students need to be trained prior to entering the patient care areas.⁶ Early training in these basic infection prevention will be helpful thorough out their medical carrier. The present study was conducted among those First year MBBS students who was trained in foundation course to assess their skill with regard to standard precautions.

METHODS

An observational cross-sectional study was carried out among first year MBBS students who attended basic skill training sessions on universal precautions as a part of their foundation course in a Government Medical College, Vishakhapatnam in the academic year of 2019. Objective structured clinical examination (OSCE) was used to assess skill as that may overcome many deficits in traditional method of assessment.^{7,8,9} Students who had completely attended basic skill training sessions on universal precautions as part of foundation course after obtaining consent were included in the study. Students who had not completely attended basic skill training sessions on universal precautions and who were not willing to participate in this study were excluded.

Sample Size

Calculated from prevalence obtained from previous study (taking $P = 32.4\%$ and $Q = 68.6\%$ and absolute error as 10% and dropout rate of 7%) = 94^{10} 94 students were included in the study. Random sampling technique was adopted for selection of study participants.

Method of Data Collection

List of all students who had attended foundation course was obtained from college attendance register. Details of this study was explained to all of them, as participation is purely voluntary. Informed consent was obtained from interested students who were above 18 years of age (age verified with ID cards). Then students were randomly selected for study. Study was conducted one week after completion of skill training in foundation course.

A. Checklist for hand washing	Applied palmful of the hand rub in a cupped hand, covering all surfaces	Yes / No
	Rubbing of hands palm to palm	Yes / No
	Right palm over left dorsum with interlaced fingers and vice versa	Yes / No
	Palm to palm with fingers interlaced	Yes / No
	Backs of fingers to opposing palms with fingers interlocked	Yes / No
	Rotational rubbing of left thumb clasped in right palm and vice versa	Yes / No
	Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa	Yes / No
B. Checklist for glove wearing	Removed all jewellery (if any) before wearing gloves	Yes / No
	Touching only a restricted surface of gloves corresponding to wrist (at the top edge of cuff)	Yes / No
	Don the first glove	Yes / No
	Taking second glove with the bare hand and touching only restricted surface of corresponding to wrist	Yes / No
C. Checklist for surgical cap wearing:	Donning second glove in a sterile way	Yes / No
	Cap worn in proper way	Yes / No
	Completely covering head and hair line	Yes / No
D. Checklist for surgical mask wearing	Secured ties or elastic band at middle of head and neck	Yes / No
	Fit of flexible band to nose bridge adjusted	Yes / No
	Fit snug to face and below chin	Yes / No
E. Checklist for apron wearing	Apron fully covered torso from neck to knees, arms to end of wrist.	Yes / No
	Tightened apron in back at neck and waist	Yes / No

Table 1. Checklist for OSCE on Universal Health Precautions

Five OSCE stations were arranged within Community Medicine Department seminar hall, each for demonstrating hand washing, wearing gloves, surgical mask, operation theatre cap and apron. Hand washing OSCE station was provided with alcohol-based hand rub. In the other OSCE stations required number of gloves, masks, apron, caps and hand sanitizers were arranged. Waste disposal bins were made available near each OSCE station. In every OSCE station, one postgraduate from Department of Community Medicine was present as invigilator for skill assessment. These postgraduates were given prior skill training in universal precautions by hospital infection control team.

Students were asked to demonstrate skills in front of invigilators. Each OSCE demonstration was given 3 minutes. Separate checklist for each entity was provided in corresponding OSCE station to avoid observer bias. These checklists (Table 1) were developed by the faculty of Community Medicine Department based on Centres for Disease Control and Prevention (CDC) and World Health

Organisation (WHO) guidelines,^{3,11,12} validated by hospital infection control team.

Each skill demonstration was observed and assessed as a whole. Skill will be considered as correctly done only if all components in checklist is demonstrated. Feedback to the students regarding wrong steps were also given. Data obtained from these checklists was entered into excel sheet and expressed in percentages. The difference in skill acquisition between boys and girls was tested for statistical significance using chi-square test.

Ethical Consideration

Study was reviewed and approved by institutional ethical committee. Strict confidentiality of participants was maintained throughout the study.

RESULTS

Out of the 94 students who attended the study, 50 (i.e. 54 %) were boys and 44 (i.e. 46 %) were girls. According to figure 1 only 19 % of students were able to demonstrate all the 5 skills of standard precautions correctly. 32 % of students demonstrated 4 skills correctly. 29 % of students demonstrated 3 skills correctly. 14 % of them demonstrated 2 skills correctly. 5 % of them did only one skill correctly and 1 % did all skills wrongly.

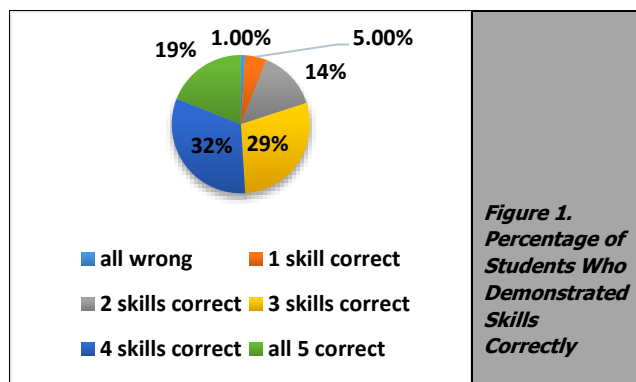


Figure 2 shows the distribution of students in individual skill demonstration. Majority of the students i.e. 71 % were able to demonstrate 7 steps of hand washing correctly. About 44 % of the students demonstrated the donning of gloves correctly. About 66 % of students demonstrated the technique of wearing operation theatre mask correctly. Regarding wearing of surgical cap about 70 % of students did it correctly and in apron donning 83 % of students were correct.

Figure 3 shows the difference in skill demonstration among boys and girls. When it comes to handwashing skill demonstration 82 % of boys and 59 % of girls did it correctly. In case of donning of gloves about 68 % of the boys did it correctly while 15 % of the girls did it in correct way. 82 % of boys and 56 % of girls did cap wearing correctly. About 84 % of boys and 45 % of girls demonstrated correct technique of wearing mask. 90 % of

boys and 75 % of girls demonstrated donning of apron correctly.

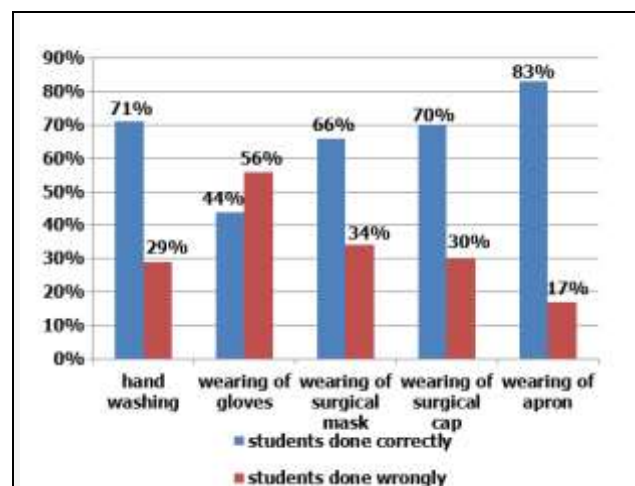


Figure 2. Distribution of Students in Each Skill Demonstration (Standard Precautions)

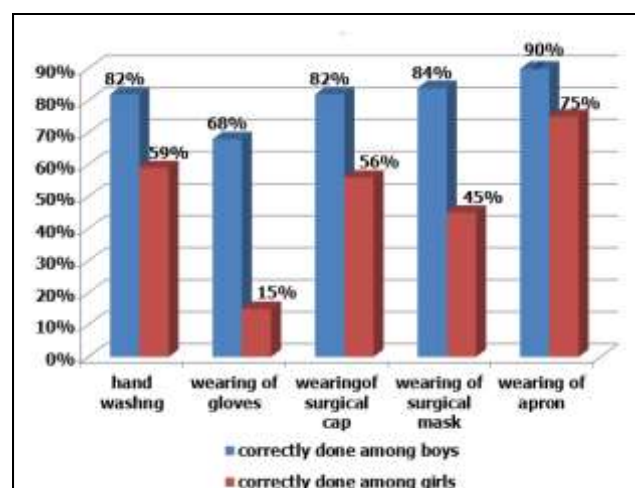


Figure 3. Distribution of Correct Skill Demonstration among Boys & Girls

Skill	Chi Square Value with 1 DOF	P Value
Hand washing	4.933	.0264 (Significant)
Gloves	23.749	.0001 (Significant)
Wearing cap	5.943	.0148 (Significant)
Wearing apron	2.742	0.0977 (Not significant)

Table 2. Statistical Comparison of Skills among Boys and Girls

In short, it is obvious that in all skill demonstrations, boys performed better than girls; this difference is found to be statistically significant except in case of donning of apron as per table 2.

DISCUSSION

In accordance to MCI's Medical Education Program of 2019,⁶ a month-long foundation course was designed and implemented in our institution for the newly enrolled MBBS batch (2019 - 2020). So, the present study is a novel study in terms of study subject and the method of skill assessment through OSCE.

As foundation course for MBBS students is a newer concept, no previous studies were done in India. Also, in most of the previous studies done related to universal precautions among medical personnel the researchers have used pretested questionnaire based on the WHO and CDC guidelines¹¹ for assessment.

In the present study, about 71 % of participants correctly demonstrated hand washing technique which was much higher than the findings from studies done by other researchers in India. About 44 % of the students demonstrated the donning of gloves correctly. About 66 % of students demonstrated the technique of wearing operation theatre mask correctly. Regarding wearing of surgical cap, about 70 % of students did it correctly and in apron donning, 83 % of students were correct. In all skill demonstrations, boys performed better than girls and was statistically significant, except in case of donning of apron.

In a study done by Modi, Pranav D et al. in 2017 about hand hygiene practices among medical undergraduates in Mumbai using questionnaire¹⁰ observed that nearly 57 % did not receive any formal training in hand hygiene and that nearly 68.6 % students were unaware of the sequence of hand washing and hand rubbing.

Vaman Kulkarni et al. have conducted a study among 2nd, 3rd, and 4th year MBBS students at Kasturba Medical College (KMC), Mangalore in the year 2012,¹² reported that knowledge regarding hand hygiene were low in healthcare workers (40 %) and only 16.4 % of the participants knew the correct sequence of the hand washing technique. Brahmabhatt KR et al.¹³ conducted a study about hand hygiene knowledge among second year MBBS students in Gujarat Medical Education and Research Society (GMERS) Medical College, Junagadh, Gujarat in 2019 using standard questionnaire revealed that 89% participants mentioned that they had not received formal training in hand hygiene in last three years. In that study, 76 % participants had moderate knowledge and approximately 10 % participants had good knowledge of hand hygiene practices. Also, the difference between males and females was not statistically significant in that study, whereas in the present study, except in the skill of apron wearing all other 4 entities were found to be statistically significant.

R. Vinay Kumar et al.¹⁴ conducted similar study among second and third year MBBS students of Kempegowda Institute of Medical Sciences, Bangalore in the year 2013 using semi structured questionnaire. That study evaluated students before and after educational intervention about standard precautions. Only 133 (51.15 %) had knowledge about universal precautions. 14 (14.89 %) seventh term students had not heard of universal precautions. 102 (39.2 %) and 111 (42.7 %) knew of correct hand washing procedure with respect to examining the patient and using the gloves respectively. Whereas with educational interventions, statistically significant improvement was found in that study regarding standard precautions.

Anargh et al.¹⁵ conducted a study regarding hand hygiene practices among health care workers at Armed Forces Medical College (AFMC), Pune in 2013 using questionnaire where 85 % of the proportion had knowledge about hand hygiene practices.

The study findings indicate that imparting skill training to first year students has been beneficial in the students' terms of gaining skills related to universal skills. However, most of the students haven't yet got the desired competence in all the procedures. Repeated training in their early clinical years may help them to develop the skills further.

CONCLUSIONS

Foundation course recommended by MCI for MBBS students at the entry level is an innovative and welcoming change. Most of the students developed good knowledge and skills pertaining to universal precautions. Introduction of foundation course and skill training in the beginning of medical curriculum has definitely benefited the first-year medical students. Reinforcement of same skills through repeated skill training sessions is also needed. Similar exclusive skill training sessions have to be introduced to all medical students before their entry into internship.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

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Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

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