Research Article

Practices of Medical Students Regarding Hygiene in Hospital Settings

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Abstract:

Background: Proper hygiene prevents healthcare-associated infections and the spread of antibiotic resistance. Hand hygiene is paramount in preventing nosocomial infections. Good hygiene is also crucial when it comes to white coats and Operation Theater (OT) attire to prevent the transmission of hospital-acquired infections. This study was designed to determine medical students' practices regarding hygiene in hospital settings.

Methodology: It was a descriptive cross-sectional study carried out at King Edward medical university, Lahore between March to September 2018. A sample size of 254 was collected by simple random sampling. After receiving approval from IRB, a questionnaire with questions regarding hygiene in the hospital settings, hand hygiene, OT dress hygiene, and whitecoat hygiene, was distributed among the students. The percentage of students practicing good or bad OT dress and whitecoat hygiene practices was found by averaging the students who scored good or bad in individual practices.

Results: Out of 254 students 107(42.1) were males while 147(57.9%) were females. Among the respondents, 164 (64.6%) said that they strictly practiced hygiene measures in hospital settings. 44.5% said that hygiene in Mayo Hospital was at a basic hand hygiene level. On average, 166 (65%) students had good OT dress hygiene practices while 88 (35%) had poor practices, 141 (55.5%) students had good whitecoat hygiene practices while 113 (44.5%) had poor practices. 74% of the students wore their whitecoats only in the hospital while 26% also wore them outside. 47.6% changed their whitecoats within a year, 39.4% did it after a year and 11% did it after 2-3 years.

Conclusion: Hand Hygiene practices were not satisfactory among the students and there was an inadequate supply of alcohol-based hand rubs, single-use towels, and soaps in the hospital. Many students wore their white coats outside the hospital as well. Among the undergraduates the 3rd year students were found to be least careful in wearing whitecoats outside hospital premises.

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Keywords: Hygiene, hand hygiene, OT dress hygiene, white coat hygiene, students' hygiene practices.

INTRODUCTION:

In a research conducted by Anwar. MA et al in 2009 found that health-care-associated infections relating to abnormal hygiene practices continue to pose a major concern for hospitalized patients by raising mortality and morbidity. According to the World Health Organisation, there are approximately 1.4 million people who are infected with diseases that they contracted in a healthcare setting. [1] Although performing hand hygiene is not a difficult procedure, the practices of doctors in developing countries did not adhere to the current World Health Organisation (WHO) regulations. Under the tagline "Clean care is safer care," WHO introduced the Global Patient Safety Challenge in October 2005. Evaluating and putting into practice the new recommendations to promote hand hygiene in healthcare is a major part of the challenge.[2] According to the Merriam Webster Dictionary, hygiene refers to practices or conditions (such as cleanliness) that are beneficial to health.[3] The knowledge of hand hygiene practices was found to be moderate by Anwar. MA et al in 2009 among the medical students. Interventions to increase awareness alone won't be enough to make an impact; they must be backed up by the provision of improved hand hygiene facilities.[1] In a research conducted by Azzam al Kadi et al, it was found that furthermore, when promoted from the fundamental to the clinical phase, nursing students exhibit a more favorable attitude towards hand hygiene than medical students.[4] Pittet D et al found in their research that Despite the significance of hygiene practice, healthcare professionals generally adhere poorly, with an average total compliance rate of less than or about 50%.[5] Many medical students neglect OT hygiene practices, wearing unwashed OT dresses from casual settings to the operation theaters. Additionally, it is common to see doctors and undergraduates wearing white coats outside clinical areas, promoting the spread of microorganisms. Conflicting results on bacterial contamination of clinical white coats have been reported in studies from the USA and the UK.[6] In another study by Pittet D. it was found that there are obstacles to adherence at the individual, group, and institutional levels, such as knowledge and education levels, resources allotted, working circumstances, leadership, dedication, and awareness.[7] Another study found that when the practice of hand hygiene among doctors and other healthcare professionals (nurses and paramedical workers) was evaluated, it was shown that a very small proportion of doctors only cleaned their hands after seeing ill patients. When compared to doctors, this practice had much larger paramedical personnel.[8] Al-Busaidi, S. in their study found that despite improvements in healthcare systems, students at all levels of education, the public are still at risk of unintended harm in their surrounding environment. [9] According to a study, medical students tend to imitate their seniors, leading to a frequent disregard for hygiene standards in professional practice. The absence of positive role models and social norms can impede adherence to proper hygiene practices.[10] In Pakistan, data regarding the hygiene practices of students in hospital settings is lacking. Therefore, it is essential to perform such a study so that this subject can be brought to light and appropriate actions can be taken to increase good

practice moving forward and to improve current training programs.

METHODS AND METHOD:

It was a descriptive cross-sectional study done at King Edward Medical University, Lahore from March to September 2018. A sample size of 254 students was estimated by sample size determination in health studies, using a 95% confidence level, 6% absolute precision, and the expected percentage of 38.8% of total adherence to hand hygiene among the trainees of teaching hospitals in a developing country. [1]

$$N= (Z^2 1-\alpha/2-p-q) \div d^2$$

Z^2 1-α/2 = Confidence level 95%= 1.96

P= Prevalence 38.8%

q= 1-p

d=Absolute precision = 6%

The sampling technique was simple random sampling. All the students of MBBS in their clinical years, i.e. 3rd, 4th, and 5th year were included in the study. Allied health students and those on long-term medications were excluded from this study. After receiving the approval from IRB, a questionnaire with questions regarding hygiene practices at the hospital setting, hand hygiene, OT dress hygiene, and whitecoat hygiene, was given to the students of 3rd, 4th, and 5th years, going to wards and residing in the hostel. Data were analyzed using SPSS 26. Age and other quantitative variables were taken as mean ±SD. Gender and other qualitative variables were counted in frequency and percentages.

Good OT dress hygiene practice was calculated by adding the students who washed OT dress daily or within 2 days, who washed it with disinfectant or ordinary soap, who washed it for more than 15 minutes, who wore OT dress during OT time only, and who wore OT dress, mask, shoe covers, and head covers during Operation theater and then dividing the sum by 5 (average) followed by the percentage calculation. Rest were considered to have poor OT dress hygiene practices.

Good white coat hygiene practice was calculated by adding the students who washed white coats within 3 days, wore them only on the hospital premises, washed them with ordinary soap or disinfectant, washed them for more than 15 minutes, and changed their white coats within a year. Then we divided the sum by 5 (average) and calculated the percentage. Rest were considered to have poor white coat hygiene practices.

RESULTS:

A total of 254 students participated in the study. The mean age was 22.08 (SD ± 1.139). Out of the total 224 students, 107 (42.1%) were males. 139 (54.7%) participants were from 4th year, followed by 61 (24%) from the final year. The majority of the participants i.e. 197 lived in hostels (77.6%). (Table no.1)

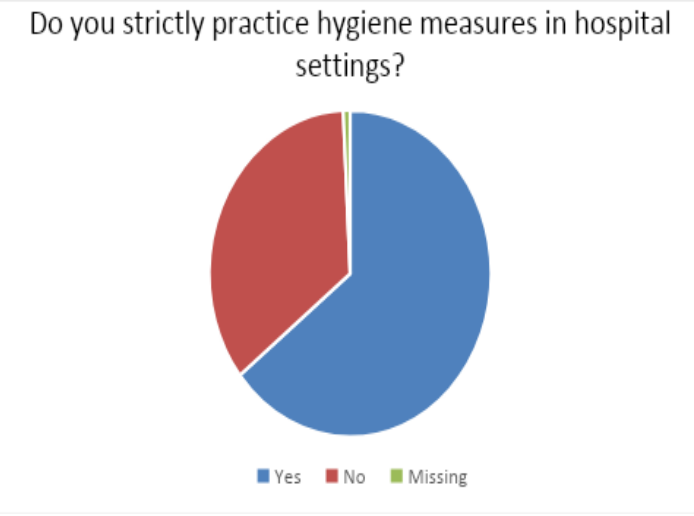
Table no. 1: Demographics

Variable		Frequency	Percentage (%)
Gender	Males	107	42.1
	Females	147	57.9
	Total	**254**	**100.0**
Accommodation Status	Hostelites	197	77.6
	Day scholars	57	22.4
	Total	**227**	**100.0**

Year of Study	3rd Year	54	21.3
	4th year	139	54.7
	Final year	61	24
	Total	**227**	**100.0**
Admission based on	Open Merit	252	99.2
	Disabled	2	.8
	Total	**254**	**100.0**

Among the respondents, 164 (64.6%) said that they strictly practiced hygiene measures in hospital settings. (Figure no. 1)

Figure No. 1:



Hand Hygiene:

The level of hand hygiene promotion and practices was basic according to 113 medical students (44.5%) of clinical years, while it was inadequate according to 101 (39.8%) students. Only two participants, or 0.8%, scored advanced level. (Table no. 2)

Table No. 2. Hand hygiene level

Hand hygiene level in Mayo Hospital settings	Frequency	Present (%)
Inadequate	**101**	**39.8**
Basic	**113**	**44.5**
Intermediate	**38**	**15**
advanced	**2**	**0.8**
Total	**254**	**100**

89 (35%) students said that an alcohol-based hand rub was available only in some wards in discontinuous supply. (Table no. 3)

Table No. 3:

How readily available are alcohol-based hand sanitizers in your healthcare setting?	Frequency	Present
Not available or available but effectiveness and tolerability have not been established	50	19.7
Only available in some wards in an irregular supply (With established effectiveness and tolerability)	89	35.0
Available throughout the facility in continuous supply, with effectiveness and tolerability having been validated	64	25.2
Most wards have it readily available throughout the whole institution, in continuous supply, and at the point of care.	40	15.7
Available across the whole institution with constant supply at every point of treatment (with proven effectiveness and tolerability)	11	4.3
Total	254	100.0

According to 93 students (36.6%), there was no continuous supply of clean running water in the sinks, 151(59.4%) said that soaps were not available at each sink in the hospital while 225(88.6%) students said that disposable towels were not available at each wash-basin. (Table no.4)

Table No: 4.

	Yes		No	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Is there a steady supply of clean, running water?	160	63	93	36.6
Is soap available at each sink?	102	40.2	151	59.4
Are disposable towels available at each wash basin?	29	11.4	225	88.6

OT DRESS HYGIENE:

- **Frequency of Washing the OT Dress:**

50 (19.7%) students washed their OT dresses/ OT dresses daily, 52(20.5%) washed within two days, 106 (41.7%) washed once a week and 46 (18.1%) didn't wash their OT dresses at all.

- **Method of Washing the O Dress:**

Various methods used by the students to wash their OT dress were disinfectant, by 42 (16.5%) students, with ordinary soap, by 180 (70.9%) students while 32 (12.6%) did not use either of these.

- **Wash Time for OT Dress:**

Wash time for OT dress showed almost an equal distribution among the two parameters. 139(54.7%) students wash their OT dress for less than 15 minutes. 115(45.3%) students give more than 15 minutes of wash time.

- **Areas where OT dress was worn:**

Out of the total of 254 students 154 students that is 60.6% of students wear OT dress during hospital time only while 100 students that is 39.4% of students wear OT dress before or after OT time also.

- **Frequency of wearing mask, head covers, and shoe covers along with OT dress:**

239 (94.1%) said that they wore these during the OT period while 15(5.9%) said that they didn't.

WHITECOAT HYGIENE

- **Frequency of washing the white coat:**

According to 125 (49.2%) medical students of clinical years, they washed their whitecoats almost after a week, 77 (30.3%) washed within a week but more than 3 days and 44 (17.3%) medical students washed their whitecoats within 3 days.

- **Method of Washing the Whitecoat:**

According to 204 (80.3%) students, they washed their whitecoats with ordinary soap, 34 (13.4%) washed with disinfectant and 11 (4.3%) said that they used only water.

- **Wash Time For Whitecoat:**

135 (53.1%) medical students washed their whitecoats for less than 15 min while 113 (44.5%) medical students washed their whitecoats for more than 15 min.

- **Areas Where Whitecoat Was Worn:**

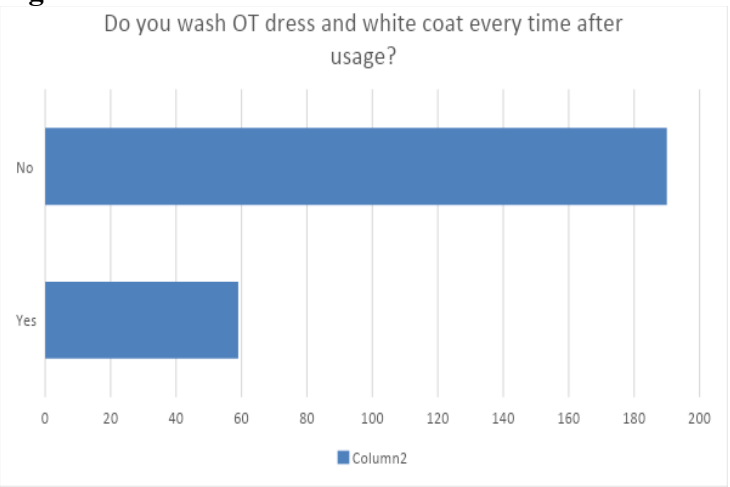
188 (74%) medical students wore their whitecoats during their visit to the hospital and 61 (24%) wore their whitecoats even outside the hospital premises

- **Time since last changed the whitecoat:**

According to 121 (47.6%) students, they changed their white coats within one year, 100 (39.4%) changed after a year while 28 (11%) medical students changed their white coats after 2-3 years.

190 (74%) students said that they did not wash their OT dress and white coat every time after usage. (Fig. no. 2)

Figure No. 2



On average, 166 (65%) students had good OT dress hygiene practices while 88 (35%) had poor practices, 141 (55.5%) students had good white coat hygiene practices while 113 (44.5%) had poor practices.

It was found that more day scholars washed their OT dresses and white coats daily within 3 days than hostelites. Similarly, the use of disinfectant and soap for washing OT dresses and white coats for 15 minutes was more in day scholars compared with hostelites. It was found that, more of the 3rd year students wore their white coats outside hospital premises than 4th year students, and more of the 4th year students wore their white coats outside than Final year students.

More females washed their OT dresses and white coats daily to within 3 days than males. 67.3% of males said that they wore their OT dresses during OT time only compared with 55.8% of females. 43% of males said that it took more than a year to change their white coat compared with 38% of females. (Table No.5).

Table No. 5:

How frequently do you wash your	OT Dress?				Whitecoat?	
	Daily		After 2 days		Within three days	
	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)
Day scholars	24	42.1	12	21.1	20	35.7
hostelites	26	13.2	40	20.3	24	12.5
Males	3	2.8	10	9.3	6	5.6
Females	47	32	42	28.6	38	27
OT dress and white coat washing time?	OT dress				Whitecoat	
	More than 15 minutes				Less than 15 minutes	
	Count	Percentage (%)			Count	Percentage (%)
Day scholars	28	49.1			29	50.9
hostelites	86	43.7			110	55.8
When do you wear your OT dress?	During OT time only				Before or after OT time also	
	Count	Percentage (%)			Count	Percentage (%)
Males	72	67.3			82	55.8
Females	35	32.7			65	44.2
How do you wash?	OT dress				Whitecoat			
	With Disinfectant?		With ordinary soap?		With Disinfectant?		With ordinary soap?	
	Count	Percentage (%)		Percentage (%)	Count	Percentage (%)	Count	Percentage (%)
Day scholars	11	19.3	44	77.2	10	19.3	24	12.4
hostelites	31	15.7	136	69	46	77.2	158	81.9
When do you wear your white coat?	Hospital only				Outside hospital premises			
	Count		Percentage (%)		Count		Percentage (%)	
3rd year	33		61.1		21		38.9	
4th year	103		76.3		32		27.3	
Final year	52		86.7		8		13.3	

DISCUSSION:

This study aimed at finding the practices of medical students regarding hygiene in hospital settings. Hygiene is the primary measure that is proven to be effective in preventing healthcare-associated infections and the spread of antimicrobial resistance.[11]

The level of Hand hygiene promotion and practices in the settings of Mayo Hospital, Lahore by 84.3% of students was between Inadequate to basic. It was predictable as in most healthcare institutions, adherence to recommended hand-washing practices remains unacceptably low, rarely exceeding 40 percent of situations in which hand hygiene is indicated.[12]

According to 59.4% of the students, soaps were not available at each sink in the hospital. This contrasted the findings of Yawson AE et al who found that out of 15 centers, 10 had soap dispensers.[13] According to 88.6% of students, each washbasin didn't contain single-use towels. On the contrary, another study found that only two out of fifteen service centers did not contain single-use towels. In a study done in Ghana, it was found that compliance with hand hygiene was low due to restricted access to hand hygiene facilities.[14]

Among the respondents, 164 (64.6%) said that they strictly practiced hygiene measures in hospital settings which includes white coats and OT dress hygiene practices. Similarly, a study on Nosocomial Infections suggested that 77% of the participants rated their uniform/ attire as moderately to very clean.[15] OT dress is part and parcel of patient protection. It can also serve as an important source of infection in the operation theater. In our study, 19.7% of students washed their OT dresses daily, 20.5% washed within 2 days and 41.7% washed once a week. According to a study, the people who used to change their attire every two days were at risk of contamination with resistant pathogens compared to those who used to change every day (29% vs. 8%).[15] Our study showed that 87.4% of students used either soap or detergent to wash their OT dresses. This is praiseworthy because the significance of correctly washing and managing healthcare fabrics and textiles to ensure their hygienically clean state when they are delivered for use in healthcare settings has been emphasized in studies[16]. Our study indicated that 156(60.6%) students wore their OT dress during hospital time only while 100 (39.4%) students wore their OT dress before or after OT time also. Another study revealed that the operation theater dresses used to be more contaminated when they were worn outside of operation theaters.[17]

Whitecoat is professional attire for physicians and an essential component of patient care. If handled carelessly, it can serve as a source of infections. In our study (74%) of medical students wore their whitecoats during their visit to the hospital while 24% wore their whitecoats even outside hospital premises. These results are comparable with the findings of another study on the role of white coats on the spread of nosocomial infection, according to which 64% of the subjects used to wear their white coats only on the hospital premises, while the other 36% used to wear it outside the hospital premises too. Despite being aware of the importance of whitecoat hygiene,

students used to wear whitecoats in various college areas such as canteens, libraries, and other public spaces.[18]

According to our study, 49.2% of medical students of clinical years washed their whitecoats almost after a week, 30.3% washed within a week but more than 3 days, and 17.3% of medical students washed their whitecoats within 3 days. This is comparable to another study in which 50% of students washed their whitecoats less frequently than once a week. [19] Another study on washing practices found that most of the students (71%) had washed their white coats within the past 1 week. [18]

The accompanying suggestions might be made based on the discoveries of this examination. Firstly, there is a need to advance conscientious hand washing among medical students with the affiliation of hand hygiene kits (like soaps, hand washes, and alcohol-based hand rubs) in hospital settings.[20] OT dresses and white coats must be worn only within the hospital premises. Those who are required to wear white coats and OT dresses should be encouraged to wash their white coats more frequently with a disinfectant specifically.[21] Our cross-sectional study has its own limitations. The main limitation was the lack of a control group and the use of limited study duration i.e. from March to September 2018, as a surrogate for compliance throughout the year. As the survey was restricted to the students of the 3rd, 4th, and final year of MBBS, it does not apply to the entire population and does not represent all the students. The participants were having many similarities, so it was difficult to compare the practices of medical students regarding hygiene in hospital settings.

CONCLUSION:

The level of hand hygiene practices in the settings of Mayo Hospital, Lahore was not very good with the inadequate supply of soaps and single-use towels at each sink or alcohol-based hand rubs in the hospital. Many students wore their OT dresses and whitecoats outside the OT and hospital premises respectively. Many students had poor OT dress and white coat hygiene practices. Day scholars and females had better OT dress and white coat washing practices compared to hostelites and males respectively. 3rd-year students were found to be least careful in not wearing whitecoats outside hospital premises. The practice of wearing masks, head covers, and shoe covers along with OT dress during OT time was found to be very good.

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