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Nurse's Attire: A vehicle for Healthcare Associated Infections

ANJALI ARORA

Tutor, Medical Surgical Nursing, Holy Family College of Nursing, New Delhi, India
Email - anjaliarora.94@gmail.com,

Abstract: ***Background:*** *Uniforms for nurses have been a distinctive mark in provision of patient care, the significant number of microorganisms may carry on nurses' uniforms also. Therefore the probability of transmission of Hospital acquired infections increases. This study concerns an infection risk among healthcare professionals due to inappropriate uniform related infection control practices.* ***Method:*** *Using quantitative approach (one group pre-test and post-test design) a research project was conducted at Holy Family College of Nursing, New Delhi from 1st December to 18th December, 2021. An observational checklist was formulated which assessed the uniform-related infection control practices of students. A Protocol was formulated as the intervention and administered through its display in the hostel rooms.* ***Results:*** *All the subjects have two pairs of clinical uniforms and all were posted in ICUs, Semi-ICUs and General wards for 5 hours. It was found that the overall practice of nursing students at the 'average' level before the intervention and 97.29% showed of 'Good practice' after intervention. In reassessing the same practice, it was found to be Good practice. All of them were following the protocol and the protocol was still displayed on the walls of rooms of the students in hostel.* ***Conclusion:*** *Either in hospitals or in hostels, nursing students can be frequently seen in their respective "uniform scrubs". Thus, these contaminated uniform scrubs are being brought in public, thereby possess a risk for cross infection. Hence, appropriate Uniform related Infection Control Practices must be reinforced and emphasized*

Key Words: *Uniform, nursing students, uniform practice, Infection Control Practices.*

1. INTRODUCTION:

Worldwide, Nurses are emerging as Covid warriors which dispense Compassion, commitment in practice, quality care and are risking their own lives in providing care to Covid patients. During Covid-19 pandemic, nurses are working overtime due to the excessive patient load and scarcity of Healthcare Professionals. At the same time, nursing students were extensively involved in the direct patient care. While providing direct care to the patients, performing any procedure on the patients, handling food, medicines, textiles, waste or cleaning tools, nursing students always use the hospital's work attire. [11]

By providing quality care, administering treatment, assisting in examination and transporting the patients from one unit to another, there will be direct contact between nurse's uniform and the patients' bedding or skin and may get exposed to microbes.

2. LITERATURE REVIEW:

Healthcare Professionals including nursing students are often exposed to blood, vomit, sputum, pus, faeces and urine from patients during their clinical exposure and could be an extraneous source of infection or healthcare-acquired infections (HCAIs) [3].It is evident that one of the possible route of transmission of microbes can be a nurses' uniforms. Various micro-organisms are able to survive on inanimate surfaces, including textiles, for extended periods [1]

Microorganisms can survive on uniforms for days to weeks such as S. aureus, E. coli and E. faecium [10]. In contrast the Spores of bacteria (C. difficile) have been reported to persist on surfaces for 5 months [10]. Uniform-related infection control practices are underemphasized by the Healthcare Professionals. Healthcare associated infections are most common cause of mortality and morbidity among nursing students hence needs to be focused. [4] The rate of infections caused by the professional uniforms can be prevented by strict adherence to Uniform related infection control practices (ICPs) and maintaining good hygiene practices. [5] Importantly during clinical training years of nursing students, they are frequent visitors to different clinical settings and non-adherence to uniform related infection control

practices among them can increase cross infection. Students of any clinical area are required to dress in scrubs as their "clinical attire". [9]

The present study is concerned with the adherence of nursing students with the Uniform related infection control practices. Despite the fact that PPE is mandatory during clinical procedures, some students do not comply and contribute to various hospital acquired infections due to uniform of healthcare workers. Assessment of practice and implementation of the intervention will prevent the transmission of nosocomial infection in future as these students will become healthcare professionals on long term basis. [6]. The aim of study is to assess the Uniform related Infection Control Practices (ICPs) among nursing students of Holy Family College of Nursing.

3. MATERIALS AND METHODS:

Study design: Using a quantitative approach, a one group pre-test post-test design study was conducted among nursing students in December 2020. The setting of the study was Holy Family College of Nursing, New Delhi and its Nurses Hostel. A uniform related infection control practices (ICPs) among GNM 2nd year nursing students was assessed. After assessment of practice, the protocol based on uniform related Infection control guidelines was formulated **(Refer Protocol)** and administered through its display on the walls of rooms of all nursing students that were participated in the study. Observation Checklist was used to assess the practice among nursing students. The Sociodemographic Profile was self-reported. Observation checklist was used for assessing uniform related infection control practice. This checklist was consisting of 10 items as 'ALWAYS', 'SOMETIMES' and 'NEVER' scored as '3', '2' and '1' respectively and interpreted as Good Practice if the score is > 20, Average Practice if the score if 11-20 and Poor practice if the score is less than 10. The maximum possible score was 30 and minimum possible score was 1. In the present study, Uniform related Infection Control Practice of GNM-2nd year students was observed in Hostel of Holy Family College of Nursing by using observation checklist from 1st to 4th December, 2021. Later on the formulated protocol on uniform related ICPs was displayed on the walls of rooms of all GNM 2nd year students. After 7 days again the practice was assessed from 13th to 18th December, 2021by using same checklist. The inclusion criteria includes all the students who are in second year of General Nursing and Midwifery, staying in hostel of Holy family College of Nursing and those students who are willing to participate in the study. The exclusion criteria includes second year students who are not staying in hostel and not willing to participate. Thus, total 37 participants were included in the study and each sample was observed once between 12:30 to 1:30 pm. by the researcher. The clinical postings of the students were from 8-12pm followed by half an hour of lunch break. Then they entered in the hostel so the observations were performed between 12:30 to 1:30 pm. After 2 months again the ICPs of the same samples were observed from 28th February to 12th march, 2021 between 12:30 to 1:30 pm. Observation check list and the intervention both were same.

4. DISCUSSION:

In order to assess uniform-related infection control practices of a group of nursing students, the non-adherence to uniform related Infection Control Practice (ICP) among the nursing students were identified. The overall practice of nursing students in terms of Uniform related infection control was at the 'average' level before the intervention and 97.29% showed of 'Good practice' after intervention.

A study conducted by Callaghan is in the support of present study. This study examined the practice, bacterial uniform contamination levels of nurses and the effects of the wearing of plastic aprons to protect uniforms. The result findings were included that uniform contamination may be a significant contributory factor for nosocomial infections and the use of plastic aprons reduce significantly the number of bacteria carried on nurses' uniforms during direct patient contact. [1]. In Contrast, the participants of the present study do not wear apron of any material which further contributes the possibility of either cross infections or occurrence of nosocomial infections.

In the aura of promotion of quality care and patient safety, the infection prevention and control practices and procedures are considered as the utmost steps. The fact is the events that can contribute in hospital acquired infections are monitored periodically but due to high rate of mortality and morbidity, the modes of transmission of microorganisms should also be taken in account. [12] The one possible route can be the hospital uniforms /attires of nurses because they are the ones who are in direct contact of patient's body, secretions, and patients surroundings etc. in terms of nursing students they wash their uniforms at home so the chances of cross infections are more [11] . In this regard, a study found that the laundering policies even for the nurses were inconsistent and did not always follow guidance. [4]. Similarly the findings of the present study also reveal that student nurses are not using any guidelines or any hospital protocol for laundry services. Another study revealed that when uniforms were washed at 40°C, microorganisms such as Escherichia coli and Staphylococcus aureus can lead to cross-contamination. [14]

In 2014, another research related to uniform based infection control practices was also conducted by undergraduate nurses. The purpose of this study was to investigate the contaminants present on the uniform and the measures taken by the nurses to eliminate risks of getting infections. [8] Eleven scrub tops were worn in one twelve-hour

shift. The contaminated scrubs were swabbed to inoculate agar plates. After incubation, bacterial colonies were identified including Staphylococcus species. A survey was also conducted by the nurses and results showed that two nurses washed their scrubs and but majority of samples wear them in public. The results pose the possibility of cross infection throughout the hospital and outside the working environment which developed the need for policies related to laundry, and awareness on risk for infection from contaminated clothes. [2]. One of the pilot study conducted in 2012 investigated that nurses are potentially bringing the pathogens into the public and their home too due to their work uniforms. In this study, at a local hospital of Washington, the sterilized uniforms were distributed to 10 nurses. At the beginning of their shift, sterilized uniforms were distributed and Worn uniforms were collected at the end of the shifts. The collected uniforms were sent for analysis in the labs. The results showed that the average bacteria colony growth for day shift was 1,246 and 5,795 for night shift. MRSA and other bacteria such as Staphylococcus aureus, Micrococcus luteus, were also present on uniforms after 48hours. [16]

5. ANALYSIS: Data was analyzed by using descriptive statistics.
Procedure for data Collection: Firstly, the Socio-demographic profile was self-completed by the participants. Secondly, a checklist was used to assess the Infection control practice among nursing students. The same samples were observed twice; first in the month of December and second in March by the researcher. All collected data were organized and entered into spreadsheets.

6. RESULT AND FINDINGS:

During the data collection**,** the clinical postings of the participants are in the ICUs, Semi-ICUs and General wards. The duration of the clinical postings per day is 5 hours. All the samples have two pairs of clinical uniforms. **Assessment of Practice:** The Uniform related infection control practice was assessed by using observation check list and it was found that the overall practice of nursing students at the 'average' level before the intervention and 97.29% showed of 'Good practice' after intervention. It was seen that before the protocol, all students were not wearing the soiled uniform but sometimes 2 percent of the students wear the clinical scrubs in the classrooms for two or more day. It was also found that (100%) of samples were not removed their uniform shoes outside their hostel rooms and (89%) of samples mix their clinical uniforms with the casuals. Some of the students were also wearing jewellery (finger rings) in clinical settings. All (100%) students tie their hair back off the collar with a hair net. After the intervention, (0%) clinical uniform in the classrooms/labs, all of them remove their uniform shoes outside the hostel rooms, (85%) students still mix their uniforms with the casuals. It was observed that students (4%) wear jewellery in clinical settings such as rings. All students keep their fingernails short and clean. The item wise description of the practice is described in figure 1.

Hence, the overall practice was categorized as Good Practice. The pre-test showed no good practice, 100% as average practice and again no poor practice was observed among nursing students. In the post-test, 97.29% samples were shown the Good practice and 2.70% samples shown average practice. The mean difference obtained between Pre-test and post-test was 7.46.

In the month of March, again the practice was reassessed among the same students and was considered as Good practice (100%). All of them were following the protocol and the protocol was still displayed on the walls of rooms of the students in hostel.

7. CONCLUSION:

Despite a fear of getting cross infection of Covid-19, all nursing students have shown a remarkable professional dedication in providing appropriate care to the patients from beginning of this pandemic. Thus, the role of uniforms/clothing could be a contributing factor for the transmission of infections. In an attempt to prevent the cross-contamination through wearing uniforms in hostels as well as in classrooms, a protocol was formulated. The present study has implications not only for the nursing profession, but also for other healthcare professionals.

Table No. 1 : Table 1 is showing percentage distribution of level of practice regarding Uniform related Infection Control Practice (ICP) among the nursing students.

Level of Practice	Pre-test		Post-test	
	f	(%)	f	(%)
Good Practice	0	0%	36	97.29%
Average Practice	37	100%	1	2.70%
Poor Practice	0	0%	0	0%

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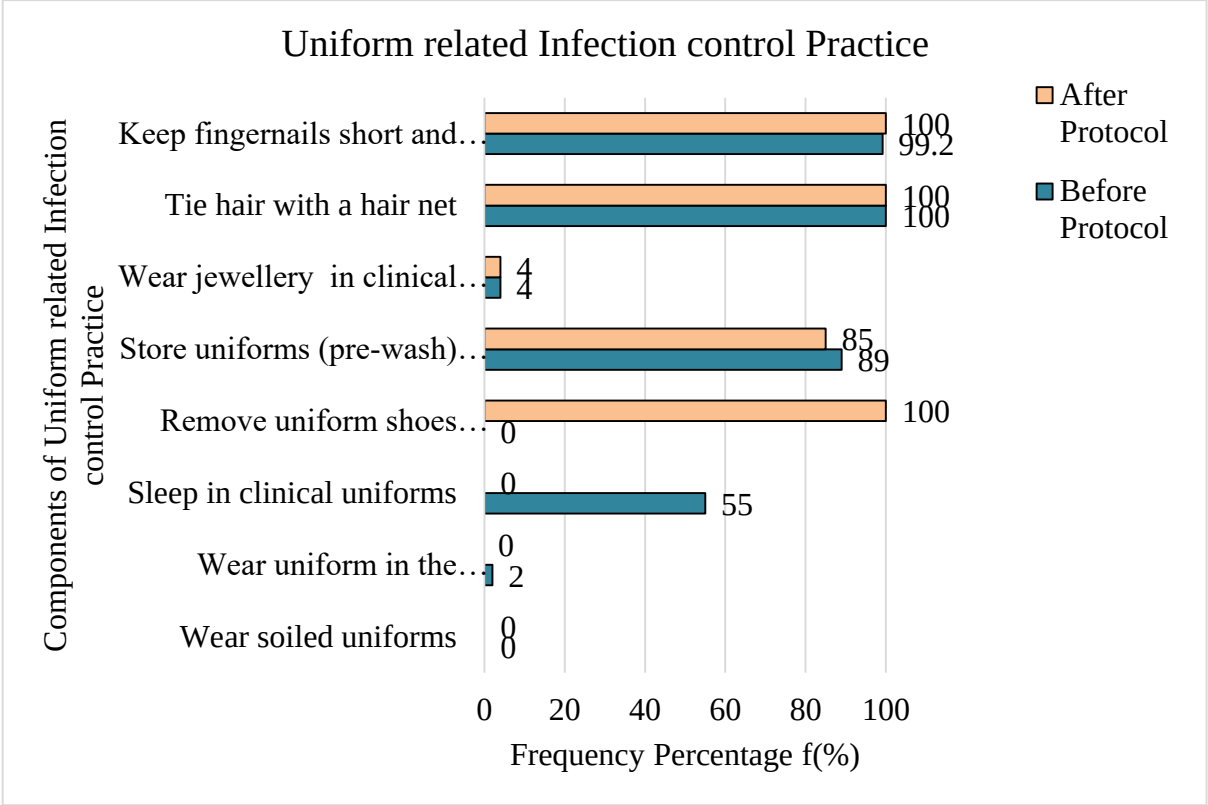

Fig.1 Bar Graph showing Item wise representation of Uniform related infection control Practice before and after implementation of Protocol

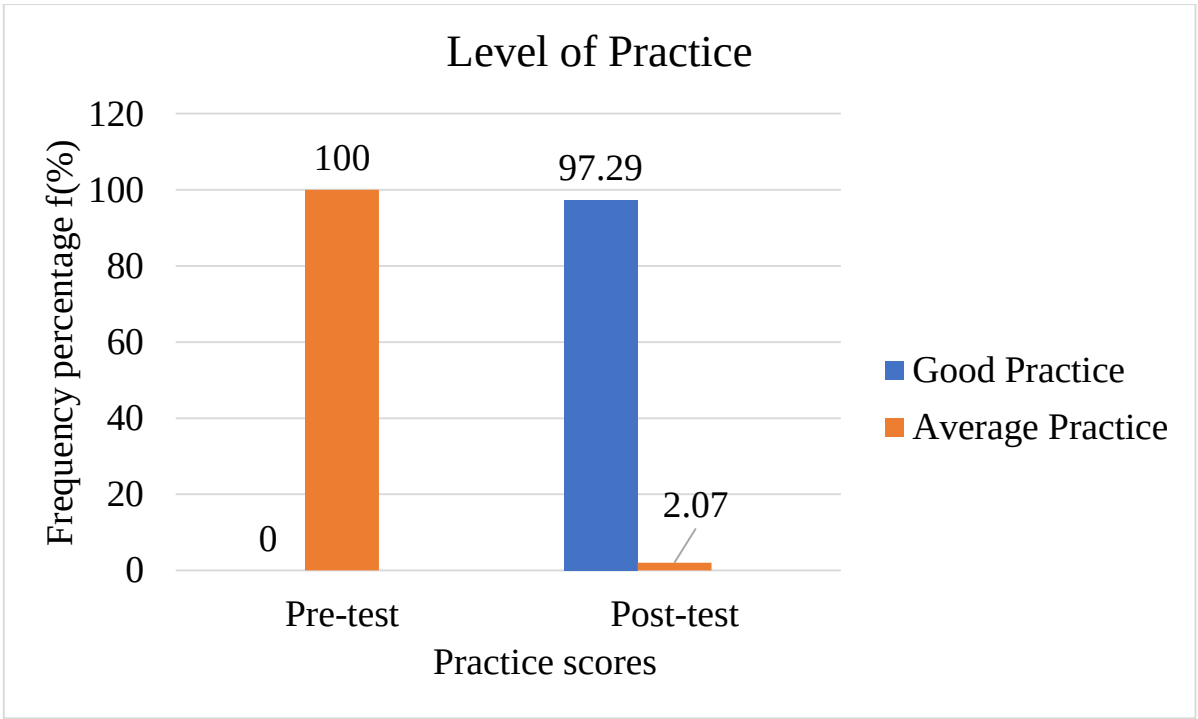

Fig.2 Bar graph showing the frequency percentage distribution of practice scores before and after implementation of protocol

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