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RESEARCH ARTICLE

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IMPACT OF SENSITIZATION ABOUT HAND HYGIENE ON NURSING STUDENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Hand hygiene (HH) is a vital and essential strategy to infection control and prevention (ICP), however adherence to hand hygiene guidelines among health care professionals is persistently inadequate. The current study aimed to ascertain nursing students awareness of hand hygiene and the impact of hand hygiene sensitization on them. **Methods:** The present study was a prospective study conducted in the microbiology department of a tertiary care hospital. The students were divided into two groups. One group was sensitized with by educating them on the need of hand hygiene. The impact of sensitization was assessed in the post-test, and bacterial isolates were identified. **Results:** Pre-test analysis revealed mean scores of 5.49 ± 1.32 and 5.05 ± 1.12 among students in Group A and Group B, respectively, and culture positive hand swabs in 27 (67.5%) and 24 (60%) individuals. In post test, the mean score in Groups A and B was 7.07 ± 1.08 and 5.71 ± 1.19 , respectively, which was significantly higher in Group A. In the post-sensitization period, the culture positive rates in Group A and Group B students were 7.5% and 27.5%. The predominant organism isolated before sensitization was Staphylococcus aureus and after sensitization was coagulase negative staphylococcus. **Conclusion:** There was a lack of understanding among nursing students about the critical problem of hand hygiene. Following sensitization, there was significant improvement in awareness and a significant decrease in bacterial isolation.

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INTRODUCTION

Healthcare-associated infections (HAI) pose a significant and pressing issue within the field of modern medicine, impacting both patients and healthcare workers (HCW). The aforementioned phenomenon significantly affects morbidity and mortality, prolongs the duration of hospital stays, and imposes a financial burden on healthcare institutions (Oh, 2021). The main channel of infection transmission is through the hands of healthcare workers. Hand hygiene (HH) is a fundamental and essential approach of infection control and prevention (ICP) that plays a critical role in preventing the spread of diseases and the transmission of drug-resistant organisms (Oh, 2021 and Yang, 2019). The World Health Organisation (WHO) acknowledged and recognised the significance of hand hygiene among health care workers in 2005. In response, the organisation initiated the "Clean Care Is Safer Care" campaign, followed by the implementation of the "Save Lives: Clean Your Hands" programme in 2009. This programme currently serves as the primary global strategy for promoting hand hygiene (Martos-Cabrera, 2019). Despite the existence of multiple studies that have shown evidence of the effectiveness of hand hygiene in reducing rates of

health care-associated infections, adherence to hand hygiene guidelines remains consistently poor among health care workers (Mahmood, 2015). Considering that nurses have the highest frequency of patient contact and engage in the most frequent interactions related to patient care, it can be argued that their hand hygiene (HH) performance holds the utmost significance among healthcare workers (HCWs) (Oh, 2021). It is imperative to implement training sessions on hand hygiene practises for nurses throughout their early academic years in order to impart accurate knowledge in the field of nosocomial infections and infection prevention (Mahmood, 2015). The present study was thus conducted with the objective of raising awareness among nursing students regarding the importance of hand hygiene. Additionally, the study aimed to examine the impact of educating nursing students to hand hygiene on the development of their hand washing skills.

METHODOLOGY

The present study was a prospective study conducted in the department of microbiology of a tertiary care hospital. After obtaining permission from Institutional ethics committee, nursing student who

consent to participate in the study were briefed about the nature of study and a well validated questionnaire containing questions related to basic understanding of HH was given to them. The personal right to withdraw from the study at any moment was ensured. Anonymity and confidentiality of participants were guaranteed.

The students were divided in two group

- Group A (Study group): 40 Nursing students.
- Group B (Control group): 40 Nursing students.

Pre-test was given to both the groups. The swabs from the web spaces of hands were collected from all. Group A got a training aimed at sensitising them to the need of hand hygiene. This sensitization involved a PowerPoint presentation that provided information on the importance and various techniques of hand washing. Additionally, a demonstration of proper hand washing technique was provided. On the next day post-test of both groups i.e. control and study group along with second swab was obtained. Sensitization was done after post-test of both groups. Coagulase test was performed to differentiate between Staphylococcus species. Data analysis was done by mean, standard deviation and P-value was calculated using Graph Pad prism InStat software version 3.06.

RESULTS

Pre-test analysis among students reported mean scores of 5.49 ± 1.32 and 5.05 ± 1.12 in Group A and Group B respectively without any significant difference ($p=0.23$) (Table 1). In the pretest phase, culture positive hand swabs were identified in 27 (67.5%) and 24 (60%) of 40 Group A and Group B students, respectively, without any significant difference ($p=0.85$) (Table 2). Before sensitization, the most prevalent bacterial isolate obtained from hand swab cultures in both groups was Staphylococcus aureus (Table 2). Following sensitization for hand hygiene in Group A students, the mean score in Groups A and B was 7.07 ± 1.08 and 5.71 ± 1.19 , respectively, which was significantly better in Group A (Table 1). In the post-sensitization phase, group A had a culture positive rate of 7.5% ($n=3$) which was significantly less as compared to those in group B, which had a culture positive rate of 27.5% ($n=11$) (Table 3). The isolated species in both the groups were Coagulase Negative Staphylococcus.

developing countries, with a relatively higher incidence in developing countries (Khan, 2017). Hand hygiene is widely recognised as a crucial preventative practise for healthcare-associated infections (HAIs) due to the significant role that hands play in transmitting various illnesses and harmful organisms among hospital employees. Considering the lack of awareness among HCWs about this simple yet effective measure of preventing HAIs, our study was a serious attempt to raise awareness and demonstrate the impact of hand washing among nursing students, because nurses, like physicians, are involved in patient care and are frequently in direct contact with hospitalised patients for extended period of time. As a result, improving awareness among nursing students prior to their involvement in patient care was felt important. The results of the pretest conducted prior to sensitization revealed a general lack of knowledge among many students on the fundamentals of Healthcare-Associated Infections (HAIs), as well as the importance and the method of hand washing. Vaishnavi Thakker (Thakker, 2015) conducted a similar study including medical, dentistry, and nursing students and highlighted similar finding as ours with lack of awareness among undergraduate students on the importance of hand hygiene in preventing HAIs. The aforementioned issue was brought to attention in a study undertaken by Ingole KV et al. (Ingole, 2016) among medical students. The study revealed that these students possess inadequate knowledge of the fundamental concepts and practises pertaining to hand hygiene. Therefore, there exists a pressing need for proactive intervention to encourage the incorporation of importance of hand hygiene technique into the academic curriculum of students and its practical implementation on daily basis. When bacterial isolates were detected immediately following the pretest, Staphylococcus aureus was the most common isolate identified. According to epidemiological studies, Staphylococcus aureus is the most common bacterium implicated in nosocomial infection (Donkor, 2019) Among them Methicillin-resistant S. aureus (MRSA) is the growing concern and it is usually spread by direct contact, open wounds, and contaminated hands (Khan, 2017). In the study done in an intensive care unit (ICU) setting, Vicca AF (Goyal, 2019) identified two primary factors contributing to the development of Methicillin-resistant Staphylococcus aureus (MRSA): understaffing of nurses and a lax attitude towards hand hygiene. Following the sensitization session, there was a significant improvement in the level of knowledge and awareness about the significance of hand hygiene among the students

Table 1. Assessment of Knowledge among students

Group	Pretest score (Mean \pm SD)	Post test score (Mean \pm SD)
A (n=40)	5.49 \pm 1.32	7.07 \pm 1.08
B (n=40)	5.05 \pm 1.12	5.71 \pm 1.19
P value*	0.23	< 0.0001

*Mann Whitney test

Table 2. Bacterial isolated grown in swabs taken from hands of students in Group A and Group B before sensitization

Sr. No.	Bacterial Isolates	Group A Number (percentage)	Group B Number (percentage)	P value *
1	Staphylococcus aureus	18(45%)	16(40%)	0.85
2	Coagulase negative Staphylococcus	9(22.5%)	8(20%)	
3	Escherichia coli	3(7.5%)	2(5%)	
4	Klebsiella pneumoniae	2(5%)	1(2.5%)	
5	Pseudomonas aeruginosa	1(2.5%)	2(5%)	
6	No bacterial isolates grown	7(17.5%)	11(27.5%)	

* Chi square test

Table 3. Bacterial isolated grown in swabs taken from hands of students in Group A and Group B students after sensitization

Sr. No.	Bacterial Isolates	Group A Number (percentage)	Group B Number (percentage)	P value*
1	Coagulase negative Staphylococcus	3 (7.5%)	11 (27.5%)	0.03
2	No bacterial isolates grown	37 (92.5%)	29 (72.5%)	

*Fisher test

DISCUSSION

Healthcare-associated infections, commonly referred to as nosocomial infections, are an important concern in both developed and

in Group A, as evidenced by the results of the post-test assessment. Additionally, it was also noted that bacterial isolates were identified in only 7.5% of students in Group A, but it was observed in 27.5% of students in Group B. All detected isolates exhibited the presence of coagulase negative Staphylococcus. The findings of the intervention

demonstrated a favourable effect on the identified bacterial strains due to the implementation of hand hygiene practises and active intervention. The study conducted by Ingole KV et al. (Ingole, 2016) also provided evidence of the positive impact of active intervention in promoting hand hygiene among students. The authors reported a significant improvement in knowledge regarding hand hygiene and a significant decrease in bacterial isolates among students who received active training. The aforementioned results were similarly confirmed by Mohit Goyal's study (Goyal, 2019), which encompassed a sample of 728 students pursuing MBBS, BDS, and BSC nursing degrees. This study emphasised the beneficial effects of educational and training initiatives focused on hand hygiene among healthcare students (HCS), particularly in their efforts to combat nosocomial infections. According to the hospital infection control guidelines (Indian Council of Medical Research, 2023) issued by the Indian Council of Medical Research (ICMR), it is recommended to practise hand hygiene measures upon entering and exiting a room as an effective measure to prevent and interrupt the transmission of harmful or purulent strains of *S. aureus*. The ICMR has assigned the responsibility of monitoring hand hygiene practises to the nursing staff. Thus, the results of our study and similar other studies conducted in past clearly demonstrate a lack of awareness regarding hand hygiene among healthcare students. It is evident that implementing interventions aimed at improving knowledge has a good impact on both knowledge levels and outcomes. In order to promote the cultivation of a proper mindset among pre-graduate students, we propose the implementation of a comprehensive approach to hand hygiene. This approach would involve the utilisation of various modes and disciplines, such as lectures, regular training sessions for healthcare staff, and the creation and distribution of informative flyers and posters at strategic locations to emphasise the significance of hand hygiene. We propose the establishment of a hospital-based task force, led by nursing personnel, to consistently monitor and educate students and HCWs.

CONCLUSION

Hand hygiene, though easy and effective, is the most ignored measure seen among health care professionals today, despite the widespread concern about healthcare-associated infections. The findings of our study indicate a notable lack in knowledge and implementations regarding the fundamentals and methods of hand hygiene among nursing students. However, a positive outcome emerged from our study, as active intervention resulted in improved knowledge and a reduction in bacterial isolates among the students. These findings suggest the need to further address this issue in future endeavours and also the need of modern methods of teaching like videos and demonstrations is encouraged.

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