JOURNAL OF NEPALESE SOCIETY OF CRITICAL CARE MEDICINE
A PEER REVIEWED, OFFICIAL JOURNAL OF NSCCM

ORIGINAL ARTICLE

Infection prevention, control and management: assessing the knowledge among nurses and student nurses in the Eastern Province of Sri Lanka

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Wickramasinghe D, Ubesekara SVGC, Lokuhewagama DK, Saranasinghe DSAPC, Arachchige SPKH. Infection prevention, control and management: assessing the knowledge among nurses and student nurses in the Eastern Province of Sri Lanka. Journal of Nepalese Society of Critical Care Medicine. 2024 Jul;2(2):13-17.

Submitted	: February 13, 2024
Accepted	: June 12, 2024
Published Online	: July 7, 2024
Declaration	: None

ABSTRACT

Background and aims : The knowledge of infection control among healthcare workers is a crucial factor in the success of infection control programs. This study compares the understanding of infection control and prevention practices among nurses and student nurses in eastern province of Sri Lanka.

Methods: We utilized a pre-tested self-administered questionnaire with 25 questions. Descriptive statistics and the independent t-test were used to analyze survey responses and compare scores between groups.

Results: Out of 178 responses analyzed 112 were nurses and 66 were student-nurses. The average scores were 44% for nurses and 51% for student-nurses. Both groups had less than 10% knowledge of notifiable diseases in Sri Lanka and medical abbreviations. Knowledge about immunization, vaccines, clinical sample transportation, and MRSA decolonization was under 40% for both groups. Overall knowledge of infection control and prevention practices among nurses was significantly poorer than that of student-nurses ($p<0.001$).

Conclusion: These findings underscore the generally inadequate knowledge of infection control and prevention practices among both nurses and student-nurses. It is imperative to implement policies and measures to assess and enhance the training curricula for student-nurses and to ensure ongoing training programs for nurses.

Key Words: *healthcare workers, infection prevention, control and management, Sri Lanka.*

INTRODUCTION

Infections occurring in patients during the stay in hospitals or healthcare facilities, but were not present at the time of admission, are generally referred to as healthcare associated infections. These also encompass infections contracted in the hospital that manifest after discharge, as well as occupational infections among the staff of healthcare facilities.

Healthcare associated infections occur worldwide and affect both developed and developing countries. It is estimated that in developing countries more than 25 % of patients admitted to healthcare facilities acquire an infection and approximately half of those reported infection incidents are preventable.[1] Standard precautions are fundamental in infection control and prevention, serving as an effective method to protect patients, healthcare workers, and the public.[2] Standard precautions are designed and modified to minimize the risk of infection from both recognized and unforeseen sources in healthcare environments. Strict adherence to standard precautions by healthcare staff can mitigate many associated risks. These precautions serve dual purposes: to safeguard healthcare workers from injuries and to inhibit the spread of hospital-acquired infections among both staff and patients.[3]

Despite the critical role of standard precautions in ensuring the safety of patients and staff, it is apparent that compliance is often suboptimal. Healthcare workers, while generally understanding the reasons behind infection control practices, do not always fully recognize the significance of standard precautions due to factors such as limited time, lack of accessible supplies, and, most notably, insufficient knowledge.[4]

Although the knowledge of infection control is crucial for preventing the spread of infections, the understanding of this subject by nurses and physicians is often reported as inadequate. The efficacy of infection control training for healthcare students is seldom formally evaluated. Studies on medical students have indicated that insufficient knowledge of infection control and prevention practices can result in poor adherence. It has been highlighted that healthcare students should receive specialized training before performing any patient procedures in healthcare facilities.[5] Infection control has been identified as a priority topic due to the significant costs associated with nosocomial infections to the health service, the inconvenience suffered by patients and their families, and the occupational hazards of infections faced by healthcare workers.[6] In the recent years, a variety of practice innovations and interventions have been adopted to enhance healthcare workers' adherence to infection control and prevention measures. Studies have shown that formal education, when combined with strategies like peer review, skills training, and computer-assisted instruction, is most effective. It is recommended that interventions be customized to meet the specific needs of each professional group to achieve lasting changes, ensuring that standard precautions and infection control and prevention practices are effectively integrated into healthcare workers' daily routines.

This study assessed the knowledge of infection control and prevention practices among nurses and student nurses in the Eastern Province of Sri Lanka.

METHODS

This study was conducted following the Eastern Province Infection Control and Prevention Programme which was held in December 2023. Informed consent was obtained in writing after receiving ethical approval from the Ethical Review Committee of the district general hospital.

The questionnaire was developed in accordance with the infection control guidelines from the Centers for Disease Control and Prevention[7] and the World Health Organization's Infection Control Standard Precautions in Health Care.[8] It comprised four sections: the first collected demographic and professional information of the participants; the second, third, and fourth sections were dedicated to assessing the nurses' knowledge, attitudes, and practices related to infection control, respectively. The participants received a pre-tested questionnaire containing 25 questions, comprising 14 multiple-choice and 11 semi-structured questions. All the questions in English language were used in the study following validation at a nursing school in Sri Lanka. Half of both the nurses and nursing students of the provincial hospital were randomly selected to participate. Descriptive statistics were utilized to summarize survey responses, and an independent t-test was employed to compare scores between two groups. A p-value of less than 0.05 was deemed statistically significant. Data analysis was conducted using the Statistical Package for the Social Sciences, version 25.0.

RESULTS

A total of 178 participants comprising 112 nurses and 66 student nurses, participated in the survey. The overall knowledge regarding infection control and prevention practices was 51.27% among student nurses and 44.86% among nurses ($p<0.001$). The awareness of viral disease identification among student nurses was 60.6%, and 71.4% among nurses. Knowledge on notifiable diseases in Sri Lanka was 9.1% for student nurses and 9.8% for nurses.

Knowledge on the appropriate times to wear gloves was reported at 89.4% among student nurses and 93.8% among nurses. Understanding of proper waste disposal practices was 98.5% for student nurses and 83.9% for nurses. The knowledge regarding the correct sequence for removing personal protective equipment was 89.4% among student nurses and 69.6% among nurses. Understanding of the application of standard precautions reached 100% for student nurses and 96.4% for nurses. Familiarity with live attenuated vaccines was 27.3% for student nurses and 42% for nurses. Awareness of which samples need refrigeration when transport is delayed was 22.7% for student nurses and 33% for nurses. Knowledge about antiseptic lotions was 71.2% for student nurses and 70.5% for nurses.

Awareness of essential items requiring sterilization was reported at 37.9% among student nurses and 55.4% among nurses. Understanding of diseases transmitted via needle stick injuries stood at 77.3% for student nurses and 75.9% for nurses. Knowledge of acquiring natural active immunization was 40.9% for student nurses and 26.8% for nurses. Familiarity with the correct protocol for preparing TCL lotion was known by 27.3% of student nurses and 26.8% of nurses. The correct procedure for cohort isolation was known by 71.2% of student nurses and 51.8% of nurses. Awareness of the precise method for MRSA decolonization was 20.6% for student nurses and 23.36% for nurses. Knowledge of medical abbreviations was 66.6% for student nurses and 34.82% for nurses (Table 1).

Table 1. Knowledge of nurses and nursing students about infection control practices

S.N.	Variables	Nursing Students	Nurses
1	Overall knowledge regarding infection control and prevention practices	51.27%	44.86%
2	Awareness of viral disease identification	60.60%	71.40%
3	Knowledge on notifiable diseases in Sri Lanka	9.10%	9.80%
4	Knowledge on the appropriate times to wear gloves	89.40%	93.80%
5	Understanding of proper waste disposal practices	98.50%	83.90%
6	Knowledge regarding the correct sequence for removing personal protective equipment	89.40%	69.60%
7	Understanding of the application of standard precautions	100%	96.40%
8	Familiarity with live attenuated vaccines	27.30%	42%
9	Awareness of which samples need refrigeration when transport is delayed	22.70%	33%
10	Knowledge about antiseptic lotions	71.20%	70.50%
11	Awareness of essential items requiring sterilization	37.90%	55.40%
12	Understanding of diseases transmitted via needle stick injuries	77.30%	75.90%
13	Knowledge of acquiring natural active immunization	40.90%	26.80%
14	Familiarity with the correct protocol for preparing TCL lotion	27.30%	26.80%
15	The correct procedure for cohort isolation	71.20%	51.80%
16	Awareness of the precise method for MRSA decolonization	20.60%	23.36%
17	Knowledge of medical abbreviations	66.60%	34.82%

DISCUSSION

Awareness of notifiable diseases in Sri Lanka was notably low in both groups, with no significant difference between them (p=0.874). In contrast, both nurses and student nurses demonstrated high levels of knowledge regarding when to wear gloves, proper waste disposal practices, the correct sequence for removing personal protective equipment, and the use of antiseptic lotions. Notably, student nurses exhibited significantly greater knowledge than practicing nurses (p<0.020). This disparity in knowledge may stem from the comprehensive theoretical training received in nursing schools, which may later decline due to lack of adherence to protocols.

However, the findings of this study contradicted existing literature, which has reported suboptimal adherence to infection control precautions among nurses and student nurses. These professionals are in the closest and most frequent contact with patients. Both groups demonstrated inadequate knowledge of the essential items that require sterilization, with student nurses exhibiting significantly worse performance (p<0.024). Such deficient understanding of proper sterilization procedures could pose occupational hazards for healthcare workers and increase the risk of nosocomial infections.[9]

The study revealed that a significant proportion of nurses and student nurses lack core knowledge about MRSA colonization/infection and management. Only a quarter of those surveyed knew the correct antiseptic and dosage for MRSA decolonization. Over-treating colonized individuals could result in negative outcomes, while not properly identifying and managing infected patients could contribute to higher rates of morbidity, mortality, and additional healthcare-related expenses among the patient population.

This indicates that nurses and nursing students must enhance their competency in infection control to respond confidently to infection outbreaks and understand the importance of adhering to infection control protocols. Additionally, both groups displayed a notable deficiency in knowledge about immunization and vaccines. Possessing a robust understanding of vaccines and immunity is essential to improve immunization coverage.

Consequently, the implementation of specialized education programs for nurses is essential to achieve adequate vaccination and to reduce nosocomial infections. Knowledge of medical abbreviations was found to be satisfactory among student nurses but lacking in practicing nurses (p=0.000), indicating that student nurses possess greater theoretical knowledge. In contrast, practicing nurses demonstrated better practical knowledge in infection control and prevention, likely enhanced by their work experience.

The proficiency of nurses and student nurses in implementing infection control measures in practice is evidently insufficient. This situation suggests a necessity for an enhanced educational program for student nurses that effectively integrates theoretical knowledge with practical application. The limited literature in this area has also highlighted the need for further research around infection control education within clinical practice.[10] Insufficient education and training contribute to reduced adherence to essential infection control procedures.

In-house training must incorporate regular educational programs on infection control, standard precautions, and ward-based teaching to ensure healthcare workers retain knowledge and effectively translate it into infection control practices. Training should encompass educational and induction programs tailored to address any gaps in healthcare workers' knowledge, attitudes, and practices regarding infection control.[11]

Growing evidence suggests that educational programs can effectively enhance adherence to established protocols. The value of specialized training for clinical link nurses, who then return to their wards to coordinate with colleagues and the infection control team, has been proven.[12] Implementing educational interventions in the workplace has boosted staff participation, engaging those who might otherwise be too occupied to attend.[13] However, educational interventions aimed at increasing knowledge are unlikely to enhance infection control practices unless paired with additional procedures that modify behavior.[14]

CONCLUSION

The findings emphasize the overall lack of knowledge regarding infection control and prevention among nurses and nursing students. Consequently, it is essential to implement policies and measures that assess the effectiveness of existing training curricula for nursing students and assure ongoing training for nurses. Enhancing education, surveillance, resource availability, and enforcing disciplinary actions for non-compliance are critical steps to advance infection control in hospital settings.

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