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A study to assess the effectiveness of structured teaching programme on knowledge and practice regarding aseptic technique to prevent nosocomial infection in paediatric unit among staff nurses in selected hospital, Bengaluru

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Abstract:

Introduction: This study aimed to evaluate the effectiveness of a structured teaching program on the knowledge and practice of aseptic techniques among pediatric unit staff nurses to prevent nosocomial infections in a selected hospital in Bangalore. A pre-experimental one-group pre-test post-test design was employed, with the study conducted at the pediatric unit of Rajarajeswari Medical College and Hospital. The sample comprised 60 staff nurses selected using convenience sampling.

Method and Material: Data collection tools included a demographic performa, knowledge questionnaire, and practice checklist. Statistical analysis was performed using frequency distribution tables and the chi-square test to assess associations between demographic variables and the use of aseptic techniques.

Results: The majority of nurses were female (83%), aged <25 years (35%), with less than 2 years of service (33.3%), and a background in General Nursing and Midwifery (35%). Most worked in the pediatric ward (30%) and were unmarried (46.7%). Seventy-five percent had never been exposed to nosocomial infections, and 76.7% had previous knowledge of healthcare-associated infections (HAI). No significant associations were found between

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demographic variables and the use of aseptic techniques. However, a significant correlation was observed between knowledge and practice.

Conclusion: The study underscores the importance of structured teaching programs in enhancing nurses' knowledge and practice of aseptic techniques to prevent nosocomial infections. However, further research is needed to explore other factors influencing the effectiveness of such programs.

Keywords: Nosocomial infection, pediatric unit, structured teaching program, aseptic technique, Knowledge, Practice

Introduction:

Preventing nosocomial infections, also known as healthcare-associated infections (HAI), is a critical aspect of providing high-quality and safe healthcare.[1] These infections are acquired during the course of receiving healthcare and are not present at the time of admission. In developed countries, comprehensive infection control programs have been implemented to reduce the incidence of nosocomial infections effectively. These programs include measures such as hand hygiene, environmental cleaning, sterilization and disinfection of equipment, and the appropriate use of antibiotics. [2]

However, the effectiveness of these infection control programs in developing countries remains uncertain due to various factors such as limited resources, infrastructure challenges, and varying levels of healthcare practices. Despite these challenges, efforts are being made to improve infection control practices in developing countries to reduce the burden of nosocomial infections. [3]

Nosocomial infections can be caused by a variety of pathogens, including bacteria, viruses, and fungal parasites. Common types of nosocomial infections include Central Line-Associated Bloodstream Infections (CLABSI), Catheter-Associated Urinary Tract Infections (CAUTI), Surgical Site Infections (SSI), and Ventilator-Associated Pneumonia (VAP). These infections can lead to increased morbidity, mortality, and healthcare costs. [4,5]

In pediatric units, nosocomial infections are particularly concerning. While precise estimates for India are not available, Western Pediatric Intensive Care Units (PICUs) report incidence rates ranging from 6% to 8%.[6] The most common nosocomial infections in PICUs include bloodstream infections, lower respiratory tract infections, and urinary tract infections. The risk of these infections is influenced by various factors such as host characteristics, the number of

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interventions and invasive procedures, the aseptic techniques employed, the duration of stay in the PICU, and the inappropriate use of antimicrobial agents. [7]

To address the challenge of nosocomial infections in pediatric units, it is essential to implement comprehensive infection control measures, including proper hand hygiene, aseptic techniques, judicious use of antibiotics, and regular surveillance for early detection and management of infections. Collaborative efforts between healthcare professionals, policymakers, and the community are crucial to reducing the burden of nosocomial infections and improving the overall quality of healthcare delivery.

Research methodology:

The study utilized an evaluative research approach with a pre-experimental design, specifically a one-group pre-test post-test design. Conducted at the Paediatric Unit of Rajarajeswari Medical College and Hospital in Bangalore, the study focused on selected staff nurses in the area. The sample size comprised 60 staff nurses working in the paediatric unit of selected hospitals in Bangalore, selected using convenience sampling due to its practicality in accessing participants available during the study period.

The research variables included the dependent variable of staff nurses' knowledge and practice regarding the prevention of nosocomial infections in children, while the independent variable was a structured teaching program (STP) on nosocomial infection in children. Attribute variables encompassed demographic characteristics such as age, gender, religion, family type, professional qualifications, clinical experience, and sources of information on nosocomial infection prevention in children. The research tools developed for this study included a demographic questionnaire to assess demographic variables, a structured questionnaire to evaluate the effectiveness of the STP on knowledge, and a checklist for assessing practice.

Data analysis and interpretation:

Section I: Description of demographic variables

Frequency and percentage distribution of subjects according to their selected demographic variable.

The bar diagram presents a snapshot of demographic and other relevant characteristics of the staff nurses in the study. The majority of participants were female (83%), with varying age distributions, predominantly below 25 years old (35%). In terms of experience, 33.3% had less than 2 years of service. Educational backgrounds varied, with 35% having General Nursing

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and Midwifery (GNM) qualifications. The largest percentage worked in the pediatric ward (30%), and most were unmarried (46.7%). Regarding exposure to nosocomial infections, 25% had a history of exposure. Additionally, 76.7% of participants had previous knowledge of healthcare-associated infections (HAI). This data provides insights into the demographics and background of the nurses participating in the study.

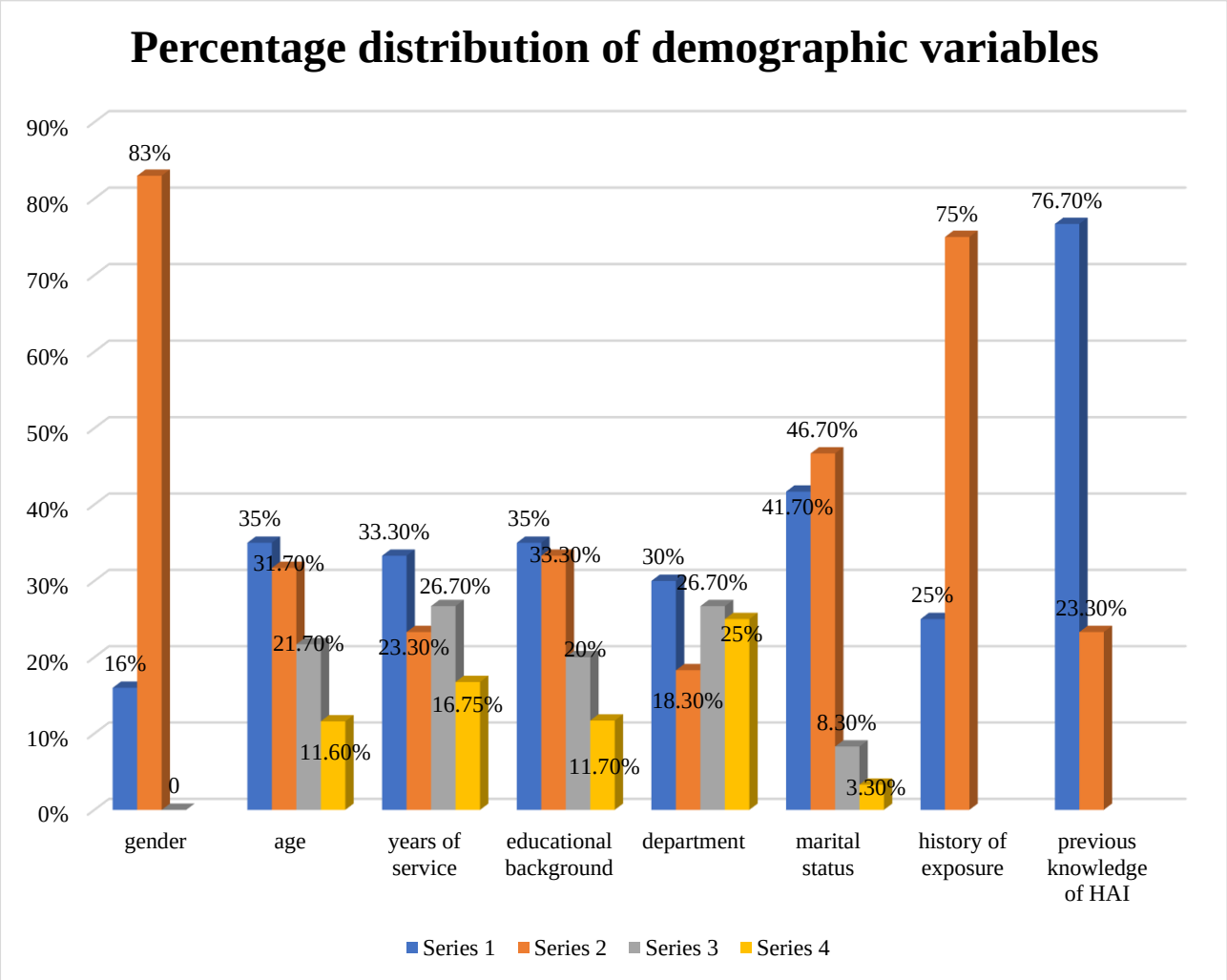

Figure: 1 Bar Diagram representation of percentage distribution of demographic variables

Section II: Pre-test and Post-test knowledge and practice level of staff nurses regarding the use of aseptic technique to prevent nosocomial infection.

Findings related to pre-test level of knowledge regarding the use of aseptic technique to prevent nosocomial infection before administration of structured teaching programme

The figure 2 displays the pre-test level of knowledge among the staff nurses regarding aseptic techniques to prevent nosocomial infections in the pediatric unit. The majority of nurses had a

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moderate level of knowledge (40), indicating a reasonable understanding of the subject but with room for improvement. However, a concerning 20 nurses were categorized as having inadequate knowledge, suggesting a need for targeted educational interventions to enhance their understanding of aseptic techniques. Surprisingly, none of the nurses demonstrated an adequate level of knowledge at the pre-test stage, highlighting the potential gaps in their understanding of this critical aspect of infection control. This data underscores the importance of the structured teaching program in addressing these knowledge deficiencies and improving the overall competence of the nursing staff in preventing nosocomial infections.

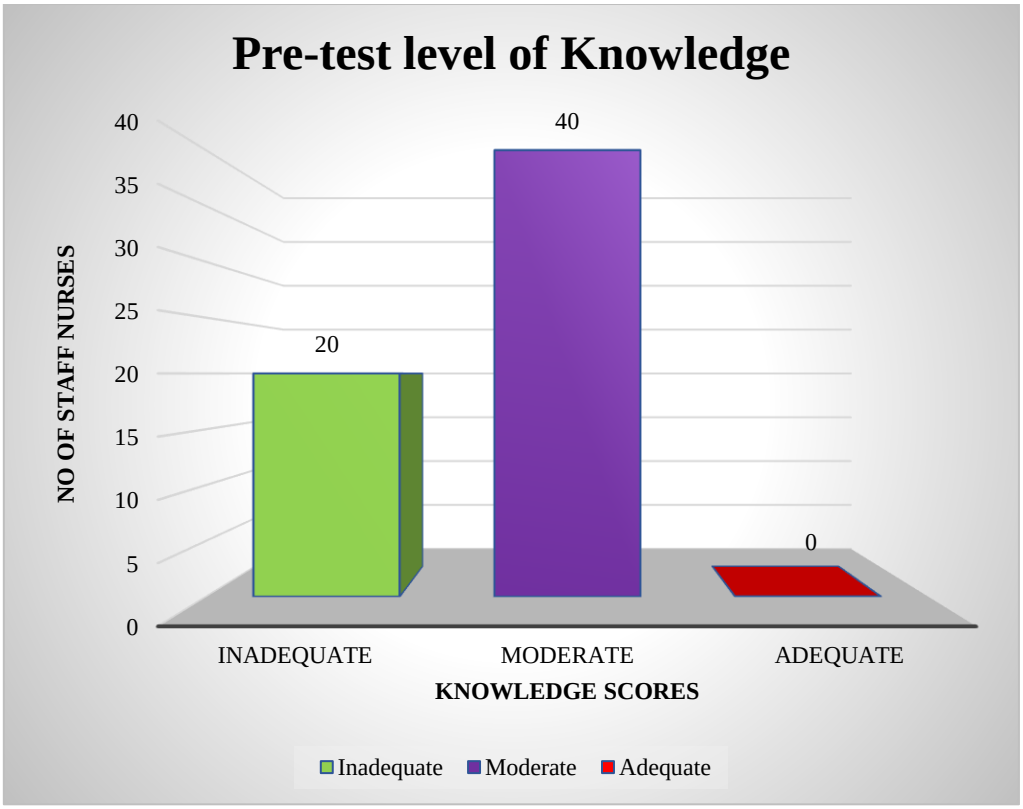

Figure 2: A bar diagram shows distribution of pre-test knowledge level regarding the use of aseptic technique to prevent nosocomial infection

The figure 3 present post-test results which showed significant improvement in knowledge levels among pediatric unit staff nurses regarding aseptic techniques to prevent nosocomial infections. None had inadequate knowledge, with 43 nurses demonstrating adequate knowledge and 17 showing a moderate level. The structured teaching program was effective in enhancing nurses' understanding of infection control practices, indicating its positive impact on improving patient safety.

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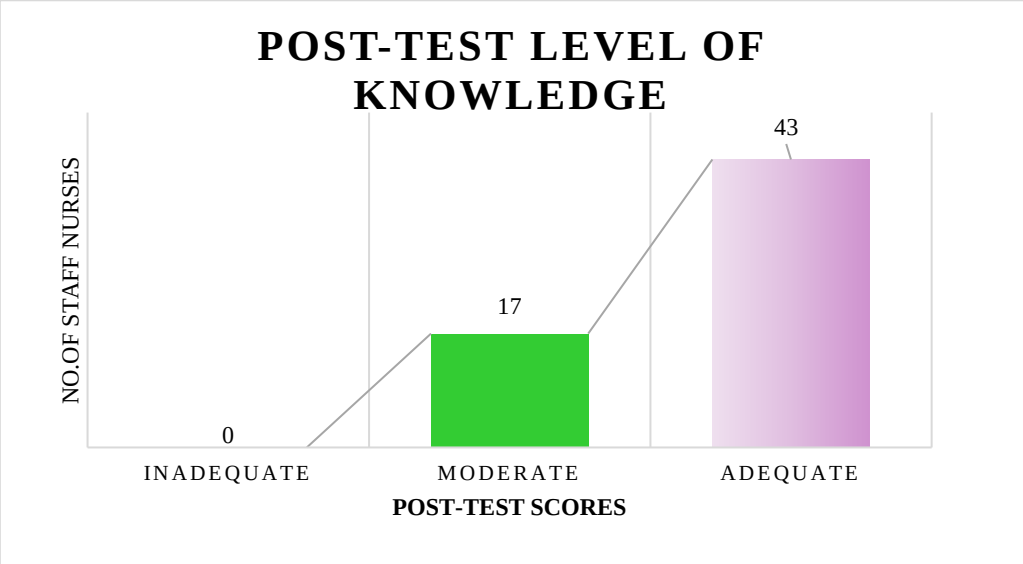

Figure 3: A bar diagram shows distribution of post-test knowledge level regarding the use of aseptic technique to prevent nosocomial infection

Section III: Comparison of mean pre-test and post-test knowledge score to evaluate the effectiveness of structured teaching programme on knowledge regarding aseptic technique to prevent nosocomial infection among staff nurses working in paediatric unit and value of paired 't' test

Distribution of pre-test practice level of staff nurses regarding the use of aseptic technique to prevent nosocomial infection before administration of structured teaching programme.

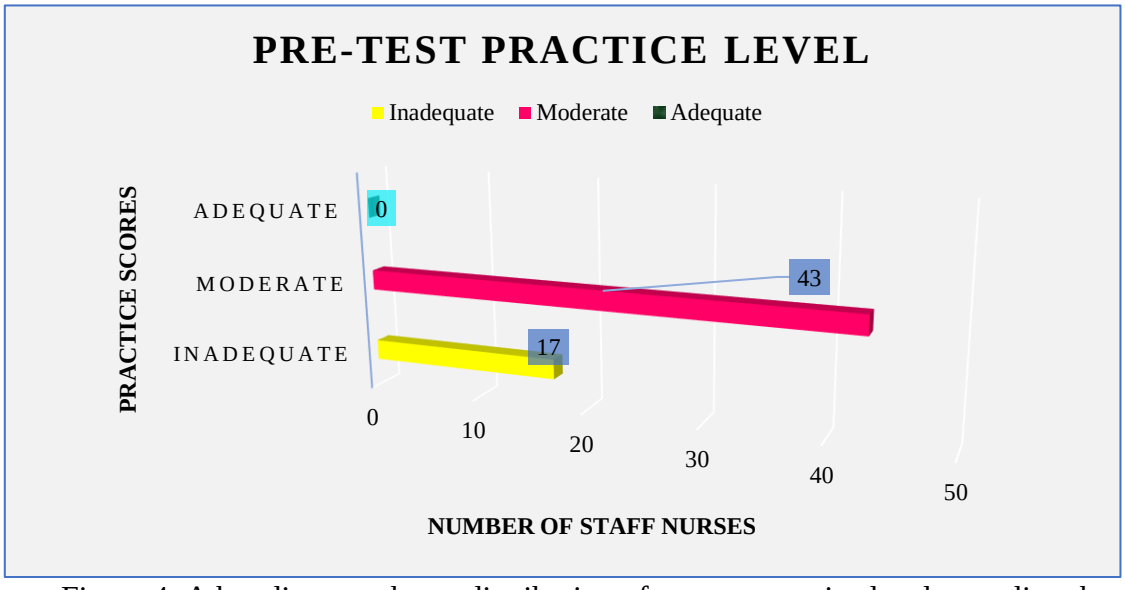

Figure 4: A bar diagram shows distribution of pre-test practice level regarding the use of aseptic technique to prevent nosocomial infection

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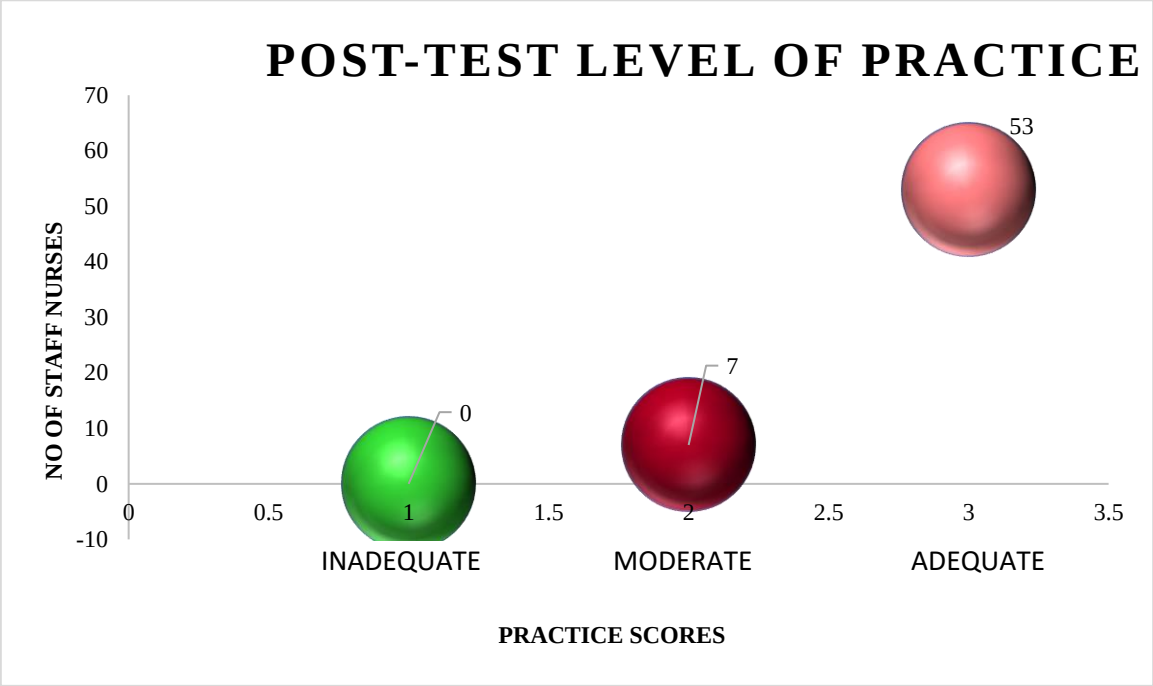

Figure 5: A bar diagram shows distribution of post-test practice level regarding the use of aseptic technique to prevent nosocomial infection

Section V: Association between post-test score of knowledge and practice regarding the use of aseptic technique to prevent nosocomial infection with the selected demographic variables.

Table 1: Association between post-test knowledge regarding the use of aseptic technique to prevent nosocomial infection.

Sl. no	**Demographic variable**	**Level of knowledge**			**χ^2 chi-square**	**p-value**	**Significance level @<0.005**
		Inadequate (0-6)	Moderate (7-13)	Adequate (14-20)			
1.	Gender				0.20339	0.652	NS
	Male	0	7	10			
	Female	0	10	33			
2.	Age				3.99	0.26	NS
	<20 years	0	0	21			
	20-30years	0	1	18			
	31-40 years	0	0	13			
	41-50 years	0	1	6			

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3.	Years of service:						
	<2	0	0	20	3.34	0.34	NS
	2-5	0	1	13			
	5-10	0	0	16			
	>10	0	0	10			
4.	Educational background:						
	GNM	0	0	21	2.0339	0.565	NS
	B. Sc	0	1	19			
	P.B.B. Sc	0	0	12			
	Others	0	0	7			
5.	Department:						
	Paediatric ward	0	0	18	2.796	0.424	NS
	PICU	0	0	11			
	NICU	0	1	15			
	Others	0	0	15			
6.	Marital status:						
	Married	0	0	25	10.37	0.015	NS
	Unmarried	0	2	26			
	Divorced	0	0	5			
	Widow	0	1	1			
7.	History of exposure to nosocomial infection:						
	Yes	0	0	15	0.338	0.56	NS
	No	0	1	44			
8.	Previous knowledge of HAI through CNE:						
	Yes	0	0	46	3.34	0.067	NS
	No	0	1	13			

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Table 2: Association between post-test practice regarding the use of aseptic technique to prevent nosocomial infection.

Sl. no	Demographic variable	Level of practice			chi-square (χ^2)	p-value	Significance level @<0.005
		Inadequate (0-5)	Moderate (6-10)	Adequate (11-15)			
1.	Gender						
	Male	0	3	7	1.33	0.248	NS
	Female	0	4	46	0.9		
2.	Age						
	<20 years	0	1	20	8.122	0.04	NS
	20-30years	0	1	18			
	31-40 years	0	4	9			
	41-50 years	0	0	7			
3.	Years of service:						
	<2	0	4	16	3.710	0.29	NS
	2-5	0	1	13			
	5-10	0	1	15			
	>10	0	0	10			
4.	Educational background:						
	GNM	0	3	18	1.164	0.76	NS
	B. Sc	0	1	19			
	P.B.B. Sc	0	1	11			
	Others	0	1	6			
5.	Department:						
	Paediatric ward	0	3	15	5.55	0.135	NS
	PICU	0	0	11			
	NICU	0	0	16			
	Others	0	3	12			
6.	Marital status:						

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	Married	0	1	24	3.698	0.29	NS
	Unmarried	0	5	23			
	Divorced	0	0	5			
	Widow	0	0	2			
7.	History of exposure to nosocomial infection:						
	Yes	0	1	14	0.246	0.619	NS
	No	0	5	40			
8.	Previous knowledge of HAI through CNE:						
	Yes	0	5	41	0.165	0.684	NS

Discussion:

The data were analyzed based on the study objectives using both descriptive and inferential statistics. The results revealed that 83% of the subjects were female, while 16% were male nurses. In terms of age distribution, 35% were below 25 years old. Regarding years of service, 33.3% had less than 2 years of experience. In terms of educational background, 35% of the staff nurses had a General Nursing and Midwifery (GNM) qualification. Additionally, 30% of the staff nurses worked in the pediatric department.

Marital status analysis showed that the majority, 46.7%, of the staff nurses were unmarried. Regarding exposure to nosocomial infections, 75% of the staff nurses reported no previous exposure, while 25% had been exposed to nosocomial infections.

The findings also indicated that most staff nurses had moderate knowledge and practice levels in the pre-test. However, after receiving the structured teaching program on the use of aseptic techniques to prevent nosocomial infections, the majority showed adequate knowledge and practice in the post-test.

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