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TO ASSESS THE KNOWLEDGE OF NURSING STUDENTS ON INFECTION CONTROL STANDARD PRECAUTIONS

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Abstract

Objectives

The study aimed to assess the level of knowledge regarding infection control standard precautions and its association with socio-demographic characteristics.

Methods

The analytical cross-sectional design was used. The research was conducted at Jesus Mary Institute of Nursing and Male College of Nursing, Sindh Government Hospital Liaquatabad Karachi, Pakistan. The targeted population comprises of undergraduate nursing students. Non-probability convenient sampling technique was used to select sample, the sample size of 166 participants was calculated using open EPI software, independent t test and ANOVA were used as statistical test to find out the association among difference variables.

Results

The results of current study revealed that 15.7% of nursing students had good knowledge, 81.9% of nursing students had moderate knowledge and 2.4% had poor knowledge. Significant associations were found between age, gender, academic year with knowledge of infection control (p= 0.001, p = 0.041, p = 0.005).

Conclusion

The current study concluded the majority of nursing students had moderate level of knowledge. The overall knowledge of nursing students is found to be satisfactory; the teaching and training workshops should be regularly conducted to enhance the knowledge of the nursing students.

INTRODUCTION

Infections linked to healthcare continue to pose a worldwide safety issue, requiring strict compliance with standard precautions by nursing personnel to reduce cross-contamination. Even with extensive theoretical knowledge, numerous nurses encounter practical obstacles like insufficient resources and elevated patient-to-nurse ratios that hinder steady adherence [1]. Nursing students often encounter blood and body fluids during clinical training, which puts them at a considerable risk for occupational infections such as HIV and Hepatitis B. Regular use of universal precautions is crucial to reduce these dangers; however, numerous students start their practice with insufficient knowledge and average levels of compliance [2]. Nursing students face significant risk of occupational exposure during clinical training, it is crucial to implement standardized educational modules to enhance their understanding and adherence to safety protocols [3]. The recent rise of highly contagious diseases

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has prioritized the regular implementation of Standard Precautions (SPs) to ensure patient safety and safeguard healthcare workers. In numerous developing nations, compliance is still minimal because of inadequate systematic training and limited resources in nursing education. Given that nursing students face a significant risk of occupational exposure while undergoing clinical training, it is crucial to implement standardized educational modules to enhance their understanding and adherence to safety protocols [4]. Infections related to healthcare (HAIs) continue to be a major source of illness and economic strain on health systems, despite being mostly preventable with rigorous compliance to standard safety measures. Although nursing students typically show acceptable theoretical knowledge, their practical adherence particularly concerning hand hygiene and the regular use of personal protective equipment is frequently affected by their educational level and the presence of encouraging role models [5]. A study carried out in Lahore, Pakistan, evaluated the knowledge and practices of standard precautions (SP) among 64 B.Sc. nursing students. The results showed that although 91% of students recognized the significance of hand washing, a notable 63% incorrectly thought that SPs were required only for patients with recognized infections, and just 72% regularly wore protective goggles during procedures [6]. In a comparable study at a private hospital in Lahore with final-year nursing students, a 2-hour organized training module resulted in a notable increase in average knowledge scores by 39.6 points ($p < 0.001$), while awareness of transmission risks for Hepatitis B, C, and HIV increased from below 15% to 100% after the intervention [7].Additionally, a cross-sectional analysis involving 200 nursing students in Kulgam, Jammu and Kashmir, indicated a mean knowledge score of 5.2 ± 1.1 (on a scale of 7) and a compliance score of 36.8 ± 5.4 (on a scale of 45), revealing a statistically significant moderate positive correlation ($r = 0.42$, $p < 0.01$) between theoretical understanding and clinical compliance [8].In Qassim, Saudi Arabia, a study involving 213 healthcare professionals revealed that 67.6% had strong knowledge (≥80%) and 73.3% demonstrated good practices; nonetheless, individuals with specialized training were 13.3 times more likely to have enhanced knowledge than those without training [9].Research conducted in Jordan with 205 nurses showed a knowledge level of 81.35%, but the actual compliance in clinical settings was only 61.4%, with the least adherence noted for protective goggles at 6% and masks at 13.2% [10].A study conducted at the University of Benin, Nigeria, involving 100 nursing students in high-risk units, revealed minimal knowledge (mean 15.38/23) and practice levels (mean 14.17/28), highlighting a significant gap as only 3% of students consistently utilized eye shields during splash-risk procedures [11].A 2013 cross-sectional analysis conducted in Nasarawa State, Nigeria, with 421 healthcare professionals, revealed that although 77.9% could explain universal precautions, merely 10.7% practiced hand washing after taking off their gloves. The research indicated that the most significant predictor for compliance was a recent unintended contact with blood or bodily fluids ($OR = 4.56$, $p = 0.03$) [12].Additionally, a scoping review of 13 international studies verified that although education enhances knowledge, adherence tends to remain low unless complemented by ongoing technology-based interventions, like online modules, which have demonstrated an increase in compliance from 43% to 64% [13].A phenomenographic study in South Korea with 30 students revealed that senior students exhibit more sophisticated understandings of infection control, such as prioritizing care for several patients, unlike juniors who concentrate only on spatial separation [14].The World Health Organization (2022) highlighted that proficiency in infection control is the most crucial element for creating a secure hospital setting [15]. A study conducted in Addis Ababa, Ethiopia, with 422 healthcare professionals showed that 51.9% possessed adequate knowledge, yet the overall adherence was low at just 36.49%. The research found that personnel in Gynecology and Obstetrics departments were 3.87 times more inclined to adhere to safety protocols compared to those in general medical units [16].In a comparable study

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conducted in Sri Lanka, it was observed that student nurses scored considerably higher in theoretical knowledge than practicing nurses (51.27% vs 44.86%, $p < 0.001$), while knowledge regarding notifiable diseases was worryingly low for both groups, remaining below 10% [17].In Malaysia, research involving 235 final-year health students revealed that medical students achieved higher scores than nursing students, with an average of 29.3/40 ($p < 0.001$), whereas merely 10.2% of all students were aware that soiled sharps must be shredded prior to disposal [18]In Turkey, research with 208 nursing students showed an average knowledge score of 26.62/36, yet indicated that 92.3% of students gave incorrect responses concerning the appropriate timing for replacing intravenous catheters [19].A study conducted in South Korea with 62 third-year nursing students revealed that simulation with standardized patients was markedly more effective than peer role-play, leading to superior performance scores of 20.50 ± 3.03 compared to 14.81 ± 3.04 ($p < 0.001$), especially in adherence to hand hygiene and personal protective equipment [20].The objectives of current study are to assess the knowledge of nursing students regarding infection control standard precautions and to determine the association between socio-demographic characteristics and knowledge regarding infection control standard precautions.

METHODS

The analytical cross-sectional design was used to assess the Knowledge of nursing students on infection control precaution standards among undergraduate nursing students. The research was conducted at Jesus Mary Institute of Nursing and Allied Sciences and Male College of Nursing, Sindh Government Hospital Liaquatabad Karachi, Pakistan. The target population comprises undergraduate nursing students. Non-probability convenience sampling technique was used to recruit participants for the study. The sample size of 166 participants was calculated using open EPI software, based on test for one sample proportion, the prevalence knowledge on infection control was 79.9% [21], with a 95% confidence interval, 80% power of the test, and 5% margin of error. an estimated population size of 500 participants. The study was conducted From January to March 2026. Permission was obtained from both the institutes. Confidentiality and anonymity were ensured throughout the study. Self-Administered Questionnaire was used to collect data. The data were collected during class hours under supervision of teacher. Data were analyzed using SPSS version 25 Descriptive statistics were used to summarize demographic information. Independent t-test and One-Way ANOVA were used to assess associations between variables.

RESULTS

The table 1 provides an overview of socio-demographic characteristics among a sample of 166 individuals. The majority of participants were male (83.7%), while females constituted 16.3% of the sample. In terms of age, the majority fall within the 18 22 age group (47.6%), followed by 23-27 (47.0%), and a smaller percentage in the above 28 range (5.4%). Marital status indicates that 86.7% are unmarried, 12.7% are married, and 0.6% fall into the "Others" category. Family types are predominantly extended (51.8%), with (48.2%) belonging to nuclear families. Regarding residence, the majority 72.3% lived with family members, while a small percentage live with friends (10.2%) or in a hostel (17.5%). Substance abuse is reported by (6.6%), with (93.4%) indicating no substance abuse. Academic year distribution shows 58.4% in Year 2, 19.9% in Year 3, and 21.7% in Year 4. Family income is diverse, with 21.7% earning below 50,000, 48.8% between 50,000-100,000, 16.9% between 100,000-200,000, and 12.6% earning above 200,000.

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Table 1: Socio-demographic characteristics (n=166)

Socio-Demographic Variables	Characteristics	N (%)
Age	18-22	79 (47.6)
	23-27	78 (47.0)
	28-Above	9 (5.4)
Gender	Male	139 (83.7)
	Female	27 (16.3)
Marital Status	Married	21 (12.7)
	Unmarried	144 (86.7)
	Others	1 (.6)
Academic Year	Second year	97 (58.4)
	Third year	33 (19.9)
	Fourth year	36 (21.7)
Family	Extended	86 (51.8)
	Nuclear	80 (48.2)
Residence	Family	120 (72.3)
	Friends	17 (10.2)
	Hostel	29 (17.5)
Family Income	Below 50K	36 (21.7)
	50K-100K	81 (48.8)
	100K-200K	28 (16.9)
	Above 200K	21 (12.6)
Substance Abuse	Yes	11 (6.6)
	No	155 (93.4)

The result of table 2 showed that 15.7% of nursing students had good knowledge regarding infection control precautions, 81.9% of nursing students had moderate knowledge and 2.4% had poor knowledge.

Table 2: Level of Knowledge

Level of Knowledge	Percentage	Scores Obtained
Poor Knowledge	2.4 %	< 10
Moderate Knowledge	81.9 %	10 - 15
Good Knowledge	15.7 %	16 - 20

Table3 shows the result of association of demographic variables with level of knowledge. The age group, gender group, degree year showed a significant association regarding knowledge of infection control ($p = 0.001$, $p = 0.041$, $p = 0.005$). Marital status, family type, residence, family

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income and substance abuse showed no significant difference (p = 0.086, p = 0793, p = 0.489, p = 0.511, p = 0.989).

Table 3: Association of demographic variables with Infection Control Standard Precautions

Variables	Mean ± SD	N	P- Value
Age			
18-22	13.63 ± 2.020	79	0.001*
23-27	14.92 ± 1.290	78	
28- Above	14.33 ± 2.000	9	
Gender			
Male	14.05 ± 1.862	139	0.041*
Female	14.81± 1.111	27	
Marital Status			
Married	14.86 ± 1.315	21	0.086
Unmarried	14.09 ± 1.820	144	
others	5.00 ± 0.000	1	
Degree Year			
2nd Year	13.80 ± 1.988	97	0.005*
3rd Year	14.64 ± 1.537	33	
4th Year	14.75 ± 1.025	36	
Family			
Extended	14.14 ± 1.743	86	0.793
Nuclear	14.21 ± 1.833	80	
Residence			
Family	14.26 ± 1.734	120	0.489
Friends	13.82 ± 2.243	17	
Hostel	13.97 ± 1.700	29	
Family Income			
Below 50K	13.78 ± 2.153	36	0.511
50K-100K	14.26 ± 1.766	81	
100K-200K	14.32 ± 1.467	28	
Above 200K	14.33 ± 1.528	21	
Substance Abuse			
Yes	14.17 ± 1.810	11	0.989

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No	14.18 ± 1.401	155	

DISCUSSION

The current study found that 15.7% of nursing students have knowledge about infection control standard precautions 81.9% have moderate knowledge and 2.4% have poor knowledge. The study, by Alshammari et al. had similar results, they found that most nursing students know a little about infection control and standard precautions but not a lot. This might be because the nursing programs and training that nursing student's get are similar. The study shows that nursing students need to keep learning about infection control through workshops and practice and that they need to be reminded about the rules to follow to prevent infections. This will help nursing students know more about precautions and actually follow them [22]. These findings are supported by several previous studies. A study conducted by Labrague et al. reported that nursing students' level of knowledge and compliance with standard precautions significantly varied according to age and year of study, indicating that students with greater academic and clinical exposure demonstrated better understanding of infection control measures [23]. Similarly, Donati et al. found that gender and academic year were significantly associated with knowledge and adherence to standard precaution practices among nursing students [24]. Another study by Ganczak and Szych also observed that demographic factors such as age and educational level had a significant relationship with infection control knowledge, whereas marital status and residence did not show any significant association [25]

CONCLUSION

The current study found out that most nursing students have a moderate level of knowledge about infection control. The study also revealed that age, gender and year of study are significantly associated with knowledge of infection control standard precautions. The overall knowledge of nursing students is found to be satisfactory; the teaching and training workshops should be regularly conducted to enhance the knowledge of the nursing students.

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