Knowledge, Attitude, and Compliance with Standard Infection Control Precautions among Nursing Students in a Higher Education Institution

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DOI: https://doi.org/10.51244/IJRSI.2026.1311000149

Received: 07 November 2026; Accepted: 12 November 2026; Published: 26 November 2026

ABSTRACT

Healthcare-associated infections remain a major concern in healthcare settings, highlighting the importance of infection prevention and control among nursing students. This study assessed the knowledge, attitude, and compliance with standard infection control precautions among nursing students in a higher education institution. Using a descriptive-correlational quantitative research design, the study involved 100 second-, third-, and fourth-year nursing students selected through stratified sampling. Data were collected using a validated questionnaire and analyzed through frequency, percentage, mean, standard deviation, Spearman rank-order correlation, Pearson product-moment correlation, and one-way analysis of variance. Findings revealed that respondents had a very high level of knowledge and a high level of attitude toward standard infection control precautions. However, their compliance was moderate, indicating inconsistencies in applying infection control practices. Statistical analysis showed no significant relationships among knowledge, attitude, and compliance. Likewise, no significant differences were found when these variables were grouped according to year level. The findings indicate that adequate knowledge and positive attitudes do not necessarily translate into consistent compliance with infection control precautions. Therefore, continuous educational reinforcement, hands-on training, clinical supervision, and an enhancement program are recommended to strengthen students' adherence to infection prevention practices and promote safe and competent nursing care.

Keywords: Attitude, Compliance, Knowledge, Nursing Students, Standard Infection Control Precautions

INTRODUCTION

Healthcare-associated infections (HAIs) remain a major public health concern because they increase patient morbidity and mortality, prolong hospitalization, and raise healthcare costs. According to the World Health Organization (WHO, 2022), millions of patients worldwide are affected by these infections, many of which are preventable through proper infection prevention and control measures. Standard infection control precautions are essential practices that protect patients and healthcare workers by minimizing the transmission of infectious agents. The Knowledge–Attitude–Practice (KAP) framework explains how knowledge, attitudes, and actual preventive behaviors influence compliance with these precautions (Launiala, 2022).

International studies have reported varying levels of knowledge, attitudes, and compliance among nursing students. Ayele et al. (2022) found moderate knowledge and favorable attitudes among Ethiopian nursing students, although compliance remained inconsistent. Similarly, Moon (2020) identified deficiencies in sharps handling and exposure prevention among South Korean nursing students. Labrague et al. (2022) emphasized that adequate theoretical knowledge does not always translate into consistent infection prevention practices. These findings highlight the importance of examining the relationship among students' knowledge, attitudes, and compliance.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue XI November 2026

In the Philippines, healthcare-associated infections remain a concern, emphasizing the need to strengthen infection prevention practices in healthcare facilities (Navoa-Ng et al., 2021; Department of Health, 2023). Although previous studies have examined infection control awareness among healthcare personnel, limited research has focused on nursing students in higher education institutions. Furthermore, the COVID-19 pandemic highlighted that increased knowledge and awareness do not necessarily guarantee consistent compliance with infection prevention measures (Santangelo et al., 2021). Since nursing students encounter patients and potentially infectious materials during clinical exposure, their knowledge, attitudes, and compliance are essential in protecting themselves and their patients (Centers for Disease Control and Prevention, 2024).

This study is significant to nursing education and clinical practice because its findings may help identify deficiencies in infection prevention knowledge, attitudes, and compliance. The results may guide nursing educators in developing improved instructional strategies, workshops, and simulation activities while helping healthcare institutions strengthen clinical supervision and infection control policies. Moreover, the study supports Sustainable Development Goal 3 (Good Health and Well-Being) and Sustainable Development Goal 4 (Quality Education) by promoting patient safety, effective infection prevention, and quality nursing education (United Nations, 2023).

In synthesis, despite the availability of established infection prevention guidelines, inconsistencies in nursing students' knowledge, attitudes, and compliance remain a concern. Given the limited local evidence, this study aims to assess the knowledge, attitudes, and compliance with standard infection control precautions among nursing students in a higher education institution. Ultimately, the findings are expected to provide evidence-based recommendations for improving nursing education, strengthening infection prevention training, and promoting safe and competent clinical practices among future healthcare professionals.

Statement of the Problem/Research Questions

This study aimed to examine the knowledge, attitudes, and compliance with standard infection control precautions of nursing students in a higher education institution.

Specifically, this study answered the following questions:

1. What is the demographic profile of the respondents in terms of:

1.1. sex and

1.2. year level?

2. What is the level of knowledge of the respondents on standard infection control precautions?

3. What is the level of attitude of the respondents toward standard infection control precautions?

4. What is the level of compliance of the respondents with standard infection control precautions?

5. Is there a significant relationship between:

5.1. knowledge and attitude toward standard infection control precautions;

5.2. knowledge and compliance with standard infection control precautions; and

5.3. attitude and compliance with standard infection control precautions?

6. Is there a significant difference in respondents' knowledge on standard infection control precautions when grouped according to year level?

7. Is there a significant difference in respondents' attitudes toward standard infection control precautions when grouped according to year level?

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue XI November 2026

8. Is there a significant difference in the respondents' compliance with standard infection control precautions when grouped according to year level?

9. Based on the findings of the study, what enhancement plan may be proposed?

Statement of the Hypotheses

H01. There is no significant relationship between knowledge and attitude towards standard infection control precautions among nursing students.

H02. There is no significant relationship between knowledge and compliance with standard infection control precautions among nursing students.

H03. There is no significant relationship between attitude and compliance with standard infection control precautions among nursing students.

H04. There is no significant difference in the level of knowledge on standard infection control precautions when respondents are grouped according to year level.

H05. There is no significant difference in the attitude towards standard infection control precautions when respondents are grouped according to year level.

H06. There is no significant difference in the compliance with standard infection control precautions when respondents are grouped according to year level.

Significance of the Study

This study provides benefits to the following groups:

Nursing Students. The findings of this study may help nursing students become more aware of their current level of knowledge, attitude, and compliance with standard infection control precautions. By identifying areas where improvement is needed, students may be encouraged to strengthen their understanding of infection prevention principles and consistently apply them during clinical duties. The study may also increase their awareness of the consequences of noncompliance, such as healthcare-associated infections, occupational exposure, and compromised patient safety. Through this awareness, nursing students may develop safer clinical habits and become more competent and responsible future healthcare professionals.

Nursing Educators. The results of the study may provide nursing educators with evidence regarding the effectiveness of current infection prevention and control instruction. By identifying strengths and weaknesses in students' knowledge, attitudes, and compliance with standard infection control precautions, educators may be able to design more effective teaching strategies, learning activities, demonstrations, simulations, and clinical exercises. The findings may also guide educators in developing interventions that address specific deficiencies and reinforce infection prevention competencies among nursing students.

Higher Education Institutions. The study may assist higher education institutions in evaluating whether their nursing curriculum adequately prepares students to comply with standard infection control precautions during clinical practice. The findings may serve as a basis for reviewing and improving course content, laboratory activities, clinical requirements, and infection prevention training programs. Furthermore, institutions may use the results to develop policies and educational initiatives that promote a culture of safety and strengthen infection prevention practices among students.

Clinical Instructors and Staff Nurses. The findings may help clinical instructors and staff nurses better understand the factors that influence students' compliance with standard infection control precautions during clinical exposure. This information may enable them to provide more targeted supervision, mentoring, and feedback to students in areas where deficiencies are identified. By understanding students' learning needs, clinical instructors and staff nurses may foster a supportive learning environment that encourages proper adherence to infection prevention guidelines and promotes patient safety.

Healthcare Institutions. Hospitals and other healthcare facilities that accommodate nursing students during clinical rotations may benefit from the findings by gaining insights into students' preparedness and compliance with standard infection control precautions. The results may assist healthcare institutions in strengthening orientation programs, infection prevention training, and monitoring systems for student trainees. Improved compliance among nursing students may contribute to a safer healthcare environment by reducing the risk of healthcare-associated infections and occupational exposure incidents.

Policy Makers and Nursing Administrators. The findings of this study may provide evidence-based information that can support the development, revision, or implementation of policies and programs related to infection prevention and control. Nursing administrators and policymakers may use the results to identify areas that require additional resources, educational support, or policy reinforcement. The study may also contribute to the formulation of standards and guidelines that promote compliance with standard infection control precautions among nursing students and healthcare professionals.

Patients and the Community. The ultimate beneficiaries of improved compliance with standard infection control precautions are patients and the wider community. When nursing students possess adequate knowledge, maintain positive attitudes, and consistently comply with infection prevention measures, the likelihood of infection transmission within healthcare settings may be reduced. This contributes to safer patient care, improved health outcomes, and greater public confidence in healthcare services. Additionally, effective infection prevention practices help protect communities by minimizing the spread of infectious diseases.

The Researchers. Conducting this study may enhance the researchers' knowledge and understanding of infection prevention and control principles, standard precaution compliance, and research methodologies. The study may also develop their skills in data collection, analysis, interpretation, and evidence-based decision-making. Furthermore, the experience gained from conducting the research may prepare them for future professional responsibilities as nurses and researchers.

Future Researchers. The findings of this study may serve as a valuable reference for future researchers interested in investigating infection prevention and control, standard precaution compliance, and related variables among nursing students and healthcare professionals. The study may provide baseline data, identify research gaps, and offer recommendations that future studies can build upon. Moreover, future researchers may use the findings to conduct comparative studies, intervention-based research, or investigations involving larger populations and different healthcare settings

RESEARCH METHODOLOGY

This chapter presents the method used in this study. Specifically, the following are included: research design, research environment, respondents, research instrument, ethical consideration, the data gathering procedures and statistical treatment.

Research Design

This study employed a descriptive-correlational quantitative research design to describe the respondents' demographic profiles in terms of sex and year level, as well as their levels of knowledge, attitude, and compliance with standard infection control precautions. No variables were manipulated, as data were collected based on the respondents' existing conditions. The correlational approach examined the relationships among knowledge, attitude, and compliance, while also determining significant differences in these variables when respondents were grouped according to year level. This design enabled the researchers to describe the study variables and establish their relationships and differences among nursing students.

Research Environment

The study was conducted at the Nursing Department, located on the ground floor of the Oscar P. Jereza Memorial Building, University of Southern Philippines Foundation, Salinas Drive, Lahug, Cebu City. The department provides classroom instruction, laboratory activities, simulations, return demonstrations, and supervised clinical exposures that develop students' nursing knowledge, attitudes, and competencies. Its

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue XI November 2026

integration of infection prevention principles into theoretical and practical training provides opportunities for students to understand and apply standard infection control precautions, including proper hand hygiene, personal protective equipment use, safe sharps handling, and infection prevention protocols. Thus, the Nursing Department served as an appropriate research setting for assessing nursing students' knowledge, attitude, and compliance with standard infection control precautions in both academic and clinical environments.

Research Respondents

The respondents consisted of 100 Level II, III, and IV nursing students of the University of Southern Philippines Foundation who were enrolled in Related Learning Experience (RLE) courses during data collection. From a total population of 132 students (47 Level II, 46 Level III, and 39 Level IV), the researchers employed proportionate stratified random sampling using Slovin's formula with a 5% margin of error. The sample comprised 37 Level II, 34 Level III, and 29 Level IV students. Eligible participants were officially enrolled in the nursing program, taking RLE courses, and willing to provide informed consent. Level I students, those not enrolled in RLE during the study period, non-USPF students, and those who declined participation were excluded. This sampling approach ensured representation across year levels and provided a basis for assessing and comparing students' knowledge, attitude, and compliance with standard infection control precautions.

Research Instrument

The study utilized a self-administered questionnaire consisting of four parts: (1) demographic profile, (2) knowledge of standard infection control precautions, (3) attitude toward standard infection control precautions, and (4) compliance with standard infection control precautions.

The Demographic Questionnaire gathered information about the respondents' sex and year level.

The Knowledge Questionnaire utilized a validated 20-item instrument based on Askarian et al. (2007), Wang (2002), and Li and Wang (2005). Responses were scored as 1 for "Yes" and 0 for "No," with a maximum score of 20. Higher scores indicated greater knowledge. The instrument demonstrated good reliability, with a reported Cronbach's alpha of 0.92 and expert content validity of 0.98. Knowledge levels were interpreted using a five-point scale ranging from Very Low to Very High.

The Attitude Questionnaire adopted the 11-item validated instrument developed by Catacutan, Joseph, and Marcial (2024), assessing students' attitudes toward infection prevention practices, including hand hygiene, PPE use, waste management, and adherence to clinical protocols. Responses followed a four-point Likert scale, with scores assigned according to positively and negatively worded statements. The maximum score was 11, with higher scores indicating a more positive attitude. The instrument demonstrated excellent internal consistency, with a Cronbach's alpha of 0.91.

The Compliance Questionnaire utilized the 20-item Compliance with Standard Infection Control Precautions Scale (CSPS) developed by Lam (2010), based on WHO and Hong Kong Hospital Authority guidelines. Responses ranged from "Never" to "Always," with scores assigned according to positive and negative statements. The maximum score was 20, with higher scores indicating greater compliance. The instrument demonstrated good reliability, with Cronbach's alpha coefficients ranging from 0.85 to 0.87, supported by its reported construct validity.

Data Gathering Procedures

To conduct the study, the researchers sought approval through a formal letter addressed to Mrs. Merlyn A. Ouano, Dean of the College of Health Sciences – Department of Nursing of the University of Southern Philippines Foundation. Data were collected using validated questionnaires. After collection, the responses were retrieved, organized, tabulated, and statistically analyzed for interpretation. The results of the analysis served as the basis for drawing conclusions and formulating recommendations.

Ethical Considerations

In accordance with Republic Act No. 10173, or the Data Privacy Act of 2012, the researchers ensured the confidentiality, privacy, and protection of respondents' personal information and well-being throughout the study. Potential risks, particularly unauthorized disclosure of information, were minimized through data coding, secure storage, restricted access, and proper disposal of identifiable records. Participants were informed of the study's purpose, procedures, and their rights through an informed consent form approved by the appropriate ethics committee. Participation was voluntary, and respondents were free to decline or withdraw at any time without penalty. Access to private and academic information was permitted only with their consent, and debriefing was conducted after data collection to address questions and minimize possible psychological discomfort. No monetary compensation was provided, although a simple token of appreciation was given to participants. The researchers declared no external funding or conflicts of interest, with all research expenses personally shouldered as part of the Bachelor of Science in Nursing requirements. Recruitment was conducted without coercion or undue influence, and participants' rights and well-being were protected. Although respondents were not considered part of a vulnerable population, appropriate safeguards were maintained throughout the research process. Furthermore, publication of the study by the researcher or thesis adviser required proper acknowledgment of authorship.

Statistical Treatment of Data

The data gathered were analyzed using descriptive and inferential statistics through the Statistical Package for the Social Sciences (SPSS) Version 26. Frequency counts and percentages were used to describe the respondents' demographic profiles in terms of sex and year level. Mean, standard deviation, and frequency distribution were employed to determine their levels of knowledge, attitude, and compliance with standard infection control precautions, with parameter limits applied for interpretation.

Spearman Rank-Order Correlation (Spearman rho) was used to examine the relationships of knowledge with attitude and compliance, while Pearson Product-Moment Correlation (Pearson r) determined the relationship between attitude and compliance. Analysis of Variance (ANOVA) was employed to identify significant differences in knowledge, attitude, and compliance when respondents were grouped according to year level. All inferential tests used a 0.05 level of significance, with the null hypothesis rejected when the p-value was less than or equal to 0.05.

Finally, the findings served as the basis for developing an intervention plan addressing identified strengths and areas for improvement through proposed seminars, training programs, simulation exercises, and workshops to enhance nursing students' knowledge, attitudes, and compliance with standard infection control precautions.

RESULTS AND DISCUSSION

This chapter presents and analyzes the gathered data through tables arranged according to the study's objectives. Each table includes interpretation, implications, and supporting literature to explain the respondents' knowledge, attitude, and compliance with standard infection control precautions, including the relationships among these variables. The findings provide insights for strengthening nursing education, clinical training, and infection prevention practices to promote safe and quality healthcare.

Table 1

Sex of the Respondents

Sex	Frequency (f)	Percentage (%)
Male	16	16
Female	84	84
Total	**100**	**100%**

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue XI November 2026

Table 1 revealed that the majority of respondents were female (84%, f=84), while males comprised 16% (f=16), indicating a predominantly female sample. This distribution reflects the common representation of women in nursing and healthcare-related programs. Although male respondents were fewer, their participation provides additional perspectives in assessing nursing students' knowledge, attitudes, and compliance with standard infection control precautions. However, the unequal distribution should be considered when interpreting and generalizing the findings.

These results are consistent with the World Health Organization (2020), which reported that women comprise a substantial proportion of the global health workforce, particularly in nursing and caregiving professions. Similarly, Cruz and Bashtawi (2021) highlighted the relevance of demographic characteristics, including sex, in understanding infection prevention practices. Overall, describing the respondents' sex distribution provides important context for interpreting the study findings.

Table 2

Year Level of the Respondents

Year Level	Frequency (f)	Percentage (%)
2nd year	37	37
3rd year	34	34
4th year	29	29
Total	**100**	**100%**

Table 2 revealed that second-year students comprised the largest proportion of respondents (37%), followed by third-year (34%) and fourth-year students (29%). This indicates a relatively balanced representation across academic levels, allowing the study to examine differences in knowledge, attitudes, and compliance with standard infection control precautions. As students advance in their nursing education, increased clinical exposure and practical experience may contribute to improved infection prevention competencies. However, the slightly higher proportion of second-year students should be considered when interpreting the overall findings.

These findings are supported by Benner (1984), who emphasized that nursing competencies develop progressively through experience. Similarly, Labrague et al. (2022) and Cruz and Bashtawi (2021) highlighted the importance of academic progression, clinical exposure, and training in strengthening nursing students' infection prevention practices. Overall, the representation of different year levels provides a broader understanding of how nursing education and clinical experiences contribute to students' knowledge, attitudes, and compliance with standard infection control precautions.

Table 3

Level of Knowledge on Standard Infection Control Precautions

	Questions	WM	Interpretation
K1	Do you know what the standard infection control precautions are?	1	Very High
K2	Standard Infection Control Precautions should only be used in patients diagnosed with infection or patients suspected of infectious disease.	0.48	Moderate
K3	The main objective of adherence to Standard Infection Control Precautions is to protect the healthcare team.	1	Very High
K4	Do you wash hands immediately in case of contact with blood or any other potentially contaminated materials.	1	Very High
K5	Hand hygiene should be performed before and after providing care to different patients.	0.41	Moderate

K6	When performing procedures that may involve contact with the patient's mucous membranes, the use of gloves is not mandatory.	0.39	Low
K7	Since gloves may prevent hand contamination, it is not necessary to wash hands after removing gloves.	0.97	Very High
K8	Contact with objects, materials, equipment, clothing, and individuals with contaminated Personal Protective Equipment (PPE) should be avoided.	1	Very High
K9	Personal Protective Equipment should not be shared.	1	Very High
K10	In blood collection or venipuncture procedures, the use of gloves is required.	1	Very High
K11	In procedures where contact with secretion or excretion is imminent, glove use is required.	1	Very High
K12	Gloves should be changed when caring for one patient to another.	1	Very High
K13	In procedures where there is a possibility of blood, body fluid, secretions, or excretions spilling, protective masks or face shields should be used.	1	Very High
K14	In procedures where there is a possibility of blood, body fluid, secretions, or excretions spilling, personal protective goggles or face shields should be worn.	1	Very High
K15	In procedures where there is a possibility of blood, body fluid, secretion, or excretion spilling, a protective apron should be worn.	1	Very High
K16	In situations where blood platters, body fluid, secretion, or excretion may occur, disposable caps and hats should be used.	1	Very High
K17	It is forbidden to bend or recap needles. When necessary, perform the one-hand recapping method. Puncture-proof containers should be near the handling area.	1	Very High
K18	When providing nursing care to patients with Hepatitis B or syphilis, it is only necessary to adopt the Standard Infection Control Precautions measure.	0.67	High
K19	When providing nursing care to patients with active tuberculosis or chickenpox, it is only necessary to adopt the Standard Infection Control Precautions measures in addition to the droplet precautions measures.	0.66	High
K20	When providing nursing care to patients with intestinal infections or skin infections, Standard Infection Control Precautions should be taken in addition to contact precautions.	1	Very High
	Factor Average	**0.85**	**Very High**

Legend: *0.80 - 1.00 - Very High; 0.60 - 0.79 - High; 0.40 - 0.59 - Moderate, 0.20 -0.39 - Low, 0.00 - 0.19-Very Low*

Table 3 revealed that respondents demonstrated a Very High level of knowledge regarding standard infection control precautions, with an overall factor average of 0.85. Most indicators, particularly those concerning personal protective equipment, sharps handling, and infection prevention measures, received very high interpretations. However, certain items (K2 and K5) were rated moderate, K6 was rated low, while K18 and K19 were rated high, indicating specific knowledge gaps in hand hygiene, proper precautionary measures, and disease-specific protocols. These findings suggest that despite their strong foundational knowledge, nursing students still need further reinforcement through continuous education, skills demonstrations, simulation exercises, and supervised clinical exposure to ensure proper application of infection control measures.

These findings are consistent with Labrague et al. (2022) and Cruz and Bashtawi (2022), who identified generally adequate infection control knowledge among nursing students but noted deficiencies in specific areas. Similarly, the World Health Organization (2023) emphasized the importance of hand hygiene in preventing infection transmission, while Erasmus et al. (2020) highlighted that knowledge alone does not guarantee compliance. Furthermore, Benner's (1984) Novice-to-Expert Theory supports the importance of continuous learning and clinical experience in developing nursing competencies. Overall, the findings emphasize the need

to address specific knowledge gaps to strengthen students' ability to consistently implement standard infection control precautions and promote patient safety.

Table 4

Level of Attitude toward Standard Infection Control Precautions

	Items	**WM**	**SD**	**Interpretation**
A1	I will adhere to Infection Prevention & Control practices based on the institution's policies.	3.96	0.196	High
A2	I believe that wearing appropriate PPE can protect me from acquiring any infectious disease.	3.98	0.14	High
A3	I believe that hand hygiene is the most effective measure to avoid transmission of infection.	3.04	0.2375	Moderate
A4	I believe that correct donning and doffing of PPE is crucial when caring for any patients following standards and transmission-based precautions.	3.98	0.14	High
A5	I believe that proper patient-placement reduces the risk of transmission of infection.	3.91	0.2862	High
A6	I believe that proper waste segregation & disposal helps prevent the spread of infectious disease.	3.97	0.1706	High
A7	I believe that patient-care equipment should be cleaned & disinfected every after use of each patient or before using to another patient; and workstations should be disinfected	3.95	0.2179	High
A8	I believe that regular disinfection and decontamination of the high-touch surfaces in my patients' environment will keep them safe.	3.96	0.196	High
A9	It is important to me that proper trash bins are available where I doff my PPE.	4	0.5477	High
A10	I believe that sharps should be discarded in a punctured-proof container.	3.97	0.1706	High
A11	I believe in "one needle, one syringe" at one time.	3.97	0.1706	High
	Factor Average	**3.88**	**0.225**	**High**

Legend: *4.21 - 5.00 - Very High, 3.41 - 4.20- High, 2.61 – 3.40- Moderate, 1.81 – 2.60 - Low, 1.00 – 1.80 - Very Low*

Table 4 revealed that respondents demonstrated a high level of attitude toward standard infection control precautions, with an overall factor average of 3.88. Most indicators received high ratings, reflecting positive attitudes toward institutional policies, proper use of personal protective equipment, waste management, and infection prevention procedures. However, A3, with a weighted mean of 3.04, was rated moderate, suggesting that some respondents may not fully recognize hand hygiene as a fundamental measure in preventing infection transmission.

These findings indicate that nursing students generally value infection prevention and recognize their responsibility to protect patients and healthcare workers. Their positive attitudes may be reinforced through classroom instruction, laboratory demonstrations, and clinical exposure. However, workload, time constraints, limited resources, and inconsistent role modeling may affect the translation of these attitudes into actual practice. Therefore, nursing educators should strengthen students' appreciation of hand hygiene through simulation, return demonstrations, reflective discussions, and clinical mentoring. Healthcare institutions should also provide adequate infection control resources and consistent guidance to promote compliance.

The findings are supported by Labrague et al. (2022) and Cruz and Bashtawi (2022), who reported favorable attitudes and perceptions toward infection prevention among nursing students. Similarly, the World Health Organization (2021) emphasized the importance of infection prevention practices in reducing healthcare-

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue XI November 2026

associated infections and promoting patient safety. Ajzen's (1991) Theory of Planned Behavior further explains that favorable attitudes strengthen an individual's intention to perform a particular behavior. Overall, although respondents demonstrated positive attitudes, continued reinforcement of hand hygiene and other infection control measures is necessary to promote consistent and safe clinical practice.

Table 5

Level of Compliance with Standard Infection Control Precautions

	Items	**WM**	**SD**	**Interpretation**
P1	I wash my hands between patient contacts.	2.74	0.5219	Moderate
P2	I only use water for hand washing.	1.42	1.1062	Very Low
P3	I use alcoholic hand rubs as an alternative if my hands are not visibly soiled.	2.69	0.5603	Moderate
P4	I don't recap used needles after giving an injection.	2.47	0.8770	Low
P5	I put used sharp articles into sharp boxes.	2.97	0.2216	Moderate
P6	The sharp box is disposed only when it is full.	2.64	0.6248	Moderate
P7	I remove Personal Protective Equipment (PPE) in a designated area.	2.89	0.4218	Moderate
P8	I take a shower in case of extensive splashing even after I have put on Personal Protective Equipment (PPE).	2.81	0.5039	Moderate
P9	I cover my wound(s) or lesion(s) with waterproof dressing before patient contacts.	2.89	0.3129	Moderate
P10	I wear gloves when I am exposed to body fluids, blood products, and any excretion of patients.	2.97	0.1706	Moderate
P11	I change gloves between patient contacts.	2.77	0.6907	Moderate
P12	I decontaminate my hands immediately after removal of gloves.	2.95	0.2179	Moderate
P13	I wear surgical mask alone or in combination with goggles, face shield and apron whenever there is a possibility of splash or splatter.	2.77	0.4440	Moderate
P14	My mouth and nose are covered when I wear a mask.	2.99	0.0995	Moderate
P15	I use a surgical mask or disposable Personal Protective Equipment (PPE).	2.33	1.1752	Low
P16	I wear a gown or apron when exposed to blood, bloody fluids or any patient excretions.	2.82	0.4274	Moderate
P17	Waste contaminated with blood, bloody fluids, secretion and excretion is placed in red plastic bags irrespective of the patient's infection status.	2.65	0.7399	Moderate
P18	I decontaminate surfaces and equipment after use.	2.88	0.3544	Moderate
P19	I wear gloves to decontaminate used equipment with visible soils.	2.92	0.2713	Moderate
P20	I clean up spillage of blood or other body fluids immediately with disinfectants.	2.96	0.1400	Moderate
	Factor Average	**2.73**	**0.484**	**Moderate**

Legend: *4.21 - 5.00 - Very High, 3.41 - 4.20- High, 2.61 – 3.40- Moderate, 1.81 – 2.60 - Low, 1.00 – 1.80 - Very Low*

Table 5 revealed that respondents demonstrated a moderate level of compliance with standard infection control precautions, with an overall factor average of 2.73. Most indicators were moderately rated, suggesting that respondents follow infection prevention measures but do not consistently practice them. However, P2 and P15

received low to very low ratings, indicating weaknesses in proper handwashing and the consistent use of personal protective equipment. P4 also showed low compliance in avoiding needle recapping, which may increase the risk of needlestick injuries and exposure to bloodborne infections.

These findings suggest a gap between knowledge, attitude, and actual clinical practice. Factors such as inadequate supervision, limited resources, heavy workload, time constraints, and insufficient clinical experience may contribute to inconsistent compliance. Since hand hygiene, proper PPE use, and safe needle handling are essential in preventing infection transmission and protecting patients and healthcare workers, nursing educators should strengthen practical training, return demonstrations, and clinical monitoring. Healthcare institutions should also ensure adequate supplies and consistently reinforce infection control protocols.

The findings are supported by Erasmus et al. (2020) and Cruz and Bashtawi (2021), who reported inconsistent compliance with standard infection control precautions despite adequate knowledge and positive attitudes. Similarly, the World Health Organization (2021) emphasized the importance of hand hygiene, proper PPE use, continuous training, and institutional support in preventing healthcare-associated infections. Overall, the moderate compliance level highlights the need for continuous education, strict supervision, and improved clinical support to promote consistent adherence to standard infection control precautions and ensure patient safety.

Table 6

Summary of the Level of Knowledge, Attitude, and Compliance with Standard Infection Control Precautions

Variables	WM	SD	Interpretation
Knowledge	0.850	0.359	Very High
Attitude	3.963	0.251	High
Practice	2.728	0.672	Moderate

Table 6 summarizes the respondents' knowledge, attitude, and compliance with standard infection control precautions. The findings revealed that respondents had a high level of knowledge (M = 0.850, SD = 0.359) and a high level of attitude (M = 3.963, SD = 0.251), indicating adequate understanding and favorable perceptions of infection prevention practices. However, compliance was moderate (M = 2.728, SD = 0.672), suggesting that respondents do not consistently apply standard precautions in clinical settings. The higher standard deviation in compliance also indicates variations in their actual practices.

These findings reveal a gap between knowledge, attitude, and compliance, suggesting that understanding and valuing infection prevention do not automatically result in consistent practice. Factors such as limited clinical exposure, inadequate supervision, time constraints, and insufficient resources may contribute to this discrepancy. Therefore, continuous training, practical demonstrations, clinical supervision, and adequate infection control supplies are necessary to strengthen adherence to standard precautions.

The findings are supported by Erasmus et al. (2020) and Cruz and Bashtawi (2021), who reported that healthcare workers and nursing students may demonstrate adequate knowledge and positive attitudes but still exhibit inconsistent compliance. Similarly, the World Health Organization (2021) emphasized that translating infection prevention knowledge into consistent clinical practice remains a major challenge. Overall, the findings highlight the need to bridge the gap between knowledge, attitude, and actual compliance to promote patient safety and prevent healthcare-associated infections.

Table 7 Summary of the Level of Knowledge, Attitude, and Compliance with Standard Infection Control Precautions

Variables	(ρ)	p-value	Decision	Interpretation
Knowledge and Attitude toward Standard Infection Control Precautions	0.092	0.362	Failed to Reject H_{01}	No significant relationship

Correlation is significant at p−value ≤ 0.05

Table 7a very weak positive correlation between nursing students' knowledge and attitude toward standard infection control precautions (ρ = 0.092). However, the relationship was not statistically significant (p = 0.362 > 0.05); therefore, the null hypothesis (H_{01}) was not rejected. This indicates that students' knowledge levels were not significantly associated with their attitudes toward infection prevention.

The result suggests that having adequate knowledge does not necessarily lead to more favorable attitudes. Other factors, such as clinical experiences, institutional culture, perceived infection risks, motivation, and guidance from healthcare professionals, may influence students' attitudes. Thus, educational interventions should go beyond knowledge-based instruction by incorporating clinical simulations, experiential learning, professional role modeling, and activities that strengthen personal responsibility for infection prevention.

These findings are supported by Al-Hussami et al. (2021), Said and El-Shafei (2021), and Aung et al. (2022), who emphasized that knowledge alone may not determine attitudes toward infection control, as clinical exposure, institutional support, and perceived risks also influence students' perceptions. Overall, the findings highlight the importance of integrating cognitive learning with practical and attitude-enhancement activities to promote a stronger commitment to standard infection control precautions.

Table 8

Test of Significant Relationship between Knowledge and Compliance with Standard Infection Control Precautions

Variables	(ρ)	p-value	Decision	Interpretation
Knowledge and Compliance with Standard Infection Control Precautions	-0.154	0.127	Failed to Reject H_{02}	No significant relationship

Correlation is significant at p−value ≤ 0.05

Table 8 revealed a very weak negative correlation between nursing students' knowledge and compliance with standard infection control precautions (ρ = -0.154). However, the relationship was not statistically significant (p = 0.127 > 0.05); therefore, the null hypothesis (H_{02}) was not rejected. This indicates that respondents' knowledge levels were not significantly associated with their actual compliance with infection prevention measures.

The result suggests that adequate knowledge does not automatically translate into consistent clinical practice. Factors such as resource availability, workload, time constraints, clinical supervision, institutional policies, and professional role modeling may influence students' compliance. Thus, nursing educators and healthcare institutions should complement theoretical instruction with simulation-based learning, clinical demonstrations, skills reinforcement, and regular monitoring. Providing adequate supplies and a supportive clinical environment may also help students apply infection control principles consistently.

These findings are supported by Labrague et al. (2021), Alshammari et al. (2023), and Abubakar et al. (2022), who emphasized that knowledge alone may be insufficient to ensure compliance with infection prevention measures. Their findings highlight the importance of clinical experience, supervision, resource availability, and institutional support in promoting proper infection control practices. Overall, the results underscore the need to bridge the gap between knowledge and actual practice to strengthen compliance and patient safety.

Table 9 Test of Significant Relationship between Attitude and Compliance with Standard Infection Control Precautions

Variables	r	p-value	Decision	Interpretation
Attitude and Compliance with Standard Infection Control Precautions	-0.024	0.815	Failed to Reject H_{03}	No significant relationship

Correlation is significant at p−value ≤ 0.05

Table 9 revealed a negligible negative relationship between respondents' attitude and compliance with standard infection control precautions (r = -0.024). However, the relationship was not statistically significant (p = 0.815 > 0.05); therefore, the null hypothesis (H_{03}) was not rejected. This indicates that respondents' attitudes were not significantly associated with their actual compliance with infection prevention measures.

The result suggests that favorable attitudes do not necessarily translate into consistent clinical practice. Factors such as PPE availability, workload, time constraints, clinical supervision, institutional policies, and opportunities for practical application may influence compliance. Therefore, nursing educators and healthcare institutions should complement attitude-building activities with simulation exercises, competency-based assessments, practical demonstrations, and continuous clinical supervision. Adequate resources and supportive clinical environments are also essential in promoting consistent adherence.

These findings are supported by Alshammari et al. (2023), Khasawneh et al. (2022), and Alrubaiee et al. (2021), who emphasized that positive attitudes do not always result in consistent infection control practices. Furthermore, Ajzen's (1991) Theory of Planned Behavior explains that behavior is influenced not only by attitudes but also by subjective norms and perceived behavioral control. Overall, the findings highlight the need to address both individual and environmental factors to translate favorable attitudes into consistent compliance with standard infection control precautions.

Table 10

Test of Significant Variation in the Level of Knowledge When Grouped According to Year Level

Source of Variation	**SS**	**df**	**MS**	**F-value**	**p-value**	**Decision**	**Interpretation**
Between Groups	3.85	2	1.93	3.921	0.1927	Failed to reject H_{04}	There is no significant variation between the year levels.
Within Groups	134.2	117	1.15				
2nd Year	45.1	36	1.25				
3rd Year	44.8	33	1.36				
4th Year	44.3	28	1.58				
Total	**138.05**	**119**					

**Difference is significant at p−value ≤ 0.05*

Table 10 revealed that there was no statistically significant difference in the level of knowledge regarding standard infection control precautions across year levels (F = 3.921, p = 0.1927 > 0.05). Therefore, the null hypothesis was not rejected, indicating that second-, third-, and fourth-year students had comparable levels of knowledge. This suggests that year level was not significantly associated with differences in students' knowledge of infection prevention measures.

The result highlights the importance of continuously reinforcing infection control concepts throughout the nursing curriculum, regardless of year level. Although students demonstrated comparable knowledge, nursing educators should incorporate advanced and differentiated instructional strategies, such as demonstrations, simulation-based activities, and supervised clinical practice, to address specific knowledge gaps and deepen understanding.

These findings are supported by Mohammedi et al. (2025) and Ayele et al. (2022), who emphasized that infection prevention and control are foundational concepts introduced early in nursing education. Similarly, Silva and Ferreira (2024) highlighted the need for continuous reinforcement, while De Almeida Lima et al. (2025) reported that interactive educational interventions can improve students' knowledge and compliance.

Table 11

Test of Significant Variation in the Level of Attitude When Grouped According to Year Level

Source of Variation	SS	df	MS	F-value	p-value	Decision	Interpretation
Between Groups	2.9	2	1.45	3.928	0.2384	Failed to Reject H_{05}	There is no significant variation between the year levels.
Within Groups	117.3	117	1				
2nd Year	39.1	36	1.09				
3rd Year	38.6	33	1.17				
4th Year	39.6	28	1.41				
Total	**120.2**	**119**					

**Difference is significant at p−value ≤ 0.05*

Table 11 revealed that there was no statistically significant difference in students' attitudes toward standard infection control precautions across year levels ($F = 3.928$, $p = 0.2384 > 0.05$). Therefore, the null hypothesis was not rejected, indicating that second-, third-, and fourth-year students demonstrated comparable attitudes toward infection prevention. This suggests that year level was not significantly associated with differences in students' attitudes.

The result highlights the importance of continuously reinforcing positive attitudes throughout nursing education. Although attitudes appear comparable across year levels, values formation activities, reflective clinical experiences, professional role modeling, and mentorship may further strengthen students' commitment to infection prevention.

These findings are supported by Bouchoucha et al. (2021), who emphasized the influence of clinical role modeling, leadership, and workplace environments on infection prevention attitudes. Similarly, Ayele et al. (2022), Mohammedi et al. (2025), and the World Health Organization (2022) highlighted the importance of continuous instruction, supportive learning environments, and sustained infection prevention education. Overall, the findings suggest that strengthening students' attitudes requires consistent educational and clinical reinforcement rather than relying solely on academic progression.

Table 12

Test of Significant Variation in the Level of Compliance When Grouped According to Year Level

Source of Variation	SS	df	MS	F-value	p-value	Decision	Interpretation
Between Groups	4.1	2	2.05	3.921	0.3028	Failed to Reject H_{06}	There is no significant variation between the year levels.
Within Groups	199.5	117	1.71				
2nd Year	67	36	1.86				
3rd Year	66.8	33	2.02				
4th Year	65.7	28	2.35				
Total	**203.6**	**119**					

**Difference is significant at p−value ≤ 0.05*

Table 12 revealed that there was no statistically significant difference in students' compliance with standard infection control precautions across year levels ($p = 0.3028 > 0.05$). Therefore, the null hypothesis was not

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue XI November 2026

rejected, indicating that second-, third-, and fourth-year students demonstrated comparable levels of compliance. This suggests that academic progression was not significantly associated with differences in infection control practices.

The result implies that compliance may depend more on clinical exposure, supervision, availability of resources, and institutional protocols than on year level alone. Thus, nursing educators and healthcare institutions should strengthen hands-on training, clinical monitoring, supervised practice, and continuous reinforcement of infection control guidelines to promote consistent adherence among students.

These findings are supported by Ayele et al. (2022) and Bouchoucha et al. (2021), who emphasized the influence of clinical environments, supervision, leadership, and professional role modeling on infection control practices. Similarly, De Almeida Lima et al. (2025) and Mohammedi et al. (2025) highlighted the importance of practical demonstrations, supervised learning, and continuous assessment in improving compliance. Overall, the findings emphasize that strengthening clinical training and institutional support is essential to improving students' consistent application of standard infection control precautions, regardless of year level.

Table 13

Standard Infection Control Precautions Enhancement Plan for Nursing Students

Concerns/ Significant Findings	Specific Objectives	Activities	Person's Responsible	Resources Needed	Time Frame	Success Indicators
Moderate knowledge regarding proper application of standard infection control precautions and hand hygiene	To strengthen nursing students' knowledge regarding standard infection control precautions and hand hygiene	Conduct seminars and lectures on standard infection control precautions guidelines and WHO hand hygiene standards. Provide orientation on standard and transmission-based precautions. Distribute educational materials such as brochures, posters, and infographics Conduct quizzes and case scenario discussions regarding infection prevention.	Nursing Students, Researcher, Clinical Instructors, Nursing Faculty	Projector, printed materials, posters, handouts, lecture venue	1st–2nd month of the semester	Students will demonstrate improved understanding of infection control principles and proper hand hygiene practices.
Low knowledge regarding glove use during procedures involving mucous membranes	To improve understanding regarding the proper use of gloves and PPE in clinical procedures	Conduct simulation-based demonstrations on proper PPE usage. Perform return demonstrations regarding glove application and removal. Show instructional videos on donning and doffing procedures.	Nursing Students, Clinical Instructors	PPE sets, gloves, masks, audiovisual materials, skills laboratory equipment	2nd month of the semester	Students will correctly identify situations requiring glove use and demonstrate proper PPE application
Moderate attitude toward hand hygiene as the most effective infection prevention measure	To improve students' attitudes and appreciation of hand hygiene in preventing infection transmission	Conduct awareness campaigns emphasize the importance of hand hygiene. Display posters on the "Five Moments of Hand Hygiene." Facilitate reflective sharing sessions about patient safety and healthcare associated infections. Organize Infection Prevention Week activities.	Nursing Students, Student Nurses' Organization, Nursing Faculty, Infection Control Committee	Posters, tarpaulins, audiovisual materials, hand hygiene brochures	2nd–3rd month of the semester	Students will develop more positive attitudes toward hand hygiene and infection prevention compliance.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue XI November 2026

Moderate compliance in handwashing	To improve compliance with proper techniques among nursing students	Conduct hands-on handwashing demonstrations and supervised practice Install reminder posters near sinks and clinical areas. Implement random hand hygiene monitoring during duty. Reinforce the use of alcohol-based hand rubs when appropriate.	Nursing Students, Clinical Instructors, Nurses	Soap, alcohol-based hand rubs, sinks, posters,	Continuous throughout clinical	Students will consistently practice proper hand hygiene care.
Low compliance in avoiding needle recapping	To enhance safe sharps handling and reduce needle-stick injury risks	Conduct training on safe injection practices and sharps disposal. Demonstrate the dangers of needle recapping through case presentations. Ensure accessibility of puncture-proof sharps containers during duty.	Nursing Students, Clinical Instructors	Sharps containers, syringes, instructional materials, training venue	3rd month of the semester	Students will consistently avoid needle recapping and properly dispose of sharps.
Low and inconsistent use of surgical masks and PPE	To strengthen compliance with proper PPE utilization during patient care	Conduct competency training on proper PPE selection and use. Require return demonstrations before clinical deployment. Monitor PPE use during Related Learning Experience (RLE) duties. Reinforce institutional policies regarding PPE compliance.	Nursing Students, Clinical Instructors, Nursing Faculty	PPE supplies, checklists, training materials	Continuous throughout the semester	Students will consistently and correctly use PPE during exposure-prone procedures.
Moderate compliance in waste segregation and environmental disinfection	To improve adherence to proper waste management and environmental cleaning protocols	Conduct demonstrations on proper waste segregation and disposal. Orient students regarding color coded waste bins. Demonstrate proper decontamination of	Nursing Students, Clinical Instructors, Hospital Sanitation and Infection Control Personnel	Color-coded bins, disinfectants, cleaning materials, posters	4th month of the semester	Students will properly segregate wastes and perform environmental decontamination procedures effectively.
Gap between high knowledge/ attitude and moderate practice	To translate knowledge and positive attitudes into consistent infection control behaviors	Implement mentorship and peer monitoring programs during clinical duty. Conduct regular feedback sessions after hospital exposure. Provide recognition and reinforcement for students demonstrating exemplary compliance with standard precautions practices. Encourage reflective journaling regarding infection prevention experiences.	Nursing Students, Clinical Instructors, Nursing Faculty, Peer Leaders	Monitoring forms, journals, certificates, feedback tools	Continuous throughout the semester	Students will demonstrate more consistent compliance with infection control measures in clinical settings.
Lack of continuous reinforcement and monitoring of standard precaution practices.	To sustain long-term compliance with standard infection control precautions	Integrate infection control reinforcement in every Related Learning Experience (RLE). Conduct periodic refresher training and workshops. Establish regular infection control audits among student nurses. Collaborating with hospital infection control committees for updated protocols	Nursing Administration, Nursing Faculty, Clinical Instructors, Hospital Infection Control Committee	Training venue, evaluation forms, updated protocols, audiovisual materials	Every Semester	Sustained compliance and continuous improvement in standard infection control precautions among nursing students.

The proposed Infection Prevention and Control Enhancement Program aims to address the identified gaps in nursing students' knowledge, attitudes, and compliance with standard infection control precautions. Based on the findings, the program focuses on strengthening knowledge of infection prevention, proper glove and PPE utilization, hand hygiene, safe sharps handling, waste segregation, and environmental disinfection. It includes seminars, skills demonstrations, simulation activities, awareness campaigns, supervised clinical practice, peer mentoring, and regular monitoring, to be implemented by nursing students, faculty members, clinical instructors,

hospital personnel, and infection control committees throughout the semester and succeeding academic terms. Through these interventions, the program seeks to translate students' knowledge and positive attitudes into consistent and appropriate infection control practices, reduce the risk of healthcare-associated infections and needle-stick injuries, and promote patient and healthcare worker safety. Its success will be evaluated through improved knowledge, positive attitudes, proper demonstration of infection control procedures, consistent PPE utilization, and sustained compliance with standard precautions during clinical exposure.

SUMMARY OF THE FINDINGS

This study assessed the respondents' knowledge, attitude, and compliance with standard infection control precautions, including the relationships among these variables and differences across year levels.

The findings revealed that most respondents were female (84%), while 16% were male. In terms of year level, 37% were second-year, 34% third-year, and 29% fourth-year students.

The respondents demonstrated high knowledge (M = 0.850) and a highly positive attitude (M = 3.963) toward standard infection control precautions. However, their compliance was moderate (M = 2.728), indicating inconsistencies in actual practices.

Correlation analysis showed no significant relationships among knowledge, attitude, and compliance, as all p-values exceeded 0.05. This indicates that knowledge and positive attitudes do not necessarily translate into consistent compliance.

Similarly, ANOVA revealed no significant differences in knowledge, attitude, and compliance across year levels. This suggests that students demonstrate comparable levels of understanding, attitudes, and practices regardless of academic level.

CONCLUSION

The respondents were predominantly female and were distributed across second-, third-, and fourth-year levels, providing a balanced representation of students at different stages of academic progression within a higher education institution.

The respondents demonstrated a very high level of knowledge regarding standard infection control precautions, indicating a strong understanding of infection prevention principles.

The respondents exhibited a high level of attitude, reflecting generally positive perceptions and a willingness to comply with standard infection control precautions.

The respondents showed a moderate level of compliance, suggesting that standard precaution practices are not consistently implemented in clinical settings.

There is no significant relationship among knowledge, attitude, and compliance, indicating that these variables function independently and that improvement in one does not necessarily lead to improvement in the others.

There is no significant difference in the levels of knowledge, attitude, and compliance when grouped according to year level, suggesting that academic progression alone does not significantly influence these variables.

Based on the findings, a comprehensive enhancement program focusing on knowledge, attitude, and compliance with standard infection control precautions is proposed to address gaps and improve infection prevention practices among nursing students in a higher education institution.

RECOMMENDATION

Considering the findings and conclusions of the study, the following recommendations are proposed:

Clinical Instructors and Hospital Personnel. Clinical instructors and hospital personnel should implement stricter supervision and monitoring of students during clinical duties. Regular feedback and evaluation must be provided to ensure that students adhere to proper standard infection control precautions and to immediately correct improper practices. This will help improve consistency in compliance with infection prevention measures among nursing students.

Educational Institutions. Educational institutions should strengthen the practical component of the curriculum by incorporating more hands-on training, return demonstrations, and simulation-based learning activities. These approaches will help students translate their knowledge into actual clinical practice and enhance their competency in applying standard infection control precautions. Institutions should also conduct regular seminars, workshops, and training programs that emphasize the consistent application of standard infection control precautions in real-life clinical settings.

Hospitals and Training Institutions. Hospitals and training institutions should ensure the availability and accessibility of necessary resources, such as personal protective equipment, hand hygiene facilities, and sanitation supplies. Providing adequate resources is essential in enabling students to properly comply with standard infection control precautions and maintain safety in clinical environments.

Educational Institutions and Clinical Instructors. Educational institutions and clinical instructors should introduce behavioral-based interventions to promote habit formation and compliance with standard infection control precautions. Strategies such as reminders, checklists, and accountability systems may help reinforce proper practices and improve adherence among students.

Future Researchers. Future researchers are encouraged to explore additional variables that may influence compliance with standard infection control precautions, such as clinical exposure, workload, supervision quality, institutional policies, and environmental factors. Investigating these variables may provide a deeper understanding of the gap between knowledge and compliance and contribute to more effective interventions.

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