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# Original Research Article

# **Evaluating Student Perspectives and Experiences with Nosocomial Infections: Insights from a Survey Study**

Mr. Vasantha Malagi<sup>1\*</sup>, Ms. Abhirami<sup>2</sup>, Mr Alan Joseph<sup>2</sup>, Mr Athul Satheesh<sup>2</sup>, Mr Alan P Benny<sup>2</sup>, Mr. Vishwas Reddy<sup>2</sup>, Mr. Steevo Joy<sup>2</sup>, Mr. Elbin Johny<sup>2</sup>

<sup>1</sup>Associate Professor, Smt. Nagarathnamma College of Nursing, Soladevanahalli, Bengaluru, Karnataka, India

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Abstract: Hospital-acquired infections (HAIs), also known as nosocomial or healthcare-associated infections are a common global challenge. Novice nursing students, as part of the healthcare team, play a critical role in infection control, but often face a theory-practice gap during their transition to clinical practice. This gap can affect patient care, reduce their clinical performance, and contribute to increased HAI rates. Objectives: The study aimed to assess novice nursing students' knowledge and practice of HAI, examine the relationship between knowledge and practice, and explore associations with socio-demographic variables. Method: A descriptive study involving 100 novice nursing students (with less than one year of study) at a tertiary care hospital was conducted. Self-structured questionnaires assessed their knowledge and practice related to HAI. Results: The majority (72%) had moderately adequate knowledge, 26% had inadequate knowledge, and only 2% had adequate knowledge. Regarding practice, 52% had poor practice, 42% had fair practice, and 6% had good practice. A moderate positive correlation was found between knowledge and practice (r=0.425, p<0.00001). Practice was associated with age (p=0.027) and gender (p=0.012), but no association was found between knowledge and socio-demographic variables. Conclusion: Most novice nursing students demonstrated moderately adequate knowledge but insufficient practice in HAI control, potentially leading to higher infection rates. These findings highlight the need for clear policies, guidelines, and training to address knowledge and practice gaps.

**Keywords:** Hospital Acquired Infection (HAIs), Nosocomial Infection, Novice Nursing Students.

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# **INTRODUCTION**

Hospital is an essential part of health care system development. The hospital experience often makes a central point in the lives of patient as they are entitled to safe care by the health care providers. Safety during patient hospitalization consists of one of the patients' rights and the priority of the health care profession. WHO (2016).

Hospital acquired infection is also known as "nosocomial infection" or "health care associated infection" or infection acquired in health care settings are the most frequent adverse event in health care delivery worldwide. Health care associated infections are those infection that the patients develop during receiving healthcare treatment for other condition, which are not incubating at the time of admission. Hospital acquired

infections are significant cause of illness and death and they can have devastating emotional, financial, and medical consequences. Some of the most occurring preventable hospital acquired infections are catheter associated urinary tract infection, central line associated blood stream infections, and ventilator associated pneumonia and surgical site infections. WHO (2019)

Novice nursing students are those who are newly qualified nurse and new to practice. During transition to practice, the novice nursing students have theory-practice gap and limited skill sets which can lead to the reduction of quality patient care and reduction of novice nurse's performance quality. A solid knowledge of infection control is necessary to assist new registered nurses to work as competent beginner practitioners within health care settings, including reducing risk for hospital acquired infection and providing safer patient

<sup>&</sup>lt;sup>2</sup>4<sup>th</sup> year BSc Nursing Students, Smt. Nagarathnamma College of Nursing, Soladevanahalli, Bengaluru, Karnataka, India

care by minimizing cross infection between patients. Murray, M., Sundin, D., & Cope, V. (2019)

According to WHO, every 100 hospitalized patients at any given point of time, 7 in high income countries and 10 in low-middle income countries will acquire at least one health care associated infection. Each year 3.2 million patients are infected with hospital acquired infection across Europe and 37000 of them die as a direct consequence. WHO (2019)

A descriptive study was conducted regarding knowledge, attitude, and practice of nurses about standard precaution for hospital acquired infection, in Iran. Simple random sampling was adopted, and 170 nurses enrolled for the study. A structured questionnaire was used to collect data regarding knowledge, attitude, and practice. Data was analysed using descriptive and inferential statistics. The results showed that 43% of the nurses had poor knowledge, 42% had average practice and 37% had moderate positive attitude about hospital acquired infection. The study recommended to provide training sessions on the prevention and control of hospital acquired infection to increase awareness of health care personal and hold practical sessions for practicing these principles. Sarani, H., Balouchi, A., Masinaeinezhad, N., & Ebrahimitabas, E. (2015)

A cross-sectional and correlational study by Algarni, S. S., Sofar, D. S., & Wazqar, D. D. Y. (2019) was conducted to assess nurses' knowledge and practice towards prevention of catheter associated urinary tract infections in Saudi Arabia from November 2017 to January 2018. A convenience sampling technique was adopted to select 137 nurses. Self-structured knowledge and practice questionnaire was used to collect the data. Descriptive statistic and chi-square test were used for analysis. The study depicted that 62.77% (86) had average level of knowledge and 62.77% (86) of nurses had low level of knowledge and only 1% (1) had high level of knowledge. Only 16.1% (22) of nurses had a good level of practices and 83.94% (115) of them had poor practice. The study recommended that further studies are needed to investigate the barriers affecting nurses' knowledge, attitude and practice regarding catheter associated urinary tract infection prevention.

A descriptive study was conducted by Algarni, S., Sofar, S., & Wazqar, D. (2019) to assess evaluation of nurse's practice on indwelling catheter in Iraq, Nonprobability purposive sampling technique was used, and 60 nurses were selected who perform catheterization. Self-structured indwelling catheter checklist that consists of 21 questions of catheter insertion was used for data collection. Descriptive and inferential statistics were used for analysis. The study result showed that 56.7% (34) of the subject had poor practice and only 43.3% (26) had good practice. The study showed that there was significant association between practice and socio demographic variable - economic status (p=0.010). The

study recommended conducting and developing catheterization research that may contribute in reducing infectious problems of patient who need temporary or permanent for urinary catheter. Involving the nursing staff in educational courses to motivate their knowledge and practices about urinary catheterization.

A cross-sectional study was conducted among 423 randomly selected nurses at university referral hospitals in the Southern Nations, Nationalities, and Peoples' Region of Ethiopia. Data were collected using self-administered questionnaires, and multivariable binary logistic regression was employed to examine the associations between the dependent and independent variables. Adjusted odds ratios (AORs) were calculated, and variables with 95% confidence intervals (CIs) were considered statistically significant. The study revealed that 45.5% of nurses (95% CI: 40.6%-50.4%) had good knowledge, while 64.8% (95% CI: 60.1%–69.5%) demonstrated good practices in HAI prevention. Factors associated with better knowledge included being male (AOR: 2.2, CI: 1.41–3.40), holding a degree or higher in nursing (AOR: 3.6, CI: 1.73-7.38), having over five years of work experience (AOR: 2.0, CI: 1.24-3.26), receiving infection prevention training (AOR: 2.6, CI: 1.58-4.37), and having access to adequate material supplies (AOR: 2.2, CI: 1.08-4.45). In terms of good practices, key factors included holding a degree or higher in nursing (AOR: 1.98, CI: 1.07-3.66), having a consistent water supply (AOR: 3.4, CI: 1.58-7.30), and being aware of infection prevention guidelines at their institution (AOR: 1.80, CI: 1.14–2.87). The less than half of the nurses had sufficient knowledge, and around twothirds demonstrated good practices in preventing HAIs. Sebro, S. F., Birhanu, M., Bilal, A., & Sahle, T. (2023)

A descriptive study by Brosio, F, et al., (2017) to assess the awareness about the risk factors and the most effective measures of prevention of HAI in the University of Ferrara nursing school students, giving particular attention to the hand hygiene practices and the use of standard precautions. 339 students attending all the three years of course of the same academic year were enrolled. An anonymous questionnaire was administered to investigate the knowledge about three specific areas: infections associated with healthcare practices (HAI), standard precautions (SP) and hand hygiene (HH). Results. A sufficient level of knowledge by all the three groups of students was observed only in the SP area. A barely sufficient score was reached only by the third-year students regarding the proper HH. The level of knowledge about HAI was inadequate. A periodically check of nursing students' knowledge would be advisable to fill any gaps, improve training, reduce HAI and increase prevention measures compliance.

A single-center cross-sectional study by Althiyabi, F. S *et al.*, (2024) was conducted at the emergency department of King Faisal Medical Complex in Taif from October to December 2022, involving 168

nurses. The study utilized a pre-validated structured online questionnaire divided into three sections: demographics, knowledge assessment, and practice evaluation. Knowledge and practice levels were classified as good, moderate, or poor based on quartiles. The results showed that among the 168 nurses, a significant 63.8% exhibited a "Good" level of knowledge, while 10.6% had a "Moderate" level and 25.5% displayed a "Poor" level of knowledge regarding infection prevention practices. In terms of practice, 56.4% of the nurses demonstrated a "Good" practice level, 22.3% maintained a "Moderate" level, and 21.3% showed a "Poor" level. Chi-square analysis indicated a significant association between age and knowledge levels (p = 0.000). Additionally, both age (p = 0.000) and years of clinical experience (p = 0.000) were significantly correlated with the nurses' practice levels. Notably, 82% of nurses aged 40-50 years and 83.3% of those with 10-15 years of clinical experience achieved good knowledge and practice levels, respectively. Overall, many nurses demonstrated effective knowledge and adherence to infection prevention practices. In conclusion, sociodemographic factors such as age and clinical experience significantly influence nurses' knowledge and practices regarding hospital-acquired infections.

A cross-sectional study was conducted by Bayleyegn, B., Mehari, A., Damtie, D., & Negash, M. (2021) among healthcare workers to assess their knowledge, attitudes, and practices (KAP) regarding hospital-acquired infections (HAIs) prevention from January to June 2019. Participants were selected through simple random sampling, and data were collected using structured self-administered questionnaires. Descriptive analysis presented the frequency and percentage of key findings, while the association between independent variables and KAP scores was evaluated using Pearson's Chi-square, with p-values less than 0.05 considered statistically significant. The study included 236 participants, achieving a 100% response rate. It was found that 90% of participants had good knowledge and 57.2% maintained a positive attitude towards HAI prevention. However, only 36% demonstrated good practices in this area, indicating less than satisfactory adherence to infection prevention measures. The analysis revealed that both the level of education and work experience were significantly associated with positive attitudes and practices towards infection prevention (p < 0.005). In conclusion, while respondents exhibited good knowledge and a supportive attitude regarding HAI prevention, this knowledge did not translate into effective practices. The level of education and work experience emerged as independent risk factors influencing attitudes and practices towards HAI prevention.

## **METHODS**

#### Design

This study used a cross-sectional design and a quantitative technique. It took up to comprehend the clinical pressures faced by inexperienced nursing students. We used quantitative content analysis to mine our data for rich, in-depth information. It involves understanding, interpreting, and conceptualizing the main meanings from qualitative data through a methodical coding and categorization process.

#### **Setting and Participants**

This study was conducted before the clinical training begins. In between May and July 24 in the nursing course at the Smt. Nagarathnamma College of nursing, Bangalore, in the India. The study population comprised undergraduate and diploma nursing students and were recruited using convenient sampling technique. The inclusion criteria for this study were 1st-year BSc and GNM nursing students of clinical training who could speak English, were willing to participate in this research, and had no previous clinical work experience. The final sample consisted of 100 students.

#### **Research Instrument**

The instrumentation package included consent form, demographic data and structured knowledge questionnaires and practice questionnaires. The demographic data consisted of Age, gender, educational status, nursing program in the public or private sector, college with a hospital attached, clinical training during study term, and in-service education on hospital acquired infections during the last six months are all included in the sociodemographic component. The development of the structured knowledge questionnaire involved a thorough literature review, expert discussions, and the investigator's own and professional experiences. It has thirty items covering different elements of hospital acquired infections, such as blood stream infections linked to central lines, ventilator-related pneumonia, and urinary tract infections connected with catheters. There are four possibilities on each multiple-choice question; only one of the options is the right answer, and the other three are incorrect. Structured situational practice questionnaire regarding hospital acquired infection. Structured situational practice questionnaire was developed by an extensive review of literature, discussion with the experts and with the investigator's personal and professional experience. It consists of 20 items. The reliability of structured knowledge and structured situational practice tool was assessed by split half test. The reliability of the tool was  $\alpha = 0.71$  and 0.73, respectively.

#### Data Collection

Data collection for the main study was conducted from June 22 to July 10, 2024. Formal permission was obtained from the Principal of Smt. Nagarathnamma College of Nursing in Bangalore. A list of novice nursing students who met the study criteria was

provided by the Nursing in charge of the respective hospital. A total of 100 subjects were selected using a non-probability convenience sampling technique and gathered in their classroom. The student researcher introduced herself, explained the study's purpose, and obtained informed consent from each participant. A questionnaire, divided into two sections-Section A (Structured Knowledge Questionnaire on Hospital-Acquired Infections) and Section B (Structured Situational Practice Questionnaire)—was distributed. Participants were instructed to read and follow the guidelines carefully, with completion approximately 20-30 minutes. Any doubts regarding the tool were clarified, and all subjects returned the questionnaires within the specified timeframe without any issues.

#### **Ethical Considerations**

Ethical approval was granted by the Institutional Review Board (IRB) and ethical committees of the selected universities. Participants were fully informed about the study's purpose and procedures, emphasizing the voluntary nature of their involvement and their right to decline or withdraw from participation at any time without facing any penalties. Anonymity was ensured by coding the questionnaires, and confidentiality was upheld by limiting access to the collected data.

#### **Statistical Analysis**

Data were analysed using IBM SPSS, version 22. Both descriptive and inferential statistical methods were applied to summarize the sample characteristics and assess the scale items.

#### RESULTS

Table 1: Frequency and percentage distribution of subjects with regards to socio demographic variables (age, gender, and educational status) N=100

| Sl no. | Socio demographic variables | Frequency (f) | Percentage (%) |
|--------|-----------------------------|---------------|----------------|
| 1      | Age in completed years      |               |                |
|        | 18 years                    | 17            | 17             |
|        | 19 years                    | 83            | 83             |
| 2      | Gender                      |               |                |
|        | Male                        | 27            | 27             |
|        | Female                      | 73            | 73             |
| 3      | <b>Education Status</b>     |               |                |
|        | Diploma Nursing             | 22            | 22             |
|        | B.Sc. Nursing               | 78            | 78             |

The study sample consists primarily of young adults, with 83% aged 19 years and the remaining 17% aged 18 years. Females dominate the group, representing 73%, while males account for 27%. Regarding

educational status, 78% of participants are pursuing B.Sc. Nursing, while 22% are enrolled in Diploma Nursing programs, highlighting a preference for degree-level education among the participants.

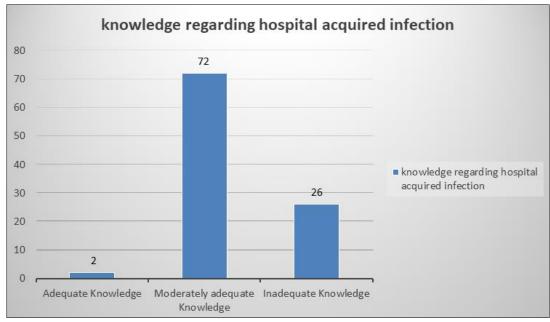


Fig. 1: Levels of knowledge regarding hospital acquired infection

The figure 1 depicts that majority of the subject 72% had moderately adequate knowledge, 26% of the subjects had inadequate knowledge and only 2% of the

subjects had adequate knowledge regarding hospital acquired infection.

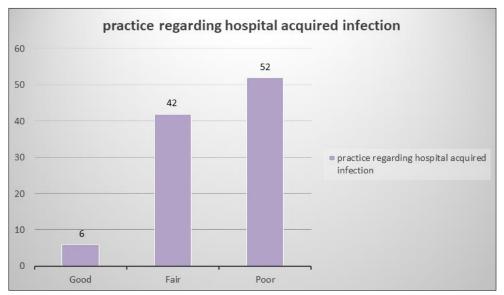


Fig. 2: levels of practice regarding hospital acquired infection

The figure 2 depicts that half of the subjects, 52% had poor practice, 42% of the subjects had fair practice and only 6% of the subjects had good practice regarding hospital acquired infection.

Table 2: Correlation between knowledge and practice regarding hospital acquired infection. n=100

| Variable  | Correlation (r) | p value  |
|-----------|-----------------|----------|
| Knowledge | 0.425**         | 0.000010 |
| Practice  |                 |          |

 $S^* = significant at p \le 0.05$ 

The table 2 depicts that there is a moderate degree of positive correlation (r = 0.425, p = 0.000010) between knowledge and practice regarding hospital acquired infection among novice nursing students.

# **DISCUSSION**

The aim of this study was to assess the level of knowledge and practice of HAI among smt. Nagarathnamma nursing students. It provided valuable insights into the extent and practice of HAI by these students.

The present study findings revealed that majority of the subjects, 72 (72%) had moderately adequate knowledge, 26 (26%) of the subjects had inadequate knowledge and only 2 (2%) of the subjects had adequate knowledge regarding hospital acquired infection. The present study is supported by the study conducted by Sodhi Kanwalpreet *et al.*, in Ludhiana, India, 2013 on knowledge of infection control practices among intensive care nurses in tertiary care hospital and the result showed that (17%) 17 nurses had good knowledge, (60%) 60 nurses had average knowledge,

(18%) 18 nurses had below average knowledge and only (5%) 5 nurses had excellent knowledge. A similar study was conducted by Alrubaiee Gamil *et al.*, in Yemen, 2017 on knowledge and practice of nurses regarding nosocomial infection control measures in private hospitals and the result of the study showed that (87%) nurses had a fair level of knowledge and only (4%) nurses had good level of knowledge. Alrubaiee, G., Baharom, A., Shahar, H.K. *et al.*, (2017).

Shahar, H.K. et al., (2017) study result showed that majority of the subject, 52 (52%) had poor practice, 42 (42%) of the subjects had fair practice and only 6 (6%) of the subjects had good practice regarding hospital acquired infection. In contradiction, the present study result is inconsistent with the result reported by Alrubaiee Gamil et al., in Yemen (2017) on knowledge and practice of nurses regarding nosocomial infection control measures in private hospitals and the result of the study showed that only 3% of them had poor practices, whereas 71% nurses had fair practices and 26% of them had good practices.

Similar study was conducted by Sarani Hamed *et al.*, in Iran (2015) on knowledge, attitude and practice of nurses about standard precaution for hospital acquired infection and the result showed that only (20%) of the nurses had poor practice, (61%) of them had fair practice and only (19%) of them had good practice.

Regarding the relationship between knowledge and practice regarding hospital acquired infection among novice nursing students. The present study showed that there was moderate degree of positive correlation (r = 0.425, p < 0.000010) between knowledge and practice regarding hospital acquired infection among novice

nursing students. The study result was contradicted by a study conducted by Garba lliyasu *et al.*, on knowledge and practice of infection control among health care workers in Nigeria (2015) and the result showed that there was a weak negative correlation between overall knowledge score and overall practice score (r = -0.004, P < 0.001).

The result of the study is not consistent with the results of a Study conducted by Balonchi Abbas  $\it{et al.}$ , in Iran (2015) on knowledge, attitude and practice of nurses about standard precaution for hospital acquired infection and the result showed that there is no statistically significant correlation between knowledge and practice (r= 00.8, p = 0.3). (14)

# **CONCLUSION**

The study highlights significant gaps in novice nursing students' knowledge and practices related to hospital-acquired infections (HAIs). While a majority demonstrated a moderate level of knowledge, practical application was found to be lacking. The correlation between knowledge and practice suggests that improving educational strategies and providing hands-on training could enhance infection control practices. Additionally, socio-demographic factors such as age and clinical experience were identified as influential in shaping both knowledge and practices, indicating the need for tailored training programs.

#### **Impact and Implication**

This research highlights critical gaps in novice nursing students' knowledge and practice regarding hospital-acquired infections (HAIs), stressing the need for improved educational interventions. It offers valuable insights for nursing educators, curriculum developers, and hospital administrators to strengthen infection control training and policies. The study's findings can guide the development of more practical, hands-on training programs to reduce HAIs. Additionally, the positive correlation between knowledge and practice suggests enhancing theoretical knowledge can improve practical skills. The impact of demographic factors like age and gender indicates the need for tailored infection control training. By addressing these gaps, healthcare institutions can enhance patient safety and improve care quality.

#### **Research Questions**

- 1. What is the level of knowledge regarding hospital-acquired infections (HAIs) among novice nursing students?
- 2. What is the level of practice related to infection control measures among novice nursing students?
- 3. Is there a relationship between knowledge and practice of infection control among novice nursing students?

#### **Hypotheses**

H1: There is a significant relationship between knowledge and practice regarding hospital-acquired infections among novice nursing students.

#### **Study Aims**

- 1. To assess the level of knowledge regarding hospital-acquired infections among novice nursing students.
- 2. To evaluate the practice of infection control measures among novice nursing students.
- 3. To identify the relationship between knowledge and practice of hospital-acquired infection control among novice nursing students.

#### **Implications**

The findings emphasize the necessity for nursing education programs to address the theory-practice gap by integrating more comprehensive training on infection control measures. Healthcare institutions should also implement regular training sessions and provide resources to ensure that novice nurses are equipped with the necessary skills to prevent HAIs effectively. Continuous evaluation and support can lead to improved adherence to infection prevention practices, ultimately enhancing patient safety and care quality.

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#### **Abbreviations:**

SPSS: Statistical Package for the Social Sciences

HAIs: Hospital acquired infections WHO: World Health Organization

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