

## RESEARCH ARTICLE

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# Knowledge and Perceived Competence of Undergraduate Nursing Students on Patient Safety Among Selected Nursing Colleges, Bengaluru

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## Abstract

**Objective:** To appraise the knowledge of undergraduate nursing students regarding patient safety and to compare their perceived competence on patient safety in clinicals and classroom settings. **Methods:** The study adopted a non-experimental descriptive research design to attain the objectives of the study. The study was conducted in two nursing colleges located in Bengaluru. Purposive sampling technique was utilized to select a sample of 369 undergraduate nursing students. Knowledge of undergraduate nursing students regarding patient safety was assessed using a structured Knowledge questionnaire, which was prepared and validated by subject experts from the institution. Health Professionals Education in Patient Safety Survey (H-PEPSS) was used to compare the perceived competence of students in classroom and clinical settings about patient safety. **Findings:** The students were in the age group of 18-31 years with a mean age of  $21.00 \pm 1.73$ . Majority of them were females (65.3%) and undergoing BSc Nursing course (68.8%). The mean knowledge score of nursing students on patient safety was  $9.16 \pm 3.37$  and 69.1% of the subjects had adequate knowledge on patient safety. The students expressed a significantly higher ( $t_{367}=1.54, p=.001$ ) perceived competence on patient safety in theory ( $83.48\% \pm 16.21$ ) compared to clinical settings ( $81.36 \pm 20.85$ ). The study also noted a significant positive correlation between knowledge on patient safety and perceived competence of students on patient safety in theory ( $r=0.55, p=.01$ ) and clinical setting ( $r=0.048, p=.02$ ). **Novelty:** The study revealed that while undergraduate nursing students possess a fundamental understanding of patient safety concepts, there are certain areas where their knowledge can be further improved. The study emphasizes the need for experiential learning opportunities, such as clinical simulations and hands-on training, to enhance their self-efficacy and translate theoretical knowledge into practical skills.

**Keywords:** Patient safety; Knowledge; Perceived competency; Undergraduate nursing students; Selfefficacy; Healthcare safety

## 1 Introduction

The evolving role of nursing is becoming more multifaceted and taking on additional responsibilities within the healthcare system. In addition to their traditional care giving role, nurses are now involved in various aspects of patient management, healthcare coordination, and even leadership positions. Their dedication, compassion, and expertise make them an indispensable part of the healthcare industry and vital contributors to patient well-being<sup>(1)</sup>. Healthcare systems have become more intricate due to advancements in medical knowledge, technology, and treatments. Specialised fields and subspecialties have emerged, requiring healthcare professionals to possess in-depth expertise in specific areas<sup>(2)</sup>. The challenge of unsafe healthcare has been acknowledged globally. While healthcare systems strive to provide safe and high-quality care, medical errors can still occur. Understanding the causes, consequences, and potential solutions to these incidents is essential for ongoing improvement. Nursing professionals are at the forefront of providing safer and higher quality care within the changing healthcare systems<sup>(3)</sup>. Through collaborative efforts, research, incident reporting systems, implementation of evidence-based interventions, and a focus on patient engagement, healthcare systems aim to minimise harm, enhance patient safety, and continuously improve the quality of nursing care provided<sup>(4)</sup>. Hospitals and healthcare organizations have made significant efforts to prioritise patient safety and implement measures to prevent injuries, errors, infections, and accidents. The issue of patient safety has gained increasing attention among medical professionals, leading to the establishment of the first World Patient Safety Day in September 2019<sup>(5)</sup>.

While precise data on medical errors in India is not readily available, it is estimated that a significant number of injuries and deaths occur due to these errors. A study conducted in a tertiary care hospital in India reported a prevalence of medication error of 334.1/1000 patient observation days. One in every three patients in ICU had an exposure to error and administration error was experienced by one in every ten patients. The study also noted a reduction in medication error after a sensitization program for doctors and nurses<sup>(6)</sup>. This finding underscores that preventable adverse events arise from the insufficient competence of healthcare professionals in ensuring patient safety. These events often occur due to inadequate skills or knowledge among nurses and other healthcare providers. In order to minimise avoidable harm in hospitals, it is essential to possess individual competence and foster a culture centered around patient safety. Each responsibility within the healthcare setting necessitates a unique combination of expertise, aptitude, understanding, and even mindset to carry out tasks with optimal effectiveness and efficiency. When delivering healthcare services, nurses must possess a self-assured demeanor when it comes to ensuring patient safety<sup>(7)</sup>. Delivery of quality and safe patient care is dependent on the knowledge, competence and practice of healthcare providers on patient safety. The knowledge and duration of clinical exposure of nursing students were found to be the factors influencing patient safety practices. It is recommended that education programs for healthcare professionals incorporate essential patient safety content and language to enhance their abilities in safeguarding patients<sup>(8)</sup>. Promoting patient safety within healthcare organisations can be achieved through collaborative teamwork, effective communication, and a comprehensive set of measures aimed at preventing errors.

Comprehensive education and training in patient safety are indispensable components of all levels of healthcare training, especially during the formative years when students are laying the groundwork for their clinical practice. It is imperative for students to acquire a solid understanding of patient safety principles and concepts, and equally important for them to develop the skills to apply this knowledge at the patient's bedside. As aspiring nurses and future leaders in healthcare, nursing students must possess awareness of the numerous factors that impact healthcare outcomes and proactively work towards minimizing the potential for errors.

The knowledge and competencies that nursing students acquire throughout their undergraduate studies play a vital role in ensuring patient safety. Integration of patient safety curricula in nursing education is essential for health professional environment and care settings. Safe nursing practice require an integration of advancing knowledge and active student engagement in clinical setting which will stimulate critical reasoning skills and enhances communication skills<sup>(9)</sup>. In order to meet the demands for curricular reform, nursing education must be adaptable and proactive in developing inventive approaches that effectively prepare graduates to deliver care with a strong emphasis on safety. By staying ahead of the curve and embracing change, nursing education can assure that students are prepared well enough to render secure and high-quality care in today's complicated healthcare setting<sup>(10)</sup>. Studies have reported the existence of a gap between the competence of nursing students in theoretical and clinical setting<sup>(11,12)</sup>. The data regarding competence of nursing students on patient safety in India is limited and hence, the present study was an attempt to appraise the knowledge regarding patient safety and to compare the perceived competence attained in theoretical learning and clinical experiences among undergraduate nursing students. By exploring these factors, valuable insights can be gained regarding the effectiveness of current educational approaches and potential areas for improvement, ultimately enhancing the preparedness of future nurses in delivering safe care.

## 2 Methodology

### 2.1 Study design and sample

A non-experimental descriptive research design was employed to appraise the knowledge and to compare the perceived competence of students on patient safety in theoretical learning and clinical setting. The study was carried out in two nursing colleges located in Bengaluru. A sample of 369 undergraduate nursing students were selected by using purposive sampling. The study included students undergoing GNM and BSc Nursing courses of selected colleges and willing to participate and excluded students of first year GNM and BSc Nursing and who were not available at the time of data collection. The study proposal was approved by the Institutional Ethical Committee. The data was collected in the respective classrooms of the students, and they were given an overview of the study's intent and informed written consent was acquired. The survey was completed within one week.

### 2.2 Data Collection

Demographic proforma to obtain demographic information regarding the students and included questions on age, gender, course and year of study and duration of clinical exposure.

Structured knowledge questionnaire to appraise the knowledge of the undergraduate nursing students on rendering safe care. The questionnaire was prepared by the researchers and was validated by the subject experts in the field of Nursing. Reliability of the tool was established by split half method ( $r=0.85$ ). The tool consisted of 15 variables with the maximum score of 15 and measured the students' knowledge on prevention of nosocomial infection, prevention of falls and medication error, promoting teamwork and communicating effectively.

Health Professionals Education in Patient Safety Survey (H-PEPSS) to compare the confidence of students in theoretical learning and clinical settings about patient safety. This questionnaire aims to gather viewpoints from health profession students regarding how patient safety is approached in their health care education and compares the competence of the students in theoretical and clinical learning. The survey consists of the following 3 sections

**Section 1:** Consisted of 27 variables on acquiring knowledge about specific areas of patient safety and included variables on clinical safety, culture of patient safety, engaging in teamwork with other health care professional, effective communication, handling safety risk, comprehending environmental and human factors and recognizing, reacting and revealing unfavourable incidents and near misses.

**Section 2:** Consisted of 7 variables related to how the broader aspects of patient safety are tackled within the realm of education for health care professionals.

**Section 3:** Consisted of 3 variables related to feeling at ease when voicing concerns related to patient safety<sup>(13)</sup>.

### 2.3 Data analysis

SPSS 26 software was utilized for both descriptive and inferential statistical analyses. Significance was determined at a p-value, lesser than 0.05. The study utilized descriptive statistics to describe the knowledge of nursing students, and in each domain, mean score was computed by averaging the scores of all variables. Paired t-test was computed to identify significant differences between the scores in theoretical and clinical setting. Regarding the second and third sections of H-PEPSS, the report included the proportion of student based on their agreement to the statements. Additionally, the study computed the Karl Pearson correlation coefficient to determine the relationship between knowledge and perceived competence among undergraduate nursing students in the context of patient safety.

## 3 Results

### 3.1 Characteristics of participants

The participants were in the age range of 18-31 years with the mean age of  $21.00 \pm 1.73$  and majority of them were females (65.3%). A greater proportion of the students were pursuing BSc Nursing (68.8%), were in 4th year (43.6%) and 39% of students were having clinical exposure of more than three years.

### 3.2 Knowledge of nursing students on patient safety

The average knowledge score of nursing students on patient safety was ( $9.16 \pm 3.37$ ); 69.1% of participants had adequate and 30.9% of participants had inadequate knowledge on patient safety. (Table 1)

**Table 1. The distribution of the sample based on their level of knowledge regarding patient safety as a percentage (n =369)**

Sr. No.	Level of knowledge	Frequency	%
1	Adequate	255	69.1
2	Inadequate	114	30.9

### 3.3 Perceived competence of nursing students on patient safety

The students reported a higher perceived competence on patient safety in theory ( $83.48\% \pm 16.21$ ) compared to clinical settings ( $81.36 \pm 20.85$ ). Paired t test was computed to contrast the average score of undergraduate nursing students in theoretical learning and clinicals and revealed a significant difference between perceived competence on patient safety in classroom setting and clinicals. (Table 2)

**Table 2. Comparison between perceived competence on patient safety in theoretical learning and clinical field among undergraduate nursing students on patient safety (n=369)**

Sr. No.	Variables	Mean	SD	Standard error	t value	p value
1	Perceived competency in theory	83.48	16.21	1.37	1.54	0.001
2	Perceived competency in clinical	81.36	20.85			

The competence of undergraduate nursing students regarding patient safety, when assessed in both theoretical learning and clinical settings, showed that students generally reported higher levels of competence in all domains of H-PEPSS in theoretical learning, except in the domain of collaborating with other professionals in a team. In theory, the students felt an increased competence in identifying, reacting and disclosing adverse events ( $3.37 \pm 0.71$ ), followed by clinical safety ( $3.33 \pm 0.61$ ) and reported a lesser competence in handling risks associated with safety of the patient ( $3.01 \pm 0.58$ ) and “communicating effectively” ( $3.03 \pm 0.62$ ). In clinical setting the students expressed a higher competence in the domains of clinical safety ( $3.2 \pm 0.59$ ) and collaborating with other professional as a team ( $3.15 \pm 0.58$ ). The students felt least competence identifying, reacting and disclosing adverse events ( $2.53 \pm 0.69$ ) Table 3.

**Table 3. Domain wise comparison of perceived competence of nursing students regarding patient safety in classroom and clinical setting (n =369)**

Sr. No.	Domains	H-PEPSS in classroom (Mean $\pm$ SD)	H-PEPSS in clinical (Mean $\pm$ SD)	t -value	p-value
1	Healthcare safety	$3.33 \pm 0.61$	$3.2 \pm 0.59$	4.58	0.001
2	Safety culture	$3.16 \pm 0.68$	$3.11 \pm 0.61$	0.96	0.334
3	Collaborating with fellow professionals in a team	$3.06 \pm 0.71$	$3.15 \pm 0.58$	4.54	0.001
4	Efficient communication	$3.03 \pm 0.62$	$2.96 \pm 0.63$	1.99	0.047
5	Addressing safety concerns	$3.01 \pm 0.58$	$2.89 \pm 0.59$	7.71	0.001
6	Analyzing human and environmental dynamics	$3.1 \pm 0.61$	$2.91 \pm 0.58$	2.65	0.008
7	Recognize, respond and disclose adverse events	$3.37 \pm 0.71$	$2.92 \pm 0.69$	1.92	0.001

#### 3.3.1 Competency in wider dimensions of patient safety and the ability to confidently voice concerns regarding patient safety

Nursing students expressed lower confidence in the way their education addresses patient safety on a broader scale and their comfort in voicing for patient safety, as compared to their competence in specific patient safety topics both in theoretical learning and clinical practice. Only a small proportion of the students agreed that the program adequately covers the “system aspect” of patient safety (16.2%), with discussions about adverse events focuses primarily on issues related to the system rather than blaming the individual (24.3%). Furthermore, a minority of students felt that patient safety is well incorporated into the curriculum (24.9%) and that safety issues are consistently addressed in the clinical environment by the preceptors (28.1%) (Table 4).

**Table 4. Distribution of how often nursing students agree with statements related to the broader dimensions of patient safety and their confidence in voicing concerns regarding patient safety (n =369)**

Statements	Mean ± SD	Agree		Neutral		Disagree	
		f	%	f	%	f	%
Had a highly defined grasp of which actions were regarded as "safe" for me in the clinical environment	2.9 ± 1.21	108	29.2	72	19.5	189	51.3
Different preceptors in the clinical environment addressed patient safety concerns consistently	2.9 ± 1.19	104	28.1	88	23.8	177	48.1
Had plenty of chances to acquire knowledge and work together with members of interdisciplinary teams	2.9 ± 1.23	109	29.5	80	22	180	48.4
Gained a robust understanding that reporting adverse events and near misses can instigate change and decrease the likelihood of their recurrence	3.0 ± 1.21	115	31.1	95	25.6	159	43.3
Program was effectively integrated with a focus on patient safety	2.8 ± 1.18	92	24.9	93	25.2	184	49.9
Program provided comprehensive coverage of clinical aspects related to patient safety	2.9 ± 1.23	105	28.4	84	22.8	180	48.8
Program thoroughly covered the "system" aspects of patient safety	2.9 ± 0.07	60	16.2	70	18.9	239	64.9
Conversations regarding adverse events predominantly focus on system-related issues instead of assigning blame to individuals	2.7 ± 1.20	90	24.3	83	22.5	195	52.9
Individuals fear negative consequences for reporting safety problem	2.9 ± 1.20	95	25.7	108	29.3	166	45
Feel comfortable approaching if, I observe someone engaging in unsafe care practices	2.8 ± 1.23	101	27.3	90	24.5	178	48.2

### 3.4 Correlation between knowledge on patient safety and perceived competence among undergraduate nursing students on patient safety

Karl Pearson correlation coefficient was computed to identify the correlation between knowledge and perceived competence on patient safety and revealed a significant positive correlation between knowledge on patient safety and perceived competence of students on patient safety in theory (r=0.55, p=.01) and clinical setting (r=0.048, p=.02) (Table 5). Chi square test revealed a significant association between knowledge of undergraduate nursing students on patient safety with gender (p=.01) and receipt of information (p=.02).

**Table 5. Correlation between knowledge on patient safety and perceived competence among undergraduate nursing students on patient safety (n=369)**

Sr. No.	Variables	r	P value
1	Understanding of patient safety and the perceived competence in theoretical aspects	0.055	0.01
2	Understanding of patient safety and perceived competence in clinical practice	0.048	0.02

## 4 Discussion

Patient safety is a top concern in healthcare institution and the present study attempted to appraise the knowledge and perceived competence of nursing students on patient safety. The mean age of undergraduate nursing students was (21.00± 1.73) and majority were females. Similar findings were reported by a study conducted in Greece and Cyprus in which the majority were

females<sup>(14)</sup>. The mean knowledge score of nursing students on patient safety was  $(9.16 \pm 3.37)$ ; 69.1% of participants had adequate and 30.9% of participants had inadequate knowledge on patient safety. Contrasting results were reported by a study conducted in Ethiopia in which only 43.2% of the participants had good knowledge on patient safety. The study also reported that only 19.9% of the participants had good patient safety practices. Duration of clinical exposure, year of study and knowledge on patient safety were linked with good patient safety practices<sup>(8)</sup>. Another study conducted among nurses in Ethiopia also reported that only 48.4% of the participants had good knowledge on patient safety and 56.1% had favourable attitude towards patient safety. Information obtained during continuing education was found to be associated with good knowledge on patient safety<sup>(15)</sup>. Strengthening patient safety education in undergraduate nursing curriculum and implementation of regular Inservice education is important to improve patient safety practices among nurses.

In the present study undergraduate nursing students had a significantly higher mean scores on perceived competence regarding patient safety in theoretical learning compared to clinical setting ( $t=1.54$ ,  $p=.001$ ). These findings are corroborated by findings of a study conducted in Kerala which reported that the students' knowledge about patient safety expressed was significantly lower ( $p < 0.001$ ) in the clinical setting compared to theoretical learning<sup>(12)</sup>. Similar findings were reported by a study conducted among Italian nursing students in which the students had major confidence in patient centered care skills, but they perceived that they were not prepared to apply these skills in to real life situation. These findings indicate that the students felt a greater competence in addressing patient safety concerns in the classroom compared to clinical environment and this emphasizes the need for revamping the clinical training of nursing students. Most of the times, in the clinical environment, the nursing students are trained by clinical nurses rather than by nurse preceptors or nursing faculty and the setting may be too busy for the clinical nurses to train the students adequately<sup>(16)</sup>.

Further the students expressed a higher competence to the specific areas of patient safety in theoretical learning compared to that in clinical environment. The students had a mean score of greater than 3 out of 5 in all the domains of patient safety in theoretical learning and in clinical environment, the students expressed a lesser competence in the domains like "communicating effectively" ( $2.96 \pm 0.63$ ), "handling safety risks" ( $2.89 \pm 0.59$ ), "comprehending environmental and human factors" ( $2.91 \pm 0.58$ ), and "recognize, respond and disclose adverse events" ( $2.92 \pm 0.69$ ). Ineffective communication can be an important cause of medical error and be a threat for patient safety. Hence, the health professional education should focus more on enhancing the competence of nursing students to interact with all the members of health care team. The present study observed a greater difference in the competence of students in identifying, reacting and disclosing adverse events between theory and clinical setting. Similar findings are reported by a study conducted in Michigan and this could be due to the hierarchical nature of health care system where nursing students feel themselves at a lower level of hierarchy and this hierarchical structure could result in disregarding or not taking their concerns seriously when voiced and also the nursing students should possess a higher level of intuition and self-confidence for this; which may not be developed during their student life<sup>(17)</sup>. This gap can be closed by an effective partnership between nursing instructors and clinical nurses to facilitate teaching to identify and address the safety concerns of their clients.

In the current study, a greater proportion of nursing students expressed disagreement to the approach, how broader aspect of patient safety is tackled in education for health care practitioners and feeling comfortable in voicing concerns regarding patient safety. A greater disagreement was expressed on variables like "Educational program thoroughly covered the system aspect of patient safety" (64.9%), "the discussions on adverse events primarily focusing on issues related to the system rather than assigning blame to individual (52.9%)," and "had a clear understanding of what actions were considered safe for me in the practice" (51.3%). These findings were contradictory to the findings reported by a study carried out in China in which the proportion of nursing students disagreed was lesser<sup>(18)</sup>, and this variation could be attributed to the characteristics of the students as the current study had a mix of second, third and final year students. Also, clinical learning is influenced by cultural and contextual variation, personal characteristics of learner and mentors, nature of healthcare setting. In the present study a significant association was noted among gender and receipt of information with the perceived competency of nursing students on patient safety. This finding is supported by a study finding where the students who participated in patient safety training had a higher competency score and also scores for broader aspects of patient safety was higher in female students<sup>(11)</sup>.

The findings suggest the need for effective educational interventions and a strong patient safety curriculum for undergraduate nursing students. Also, it is important that the nurse educators should adopt a role modelling behaviour to lead and motivate students to express their voice regarding patient safety<sup>(19)</sup>. Sound clinical judgement skills are vital for nurses to provide safe patient care<sup>(20)</sup>. Hence, innovative teaching strategies which support critical thinking, reasoning to be used by the nurse educators.

The current study acknowledges the following limitations that the use of non-probability sampling technique in selecting the students could have resulted in some selection bias and the study measured the self-reported competence of nursing students on patient safety and no objective measure was used. It is recommended that the study can be replicated in a larger setting

to explore the factors associated with the competence of nursing students regarding patient safety and to identify strategies to strengthen patient safety education in undergraduate nursing curriculum.

## 5 Conclusion

This study sheds light on the knowledge and perceived competency of undergraduate nursing students of two colleges of Bengaluru regarding patient safety. The study found that a greater proportion of participants had adequate knowledge on patient safety and a significant variation in competency between classroom and clinical setting. This finding indicates the existence of a lacunae between theoretical and clinical learning in nursing education which require further attention by policy-makers and nurse educators. The study emphasizes the need for experiential learning opportunities, such as clinical simulations and hands-on training, to enhance their self-efficacy and translate theoretical knowledge into practical skills. Strengthening the education and training programs for health care professionals and enhancing the competency is vital to ensure safer healthcare practices and ultimately leading to enhanced patient outcomes.

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