

Patients' Safety Awareness and attitude among Secondary Technical Nursing Schools Students'

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Abstract: Background: Patient safety is one of the most crucial aspects of high-quality healthcare and ensure positive patient outcomes. Nursing students contribute to safety care and are seen as an essential and vital part of the healthcare system. **Purpose:** This study was conducted to assess secondary technical nursing school students' awareness and attitude toward patients' safety. **Design:** A descriptive correlation research design was utilized. **Setting:** The study was conducted at four secondary technical nursing schools randomly chosen out of thirteen schools at Menoufia Governorate, Egypt. **Sample:** A convenience sample of 440 secondary technical nursing students aged 16-20 years, from first to fifth grade. **Instruments:** three instruments were used (Demographic characteristics, structured self-administered awareness questionnaire of nursing students about patient safety and nursing students attitude scale about patient safety. **Results:** The main finding revealed that, 64.3% of the studied nursing students had unsatisfactory awareness, whereas 35.7% had satisfactory awareness about patient safety. Additionally, 81.6% of the participated nursing students had a negative attitude toward patient safety. **Conclusion:** The majority of nursing students had a negative attitude and inadequate awareness regarding patient safety. **Recommendations:** patient safety orientation training programs should be implemented for technical nursing students to improve their awareness and attitudes regarding patient safety prior graduation.

Keywords: Attitude, Awareness, Nursing students, Patient safety.

Introduction: -

Patient safety (PS) is one of the healthcare organizations' concerns, which involves minimizing and preventing medical errors that frequently have detrimental effects on

health. In addition to becoming more efficient, health care has also become more complex due to the increased use of new technologies and therapies. In order to improve PS, simulate

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international competition, and boost the competitive advantages of healthcare organizations at both the national and international levels, these policies must be adopted (Al-Worafi, 2023).

The World Health Organization (WHO) has reported that PS is a major public health issue and defined it as 'protecting patients from healthcare-related errors and undesirable situations. It is the absence of preventable harm to a patient during the process of health care and reduction of risk of unnecessary harm associated with health care to an acceptable minimum by health care professionals' (WHO, 2020). Unsafe patient care is one of the leading causes of death and disability worldwide. The percentage of patients subject to adverse events while receiving healthcare services is 10% in high income countries and may reach up to 25% in low- or middle-income countries (Kakemam et al., 2024).

According to WHO, millions of patients suffer injuries or die every year because of unsafe and poor-quality health care, worldwide many medical practices and risks associated with health care are emerging as major challenges for PS and contribute significantly to the burden of harm due to unsafe care. Some of the PS's situations causing most concern: medication errors, health care-associated infections, unsafe surgical care procedures, unsafe injections practices, diagnostic errors, unsafe transfusion practices, radiation errors, sepsis and venous thromboembolism (WHO, 2023).

Patient harm in health care due to unsafe conditions is widespread and problematic, and it can occur in any location and at any level of health care provision. There are numerous interrelated factors that can cause patient harm, and more than one factor is usually involved in any single patient safety incident, including system and organizational factors, technological factors, human factors and behaviors, patient-related factors, and external factors (Averill et al., 2023).

In developing countries, the potential of adverse events is far above that in developed states. For example, in the Eastern Mediterranean Region, the annual numbers of adverse events around 4.4 million, and 18% of inpatient admissions were associated with adverse events, with an associated high rate of death and lifelong disability (Ayyad et al., 2024). It is essential to highlight that the causes of nursing adverse events can be multifactorial and complex, and preventing these errors requires continuous efforts from the healthcare team and health facilities. Some of these causes include lack of technical knowledge or insufficient clinical skills, understaffing and workload burden, inadequate communication among healthcare team members, lack of proper training or guidance, distraction or fatigue, lack of process and procedure standardization, inadequate or poorly organized work environment, lack of appropriate equipment or materials, time or environmental pressures, and healthcare system failures, such as

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medication or equipment problems (Aydoğdu et al., 2024).

Nurses are the front lines of safety and quality health care delivery and the health care professionals who are with the patient almost 24 hours a day. Their role is critical in nearly all aspects of patient assessment safety and care. Nurses are required to understand and develop the skills needed to improve health care processes and to take that as a professional responsibility (Mostafa, 2022).

Nurses' knowledge is essential for implementing PS measures. Implementing a patient safety culture by a knowledgeable nurse can lead to long-term safety behaviors for patients. Nurses must possess the necessary knowledge, skills, and attitudes to deal with the complexities of healthcare. Lack of information prevents health care personnel, particularly nurses, from implementing and maintaining patient safety culture effectively (Ayyad et al., 2024).

Understanding and developing PS is essential for nursing students since it promotes patients' recovery, prevents adverse events, and has been a global goal for educational and medical institutions. Furthermore, maintaining PS strengthens healthcare facilities' credibility and reputation in as well as improving healthcare outcomes. Nursing schools and colleges can generate qualified nurses that support the growth and advancement of the healthcare sector by emphasizing patient safety (Khider et al., 2024). Undergraduate nursing education is an important starting point in advancing patient safety in the domains of

knowledge, attitude, and skills in preparing future nurses (Rocque et al., 2023).

Significance Of the Study

Globally, patient harm attributed to unsafe healthcare delivery is one of the major contributors for the global burden of disease ranking fourteen. In lower- and middle-income countries unsafe healthcare delivery alone is responsible for 134 million adverse events reported annually and 2.6 million deaths (Afework et al., 2023).

Nurses have a critical role in preventing unwanted events and therefore ensuring and maintaining PS. Since nurses compared to other healthcare professionals provide health care to patients for a long period of time within complex processes, they have the opportunity to identify the risk factors and conditions as well as taking an effective part in reducing errors. Therefore, nursing students are required to graduate with adequate knowledge, skills and attitude toward PS (Yılmaz et al., 2024). Thus, the purpose of the study was to assess patient's safety awareness and attitude among secondary technical nursing school students'.

Purpose

To assess secondary technical nursing school students' awareness and attitude toward patients' safety.

Research Questions

- 1) What's the awareness level of nursing students toward patient safety?

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- 2) What's the attitude of nursing students toward patient safety?
- 3) Is there a relation between nursing students' awareness and their attitude regarding patient safety?

Methods

Research design:

A descriptive correlation research design was utilized to assess patient safety awareness and attitude among secondary technical nursing students.

Settings:

The study was conducted at four secondary technical nursing schools randomly chosen out of thirteen schools at Menoufia Governorate, Egypt. The four Secondary technical nursing schools are Shebin Elkom, Berket Elsabaa, Menouf and El Sadat school.

Sampling:

A convenience sample of 440 secondary technical nursing students from the previously described settings out of 1650 students were included. According to inclusion criteria: aged 16-20 years, from first to fifth grade, both sexes, and who agreed to participate in the study.

Sample size calculation:

Since the actual level of awareness towards patient's safety among students at secondary technical nursing school is unknown, the probability of its occurrence was estimated to be equal to that of its nonoccurrence ($p = q = 0.5$) and a value of 0.05 chosen as the acceptable limit of precision (D). The total number of students to be selected is estimated using the following

equation: $n = (z^2 \times p \times q) / D^2$. Based on this assumption, the sample size was estimated to be 397 participants. Accounting for 10% drop-out, the sample size is estimated to be 440 participants.

Instruments:

The following two instruments were used: -

Instrument one: A structured self-administered questionnaire:

It was developed by the researcher based on reviewing of the related literatures (Oyediran et al., 2021, Biresaw et al., 2020, Biswas et al., 2023) and revised by supervisors. It included:

- a) Characteristics of technical nursing students: such as age, sex, grade level, previous training as well as previous information about patient safety during education.
- b) Sources of information about patient safety involved various choices as TV, social media, friends, course, health care providers and the reply of each choice Yes or No.

Instrument two: Nursing students' awareness questionnaire about patient safety:

It was adopted from WHO's medical school curriculum guide for patient safety education (Patey et al., 2011) and modified by researchers to assess nursing students' awareness about patient safety. It was included 37 questions about patient safety concepts, common causes of harm, factors affecting patient safety, error reporting, and error prevention measures.

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Scoring system

Each question was scored one point for right responses (Yes) and zero point for wrong responses (No). Maximum score was (37). If nursing students received $\geq 80\%$, there awareness was satisfactory. If they received $< 80\%$, there awareness was unsatisfactory.

The Reliability of the instrument was estimated by using 10% of participants by test-retest method with two weeks apart between them and correlation coefficient (Cronbach's alpha) was calculated between two scores. Correlation coefficient was 0.83 that indicate that the tool is reliable.

Instrument three: Patient safety attitude scale:

It was adopted from Madigosky et al., (2006) to assess nursing students' attitude regarding patient safety. It contains of nine items, self-report tool with five of them were positive items as well as four negative items.

Scoring system

To obtain an overall score on the scale the point value for each answered questions was summed then converted to percentage value. The range of scores varies from 9 to 45. The higher the total score, the more positive students' attitude. It was categorized into: positive attitude ($\geq 75\%$), and Negative attitude ($< 75\%$).

Reliability of the instrument, the correlation coefficient was 0.84 that indicate that the tool is reliable.

Validity:

The validity of the instruments was assessed and tested for its face validity

by five panels of specialists (professor) in the field of family and community health nursing and community medicine. The relevancy, clarity, and simplicity of each item in the questionnaire is valuable and supportive so, the needed modification required were done.

Ethical consideration:

An approval of the study was obtained from Ethical and scientific research committee at Faculty of nursing, Menoufia university to carry out the current study. Informed written consent was obtained from the participants for their willingness to fill the questionnaires and included in the study.

Pilot study:

A pilot study was carried out on 10% (44) of total sample to test the applicability and clarity of the questions of the study instruments, estimate the time needed to complete the instruments, and to add or omit questions. According to the result of pilot study, some questions were added, restated and others were omitted and the time to answer the tools was estimated as 20 to 30 minutes. The pilot sample was not involved in the current research.

Procedure:

- The study duration was four months, which extended from February 2024 to the end of May 2024.
- An official letter included the purpose of the study was taken from the faculty of nursing Menoufia university to the directors of selected technical nursing school requesting

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their cooperation and permission to conduct the study.

- The data collection was planned according to time available for nursing students' to be two days per week.
- An extensive literature was made which included electronic dissertations, available books, articles and periodicals to formulate a knowledge base relevant to the study area.
- At the beginning of data collection from the students', the researcher introduces herself. The aim of the study was explained to each student included in the study to gain their cooperation with promise of close confidentiality of data.
- Data collection was performed in selected class room to confirm privacy, comfort of the students and free reporting information. The room is located in second floor and had enough seats for students and researcher.
- The interview was carried out by the researcher during school day 2 days per week from 11:00 AM to 1:00 PM. About 12-15 students per day. Approximately 24-30 students per week
- A structured self-administrated questionnaire was distributed to the studied nursing students who were present at the time of interview to assess their awareness and attitude about patient safety. The researcher supervised the completion of the questionnaire during data collection. This was done by explaining to selected students why this was being

done and given instructions on how to complete questionnaire.

- The time that taken to fill the questioner ranged from 20-30 minutes.

Statistical analysis:

The data collected were tabulated & analyzed by SPSS (statistical package for the social science software) statistical package version 26 on IBM compatible computer. Two types of statistics were conducted: Descriptive statistics: were expressed as number and percentage (No. & %) for qualitative data or mean and standard deviation ($X \pm SD$) for quantitative data and Analytic statistics: a logistic regression was performed to ascertain the predictors of un satisfactory awerness, and poor attitude about patient's safety among Nursing student's and Pearson Chi-squared test (χ^2) was used to study association between two qualitative variables, and Pearson correlation coefficient (r) used to describe the strength and direction of the linear relationship between two quantitative variables.

- P-value < 0.05 was considered to be statistically significant.
- $P \geq 0.05$ indicates no significance

Results

Table 1 shows that the mean age of the participated technical nursing students is 17.81 ± 1.32 years. The percentage of male students is approximately equal to the female students. The distribution of the students through the grades 1st, 2nd, 3rd, 4th, and 5th are 22.3%, 20.2%, 18.9%, 19.1% and 19.5% respectively. Also, 69.5% of the students' have not a previous training

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course on patient safety while 95.5% have information about patient safety during education.

Figure 1 shows that 64.3% of the studied technical nursing students' have unsatisfactory awareness about patient safety, while 35.7% have satisfactory awareness. This result answers the first research question, "What is the technical nursing students' awareness level about patient safety?".

Figure 2 shows that physicians, nurses, and other health care practitioners are the most common sources of knowledge concerning patient safety (93.9%), followed by social media and the internet (19.8%) then courses and seminars (11.4%) while family, friends, and neighbors (5.2%) as well as TV and radio (3.4%) are the least common.

Table 2 shows that 67.9% of technical nursing students agree or strongly agree that mistakes are common and that there is a gap between the highest standard of care and routine practice. Furthermore, 87.7% of the technical nursing students agreed that I should fix the mistake as soon as possible.

Figure 3: demonstrates that 81.6% of the technical nursing students' that enrolled have a negative attitude regarding patient safety, whereas 18.4% have a positive attitude. This result answers the second research question, "What is the technical nursing students' attitude level about patient safety?".

Table 3: shows that the students with higher age and higher grades have significant more satisfactory awareness

than their colleges with lower age and lower grades ($P < 0.001$) in both. Also, students' who have previous training course on patient safety have more satisfactory awareness than their colleges ($P < 0.001$). However, there's no statistically significant difference between male and female students' regarding patient safety awareness level. This result answers the third research question, "Is there a relation between nursing students' awareness regarding patient safety and their demographic characteristics?".

Table 4: shows that the students with older age, higher grades especially 3rd and 4th grades and female students' have more positive attitude than their colleges with lower age, lower grades and male students ($P = 0.021, 0.033, 0.012$) respectively. Also, students who have information about patient safety during education have a significant more positive attitude than their colleges ($P = 0.030$). This result answers the fourth research question, "Is there a relation between nursing students' attitude regarding patient safety and their demographic characteristics?".

Table 5: indicates that there is no statistical significant correlation between technical nursing students' total awareness score and their total attitude score about patient safety. This result answers the fifth research question, "Is there a relation between nursing students' awareness regarding patient safety and their attitude regarding patient safety?".

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Table (1): Characteristics of Studied Technical Nursing students' (n=440)

Demographic Characteristics		No.	%
Age (years)	16-	186	42.3
	18-20	254	57.7
Mean $\pm$ SD		17.81 $\pm$ 1.32	
Sex	Male	221	50.2
	Female	219	49.8
Grade level	1 st	98	22.3
	2 nd	89	20.2
	3 rd	83	18.9
	4 th	84	19.1
	5 th	86	19.5
Previous training course on patient safety	Yes	134	30.5
	No	306	69.5
Information about patient safety during education	Yes	420	95.5
	No	20	4.5

Figure (1): level of awareness of Technical Nursing Students about patient safety (n=440)

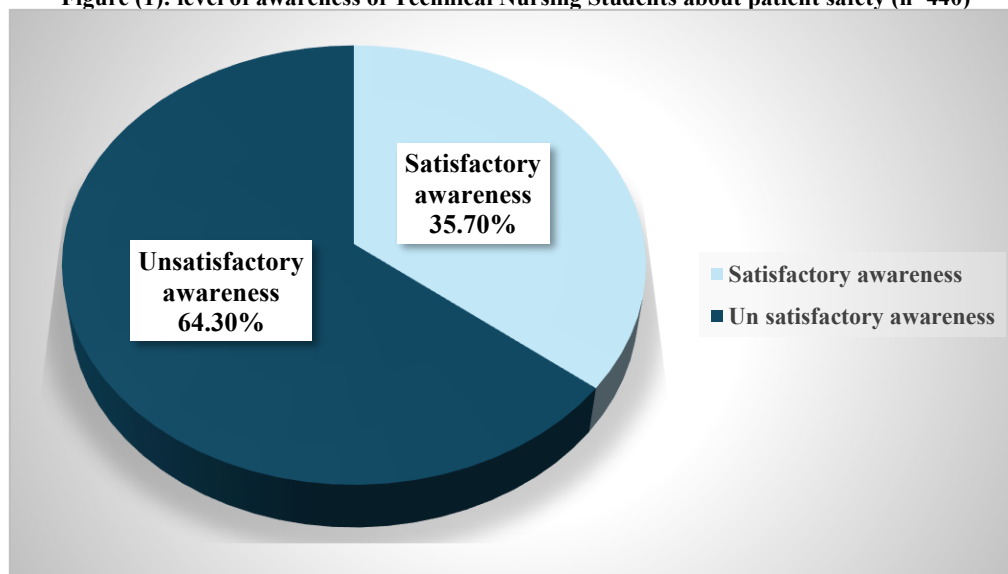


Figure (2): percentage distribution of technical nursing students' toward their source of information regarding patient safety (n=440)

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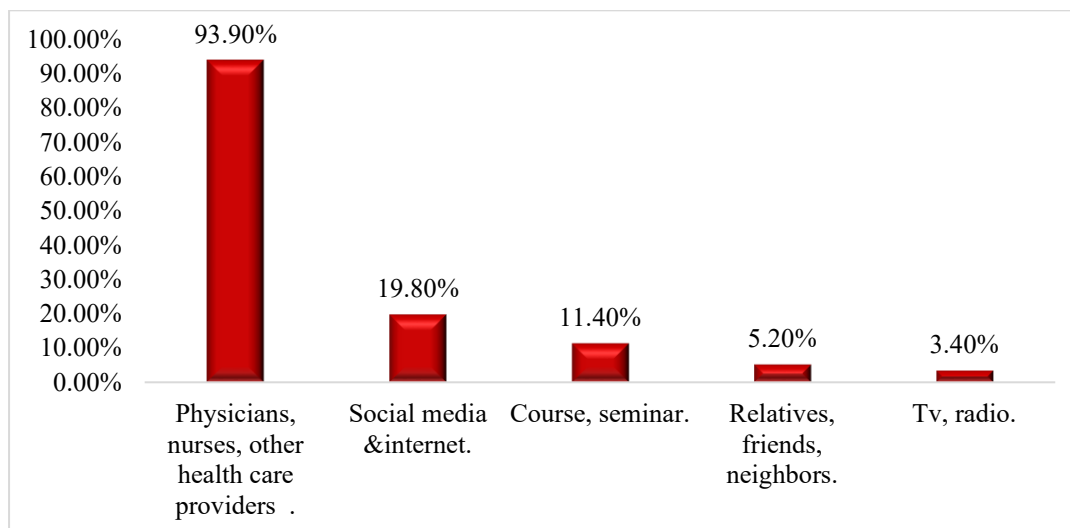


Table (2): Distribution of the technical nursing students' attitude regarding patient safety (n=440)

Nursing students' attitude regarding patient safety	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Making errors in nursing is expected.	0	41(9.3)	100(22.7)	180(40.9)	119(27)
There is a gap between what nurses known as “best care” and what is being provided on a day-to-day basis	7(1.6)	57(13)	99(22.5)	184(41.8)	93(21.1)
Most errors are due to things that nurse cannot do anything about.	40(9.1)	52(11.8)	111(25.2)	190(43.2)	47(10.7)
There is no need to address an error, if there is no harm to a patient.	30(6.8)	112(25.5)	105(23.9)	93(21.1)	100(22.7)
Reporting systems do little to reduce future errors.	105(23.9)	134(30.5)	53(12)	132(30)	16(3.6)
Competent nurse does not make medical errors that lead to patient harm.	32(7.3)	94(21.4)	87(19.8)	128(29.1)	99(22.5)
I would correct the error as I can, If I saw it.	0	10(2.3)	44(10)	151(34.3)	235(53.4)
Nurses can determine the causes of a medical error.	6(1.4)	47(10.7)	113(25.7)	231(52.5)	43(9.8)
After an error occurs, it is better to understand the underlying factors rather than blaming others.	10(2.3)	5(1.1)	37(8.4)	66(15)	322(73.2)
Total score	45				
Mean ±SD	29.04±4.51				

Figure (3): Percentage distribution of the technical nursing students' attitude level toward patient safety (n=440).

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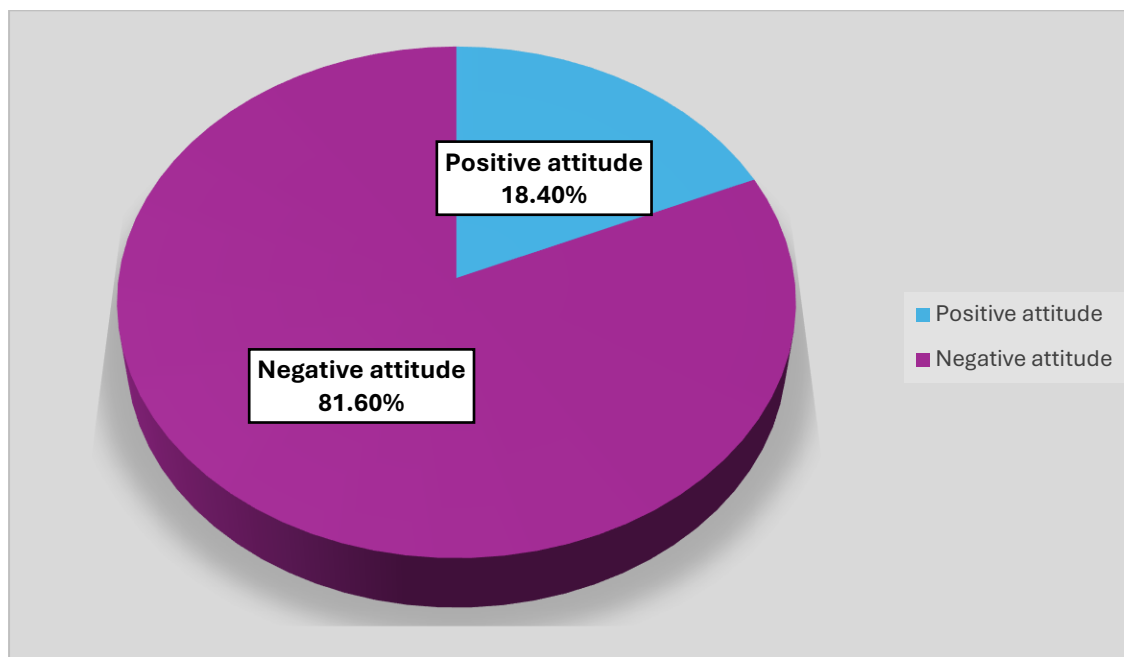


Table (3): Distribution of the demographic features of technical nursing students and in relation to their awareness towards patient safety (n=440)

Demographic characteristics		Awareness				Test of significance	P-value
		Unsatisfactory		Satisfactory			
		No.	%	No.	%		
Age (years)	<18 (n=186)	150	80.6	36	19.4	$\chi^2= 37.42$	P<0.001*
	≥18 (n=254)	133	52.4	121	47.6		
Sex	Male (n=221)	146	66.1	75	33.9	$\chi^2=0.59$	P=0.486
	Female (n=219)	137	62.6	82	37.4		
Grade level	1 st (n= 98)	88	89.8	10	10.2	$\chi^2=61.91$	P<0.001*
	2 nd (n=89)	65	73	24	27		
	3 rd (n=83)	55	66.3	28	33.7		
	4 th (n=84)	40	47.6	44	52.4		
	5 th (n=86)	35	40.7	51	59.3		
Previous training course on patient safety	Yes (n=134)	52	38.8	82	61.2	$\chi^2=54.64$	P<0.001*
	No (n=306)	231	75.5	75	24.5		
Information about patient safety during education	Yes (n=420)	268	63.8	152	36.2	$\chi^2=1.04$	P=0.350
	No (n=20)	15	75	5	25		

Table (4): Distribution of the demographic features of technical nursing students in relation to their attitude towards patient safety (n=440)

Demographic characteristics		Attitude				Test of significance	P-value
		Positive		Negative			
		No.	%	No.	%		
Age (years)	<18(n=186)	25	13.4	161	86.6	$\chi^2=5.29$	P=0.021*
	≥18(n=254)	56	22	198	78		

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Sex	Male	32	14.5	189	85.5	$\chi^2=4.56$	P=0.033*
	Female	49	22.4	170	77.6		
Grade level	1 st (n= 98)	14	14.3	84	85.7	$\chi^2=12.92$	P=0.012*
	2 nd (n=89)	12	13.5	77	86.5		
	3 rd (n=83)	25	30.1	58	69.9		
	4 th (n=84)	19	22.6	65	77.4		
	5 th (n=86)	11	12.8	75	87.2		
Previous training course on patient safety	Yes(n=134)	21	15.7	113	84.3	$\chi^2=0.96$	P=0.352
	No(n=306)	60	19.6	246	80.4		
Information about patient safety during education	Yes(n=420)	81	19.3	339	80.7	$\chi^2=4.72$	P=0.030*
	No(n=20)	0	0	20	100		

Table (5): Relationship between technical nursing students' attitudes and their awareness about patient safety (n=440)

Students' awareness about patient safety	Total attitude score	
	R	P-value
Total awareness score	+0.035	0.458

Discussion

Nursing students are crucial because they make up a significant portion of the nursing workforce in diverse healthcare settings. They play key roles in the provision and coordination of care, as well as participating in organizational, quality, and safety structures to optimize patient outcomes (WHO, 2020). Undergraduate nursing education must focus on developing students' knowledge, skills, behaviors, and attitudes to ensure their adherence to patient safety and improve the quality of healthcare systems (Torkaman et al., 2022). Thus, the purpose of the current study was to assess patient's safety awareness and attitude among secondary technical nursing school students.

Regarding awareness level of nursing students about PS, the present findings illustrated that about two thirds of the

studied nursing students had unsatisfactory awareness about patient safety. These results were in agreement with Mohammed et al., (2023) who showed that more than half of the undergraduate health science students in Ethiopia had poor knowledge about PS. On the same line, Svitlica et al., (2021) who showed that medical and nursing students in the Republic of Serbia had not enough knowledge of patient safety. Additionally, Biresaw et al., (2020) reported that more than half of the nurses in Ethiopia had poor knowledge on patient safety.

On the contrary, these findings were inconsistent with results of the study conducted by Biswas et al., (2023) revealed that knowledge of nursing students in Bengaluru on PS was sixty-nine percent of undergraduate nursing students had adequate knowledge on

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PS. Additionally, Sreekumar et al., (2023) revealed that the majority of medical students in India knowledge score toward PS was very good. Also, Zulkifli, (2021) who carried out study in Malaysia at one Private University College among nursing students and showed that the most of students had good knowledge on PS. Moreover, Oyediran et al., (2021) stated that more than two-thirds of the clinical students in Nigeria had good knowledge about PS. The difference between present study and other studies might be related to changing in study sample characteristics, sample size, difference in data collection scale and cut-off point used to assess awareness level. Regarding nursing students' source of information about PS, the present study findings illustrated that physicians, nurses, and other health care practitioners were the most common sources of information concerning PS, followed by social media and the internet then courses and seminars while family and friends as well as TV and radio are the least common. These findings were inconsistent with Oyediran et al., (2021) stated that, more than two-thirds of studied students in Nigeria were taught about PS as part of the course of study in their respective department. While less than half learn about PS on their own. Additionally, about one third attended a seminar on PS likewise majority of them were unable to learn about PS from their parents who are health care professionals. The difference might be due to difference in mode of delivery of different educational and training programs and, difference in the

research sample's characteristics and the presence of separate PS curriculum in their institution.

Concerning to the nursing students' attitude about causes of errors, the present study findings illustrated that, more than two thirds of studied nursing students agreed and strongly agreed with making errors is expected. These findings were consistent with Alshahrani et al., (2021) who revealed that the most of students had positive attitude about human error is inevitable. Moreover, Moraes et al., (2020) in Curitiba – Paraná, they represented that about sixty percent of nursing students agreed with that making mistakes in the health area is inevitable. Furthermore, Gudayu & Solomon (2020) showed that two thirds of students in Ethiopia in all categories agreed that making errors in medicine is inevitable. The similarity between study results and other studies might be related to that mistakes are inevitable in life; it is expected that anyone working in the health care environment will make mistakes.

Moreover, the current study showed that, the majority of the nursing students agreed and strongly agreed that there is gap between best care and day to day care. These findings were consistent with Gudayu & Solomon (2020) who reported that the majority of nursing students agreed on the disparity of what is known as "best practice" and "day-to-day" practice.

Furthermore, the current study showed that, more than half of nursing students agreed that most errors are due to things that nurse cannot do anything about it. These results were inconsistent with

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Oyediran et al., (2021) who reported that majority of students disagreed and strongly disagreed that most errors are out of staff control. The difference between study results and other studies might be related to disparity in sample size, characteristics and lack of information about causes of errors.

The current study showed that most of nursing students agreed with understanding the underlying factors after errors occurs. These findings were consistent with the findings of the study conducted by Gudayu & Solomon (2020) they revealed that the most of medical and health science students agreed and strongly agreed that after an error occurs, an effective strategy is to work harder and to be more careful. The similarity between study results and other studies might be due to students learning from errors and comprehend their causes instinctively. Regarding attitude level of nursing students about PS, the present study findings represented that, most of the participated nursing students had a negative attitude toward PS. These findings were consistent with Oyediran et al., (2021) showed that majority of the clinical students had a negative attitude towards patient safety while more than one third had a positive attitude towards safety of patient.

On the contrary, Vaismoradi, et al., (2020) they found that ninety percent of students in Malaysia showed a positive attitude toward PS. Also, Ayyad et al., (2024) illustrated that sixty-one percent of the participated nurses in Jordan demonstrated a positive attitude towards PS. Furthermore, Alser et al., (2020) revealed that medical students

in Palestine reported slightly positive PS attitudes. A possible explanation for this variation could be related to availability of proper environment for teaching/training of PS. This variance might be caused by changes in sample size and the study population. Also, this might be attributed to the fearfulness in taking responsibility and becoming accountable for such a sensitive issue in health care practice.

Regarding to the relation between nursing students' awareness level and their demographic features, the present study findings revealed that older students (>18) and higher grades (4th,5th) had significant more satisfactory awareness than their colleges with lower age and lower grades. The study findings were consistent with the findings of the study conducted by Usher et al., (2017) they showed that first-year students had lower scores compared to other years, and third-year students obtained the highest scores. Moreover, a study conducted by Albaqawi et al., (2023) demonstrated a significant difference between the levels of students and their degree of PS knowledge.

On the contrary, the study findings were inconsistent with the finding of the study conducted by Çiftcioğlu et al., (2022) they found no difference between undergraduate students' PS culture scale mean scores and students' grade level in Turkey. The discrepancy between the study's findings and other research findings could be attributed to differences in the study sample's characteristics and the scale employed for assessing participants' awareness of PS.

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Concerning to relationship between nursing students 'awareness level about PS and their sex, the present study showed that there was no statistically significant difference between male and female students' regarding PS awareness level. On the same line, the study conducted by Albaqawi et al., (2023) reported that no statistically significant difference between nursing students' gender and PS knowledge at Saudi Government University.

Regarding to relation between nursing students' awareness level about PS and their previous training course, students' who had previous training course on PS had a significant more satisfactory awareness than their colleges. These findings were consistent with a study conducted in Pakistan by AKRAM et al., (2024) they showed that factors significantly associated with good knowledge were patient safety prior education and training.

Regarding to the relation between the demographic features of technical nursing students' and their attitude towards PS, the present findings showed that the female students had significant more positive attitude than male students. These findings were consistent with Alwhaibi et al., (2020) who conducted a study in Saudi Arabia, they found that female students had a more positive attitude at PS. These findings were inconsistent with the findings of the study conducted by Albaqawi et al., (2023). They found there was no statistically significant difference between the gender of nursing students in Saudi Government University and their PS attitude.

Regarding to relation between attitude level and their age and grades, the present study showed that the students with higher age, higher grades especially 3rd and 4th grades students had significant more positive attitude than their colleges with lower age, lower grades. These findings were consistent with the findings of the study conducted by Albaqawi et al., (2023) they revealed that, there was a significant difference between the levels of students and their attitudes toward PS. On the same line, Ramírez-Torres et al (2023) they showed that the differences in means between years of study is significant in all items of perception.

Regarding to relationship between attitude level and their pervious information, the present findings showed that students who had information about PS during education had a significant more positive attitude than their colleges. These findings were consistent with Biresaw et al., (2020) they revealed that information about patient safety received during initial or continuing education and training about PS were found to had a significant association with the attitude of nurses towards PS. Moreover, a study in Pakistan conducted by Akram et al., (2024) they showed that prior education and training about PS were significantly associated with good attitude.

Regarding to the relationship between technical nursing students' attitudes and their awareness about PS, the present study findings illustrated that, there was no significant correlation between technical nursing students'

total awareness score and their total attitude score about PS. These findings were consistent with finding of a study conducted in Egypt by Mahmoud et al., (2021) showed that there was non-significant correlation between total knowledge, practice and total PS attitude score of the studied nurses.

On other hand, these findings were inconsistent with Ayyad et al., (2024) who reported a positive significant correlation between the total knowledge score and the total attitude score. The difference between the present study and other studies might be attributed to it looked that nurses had knowledge and clinical experience and participating in workshops which improved the level of knowledge and practice of nurses than nursing students as well as, PS is a nurse's primary responsibility.

Conclusion

Based on the findings of this study,

- The current study concluded that, sixty-four-point three percent of the studied nursing students had unsatisfactory awareness about patient safety, whereas more than one-third had satisfactory awareness. Additionally, more than three fourths of the participated nursing students had a negative attitude about patient safety. In addition, there was no statistical significant correlation between nursing students total score of awareness and their attitude about patient safety.

Recommendations

Based on the finding of the present study, it was recommended that:

Patient safety orientation training programs should be implemented for technical nursing students to improve their awareness and attitudes regarding patient safety prior graduation. Also, it is essential to provide nursing students with the necessary professional knowledge, skills, and attitudes in relevant courses to prepare them for potential healthcare errors they may encounter as future nurses. Furthermore, Promoting the integration of patient safety culture into the curriculum of nursing students to help them to realize the value of patient safety and their role in promoting. Additionally, written guidelines regarding patients' safety should be available in all health care settings.

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