

A STUDY TO ASSESS THE EFFECTIVENESS OF PLANNED TEACHING PROGRAMME ON KNOWLEDGE AND ATTITUDE REGARDING PREVENTION OF MEDICATION ADMINISTRATION ERRORS AMONG B.SC. NURSING STUDENTS AT SELECTED NURSING COLLEGE, KELAMBAKKAM, CHENGALPATTU DISTRICT, TAMILNADU, INDIA

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Abstract

Medication administration errors are a significant patient-safety concern, and adequate knowledge and a positive attitude among nursing students are essential for their prevention. This study was conducted to assess the effectiveness of a Planned Teaching Programme on knowledge and attitude regarding the prevention of medication administration errors among B.Sc. Nursing students. A pre-experimental one-group pre-test and post-test design was adopted at Chettinad College of Nursing, Kelambakkam. Sixty B.Sc. Nursing II-year students were selected using non-probability convenience sampling. Data were collected using a demographic questionnaire, a structured 10-item knowledge questionnaire, and a 10-item five-point Likert attitude scale. The Planned Teaching Programme was administered on day one, followed by a post-test on the seventh day. Data were analyzed using descriptive and inferential statistics, including paired *t*-test and chi-square test. The mean knowledge score increased significantly from 4.68 ± 1.56 in the pre-test to 8.12 ± 1.24 in the post-test ($t = 18.45$, $p < 0.001$). Similarly, the mean attitude score improved from 28.54 ± 5.21 to 41.36 ± 4.82 ($t = 16.32$, $p < 0.001$). Significant associations were observed between post-test knowledge scores, clinical exposure, and previous workshop attendance ($p < 0.05$). The Planned Teaching Programme was highly effective in improving students' knowledge and attitude toward preventing medication administration errors and may contribute to enhanced patient safety in nursing practice.

Keywords: Medication administration errors, Planned Teaching Programme, Knowledge, Attitude, Nursing students, Patient safety.

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Introduction

Patient safety is a foundational principle of healthcare and a critical component of quality care delivery. The World Health Organization (WHO) estimates that millions of patients worldwide suffer from preventable injuries and deaths each year due to unsafe medical care. Among the various threats to patient safety, medication errors represent one of the most significant and persistent challenges, jeopardizing patient well-being and imposing substantial costs on healthcare systems globally. A medication error is defined as “any preventable

event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer.” Such errors can occur at any stage of the medication-use process, including prescribing, transcribing, dispensing, administering, and monitoring, and may result in adverse drug events, prolonged hospitalization, disability, and even death. The global burden of medication errors is considerable. According to the World Health Organization, the global cost associated with

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medication errors has been estimated at approximately \$42 billion annually, representing nearly 1% of total global health expenditure. In England, an estimated 237 million medication errors occur annually, of which 66 million are potentially clinically significant. In the United States, more than 1.3 million people suffer unintentional injuries from medication errors each year, with thousands of deaths and costs approaching \$77 billion. In India, approximately 5.2 million medication errors are reported annually, contributing to loss of faith in healthcare professionals among patients. Nurses play a pivotal role in medication administration because they are responsible for administering the majority of medications to patients and therefore represent an important safety checkpoint. Nurses spend approximately 40% of their clinical time on medication-related activities, and studies indicate that errors committed by nurses account for 54% of total medication errors. Common medication administration errors include wrong administration technique, wrong time, wrong dose, wrong drug, wrong route, omission of doses, and administration to the wrong patient. Therefore, adequate pharmacological knowledge, accurate drug-calculation skills, adherence to protocols, and a positive attitude toward medication safety are essential competencies for nursing students and practicing nurses. Medication administration errors are multifactorial and may arise from individual, educational, and environmental factors. Inadequate pharmacological knowledge, poor drug-calculation skills, illegible prescriptions, look-alike and sound-alike medications, interruptions, high workload, inadequate staffing, stress, fatigue, poor communication, and lack of adherence to established protocols have all been identified as important contributing factors. Barzegari Nasrabad et al. (2024) reported that among nursing students, major causes of medication errors included inadequate pharmaceutical knowledge, unfamiliarity with drug brand names, drug interactions and adverse effects, poor drug-calculation skills, and unclear medical prescriptions. Nursing students are particularly vulnerable to medication errors during clinical training because they are transitioning from theoretical education to practical patient care. Medication errors among nursing students in clinical settings have been reported at varying rates, while near misses are also commonly experienced. Such incidents may affect both patient safety and students' psychological well-being. Students involved in medication errors may experience guilt, shame, fear of repercussions, anxiety, and loss of confidence, which can negatively influence their learning and professional development. A study conducted in South Africa found that although 85.2% of nursing students were aware of medication administration errors, only 40%

of committed errors were adequately reported. This emphasizes the importance of developing an educational environment that promotes open communication, appropriate reporting, and a strong culture of patient safety. The need for strengthening medication safety education in undergraduate nursing programmes is therefore evident. Although pharmacology is generally included in the B.Sc. Nursing curriculum, students may receive greater emphasis on theoretical knowledge than on practical medication-safety skills, error prevention, reporting, and clinical decision-making. The second year of B.Sc. Nursing is particularly important because students have acquired foundational pharmacological knowledge and are increasingly exposed to clinical practice. Structured educational interventions at this stage can reinforce theoretical knowledge and develop positive attitudes toward safe medication administration. Evidence supports the effectiveness of structured educational interventions. Deswal et al. (2023) demonstrated significant improvement in nursing students' knowledge following a training programme on medication errors, with knowledge scores increasing from 12.62 ± 2.33 at baseline to 18.52 ± 2.22 after training ($p < 0.001$). Similarly, Park et al. (2025) found that a blended learning-based medication safety education programme significantly improved knowledge, confidence, and competence among nursing students ($t = 4.93$, $p < 0.001$; $t = 13.70$, $p < 0.001$; and $t = 9.23$, $p < 0.001$, respectively) [25]. Shor et al. (2024) further reported that simulation-based training could positively influence nursing students' attitudes and intentions regarding medication-error reporting [36]. A Planned Teaching Programme (PTP) provides a systematic educational approach incorporating specific objectives, structured content, appropriate teaching strategies, learner engagement, and evaluation. It can facilitate comprehensive learning and provide measurable outcomes. Studies conducted in India have demonstrated the usefulness of Planned Teaching Programmes in improving knowledge and attitudes among nursing students and staff nurses regarding medication-error prevention. Patel et al. (2022) reported significant improvement following a Planned Teaching Programme on the prevention of medication administrative errors among staff nurses in Gandhinagar. Considering the substantial burden of medication errors, the pivotal role of nurses, the vulnerability of nursing students during clinical practice, and existing gaps in medication-safety education, the present study was undertaken to assess the effectiveness of a Planned Teaching Programme on knowledge and attitude regarding the prevention of medication administration errors among B.Sc. Nursing II-year students at Chettinad College of Nursing, Kelambakkam. The study aims to provide evidence regarding the usefulness of

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structured educational interventions in strengthening medication-safety knowledge and fostering positive attitudes, thereby contributing to safer future nursing practice and improved patient safety.

Statement of the problem

"A study to assess the effectiveness of Planned Teaching Programme on knowledge and attitude regarding Prevention of Medication administration errors among B.Sc. Nursing students at selected Nursing College, Kelambakkam, Chengalpattu District, Tamilnadu, India."

Objectives of the study

The objectives of the study are to:

1. Assess the pre-test levels of knowledge and attitude regarding prevention of medication administration errors among B.Sc. Nursing II-year students.
2. Assess the post-test levels of knowledge and attitude regarding prevention of medication administration errors after implementation of Planned Teaching Programme.
3. Determine the effectiveness of the Planned Teaching Programme on knowledge and attitude regarding prevention of medication administration errors by comparing pre-test and post-test scores.
4. Associate the post-test levels of knowledge and attitude with selected demographic variables (age, gender, clinical exposure, previous attendance of workshop/seminar on medication errors or patient safety).

Variables of the study

Variables are the traits that differ across the subjects under investigation.

Independent Variable: Planned Teaching Programme on prevention of medication administration errors.

Dependent Variables:

- Knowledge regarding prevention of medication administration errors.
- Attitude regarding prevention of medication administration errors.

Demographic Variables: Age, gender, current year of B.Sc. Nursing, language of instruction, duration of current clinical exposure, previous attendance of workshop or seminar on medication administration errors or patient safety.

Extraneous Variables: Factors that could influence the study outcomes but are not the focus of the study, such as prior exposure to medication error information through other sources, concurrent learning in other courses, and individual motivation levels. These were controlled by the inclusion and exclusion criteria.

Research Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

H₁: There is a significant difference between the pre-test and post-test knowledge scores of B.Sc. Nursing students regarding prevention of medication administration errors after implementation of Planned Teaching Programme.

H₂: There is a significant difference between the pre-test and post-test attitude scores of B.Sc. Nursing students regarding prevention of medication administration errors after implementation of Planned Teaching Programme.

H₃: There is a significant association between post-test knowledge scores and selected demographic variables (age, gender, clinical exposure, previous attendance of workshop/seminar on medication errors or patient safety).

H₄: There is a significant association between post-test attitude scores and selected demographic variables (age, gender, clinical exposure, previous attendance of workshop/seminar on medication errors or patient safety).

Assumptions

The study was conducted based on the following assumptions:

1. B.Sc. Nursing students may have varying levels of knowledge regarding prevention of medication administration errors.
2. B.Sc. Nursing students may have varying attitudes towards medication error prevention and reporting.
3. Planned Teaching Programme can enhance the knowledge and modify the attitude of nursing

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students regarding prevention of medication administration errors.

4. The knowledge and attitude of nursing students can be measured objectively using a structured questionnaire and attitude scale.

5. The responses given by the participants reflect their true knowledge and attitude.

Review of literature

A literature review related to medication administration errors, nursing students' knowledge and attitudes, and the effectiveness of educational interventions. Relevant literature was collected from national and international journals, textbooks, and databases including PubMed, Scopus, Google Scholar, and ScienceDirect.

Table 1: Literature related to medication errors - prevalence and consequences

Author	Title	Study Design	Sample Size & Tool	Result
Hodkinson A, Tyler N, Ashcroft DM, et al. (2020)	Preventable medication harm across health care settings : a systematic review and meta-analysis	Systematic review and meta-analysis	81 studies from various countries; systematic review methodology	Approximately 50% of preventable harm in medical care contexts is directly associated with medication use. Median prevalence of preventable

				ble medication errors was 5.3% in primary care, 4.8% in hospital settings, and 3.1% in care homes.
Elliott RA, Camacho E, Jankovic D, et al. (2021)	Economic analysis of the prevalence and clinical and economic burden of medication errors in England	Economic analysis with prevalence study	NHS England data; economic modelling	Approximately 237 million medication errors occur annually in England, of which 66 million are potentially clinically significant. The economic burden was estimated at £98

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				million in directly attributa ble costs, with total costs potential ly reaching £1.6 billion annually. Errors contribut e to approxi mately 1,700 deaths annually.			and meta- analysi s			(24.3%), wrong time (21.8%), and wrong administ ration techniqu e (18.2%). Associat ed factors included inadequa te pharmac ological knowled ge, high workloa d, fatigue, and interrupt ions.
Fathiza deh H, Mousa vi SS, Gharib i Z, et al. (2024)	Prevale nce of medicat ion errors and its related factors in Iranian nurses: an updated system atic review	Syste matic revie w and meta- analy sis	32 studies with 7,845 nurses; meta- analysi s	Pooled prevalen ce of medicati on errors among Iranian nurses was 43.6%. Most common errors were wrong dose		Eshetie Y, Aytene w TM, Abere Y, et al. (2025)	Prevale nce and its associat ed factors of medical error reportin g among	Syste matic revie w and meta- analy sis	12 studies with 4,287 partici pants; meta- analysi s	Pooled prevalen ce of medical error reporting was 42.7%. For medicati on errors specifica

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	healthcare professionals in Ethiopia: a systematic review and meta-analysis			lly, the reporting rate was 40.1%. Higher reporting was associated with knowledge of reporting systems, positive attitudes, supportive organizational culture, and absence of fear of punishment.					inadequate pharmacology knowledge, poor drug-calculation skills, lack of confidence, anxiety, inadequate supervision, and interruptions. Only 40–50% of errors were reported.
Stolic S, Ng L, Southern J, Sheridan G. (2022)	Medication errors by nursing students on clinical practice: an integrative review	Integrative review	18 studies published from 2000–2021; integrative review methodology	Prevalence of medication errors among nursing students ranged from 1.1% to 6%. Factors included	Asensi - Vicente J, Jiménez-Ruiz I, Vizcaya-Moreno MF. (2018)	Medication errors involving nursing students: A systematic review	Systematic review	12 studies from 8 countries; systematic review	Error rates among nursing students ranged from 18.8% to 32.1%. Common errors included wrong dose (32.4%),

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				wrong drug (18.7%), and wrong administration technique (15.3%). Causes included lack of pharmacological knowledge, poor calculation skills, inadequate supervision, and distractions. About 54% of students reported near misses.		ahasto I. (2019)	qualitative study in Indonesia		in-depth interviews	individual factors such as lack of knowledge, poor calculation skills, low confidence, and stress; educational factors such as gaps between theory and practice and insufficient supervision; and system factors such as interruptions, unclear prescriptions, and workload.
Musharyanti L, Claramita M, Haryanti F, Dwipr	Why do nursing students make medication errors? A	Qualitative study	15 nursing students and 5 clinical instructors;	Three main categories of factors were identified:		Wondmieneh A,	Medication administration	Cross-section	248 nurses; structured	71.8% of nurses reported

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Alemu W, Tadele N, Demis A. (2020)	tration errors and contributing factors among nurses: A cross-sectional study in tertiary hospitals, Ethiopia	nal study	red questio nnaire	committi ng at least one medicati on error in the previous year. Common errors included wrong time (62.1%), omission (45.2%), and wrong dose (38.3%). Associated factors included inadequate training (AOR: 3.42), lack of medication knowledge (AOR: 2.98), interruptions (AOR:					2.76), and fatigue (AOR: 2.34).
					Yousef AM, Al-Metwally AA, Abu Radda AH. (2021)	Factors associated with medication administration errors as perceived by nursing students: A cross-sectional survey	Cross-sectional survey	215 nursing students in Saudi Arabia; structured questionnaire	Students identified lack of pharmacological knowledge (78.6%), poor drug-calculation skills (71.2%), inadequate supervision (65.1%), interruptions (62.3%), and stress (58.6%) as contributing factors. Although 68.4% agreed that errors should

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				be reported, only 35.3% felt confident reporting without fear. A significant association was found between clinical experience and confidence.					d in 82% of studies and were the most frequently cited contributing factor. Other factors included communication breakdowns, complex calculations, interruptions, distractions, staffing levels, and safety culture.
Lage O, Lopes M, Sousa P. (2023)	Medication errors in nursing practice : A systematic review of contributing factors	Systematic review	45 studies from 18 countries; systematic review	Factors were categorized into individual, team, task, environmental, and organizational factors. Knowledge deficits were identified					

Research Methodology

Research methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. This chapter provides a detailed description of the research methodology adopted in this study, including the research approach, research design, variables, setting, population, sample, sampling technique, criteria for sample selection, description of the tool, validity and reliability, ethical considerations, pilot study, data collection procedure, and data analysis plan.

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Research Approach

A research approach is a plan and procedure that consists of the steps of broad assumptions to detailed methods of data collection, analysis, and interpretation. For this study, a quantitative research approach was adopted. The quantitative approach is appropriate for this study as it aims to objectively measure the knowledge and attitude of nursing students using structured tools and to statistically analyze the effectiveness of an intervention (Planned Teaching Programme). This approach allows for the collection of numerical data that can be subjected to rigorous statistical analysis to test the research hypotheses.

Research Design

A research design is the overall plan for obtaining answers to the research questions and for handling the challenges of the research process. This study employed a pre-experimental one-group pre-test post-test design.

Schematic Representation:

Pre-test	Intervention	Post-test
O ₁	X	O ₂

Where:

- **O₁** represents the pre-test assessment of knowledge and attitude regarding prevention of medication administration errors.
- **X** represents the intervention, i.e., the Planned Teaching Programme (PTP) on prevention of medication administration errors.
- **O₂** represents the post-test assessment of knowledge and attitude after one week, using the same tools.

This design was chosen because it is appropriate for educational research where the researcher aims to evaluate the effect of an intervention within a single group, without a control group. It allows for the comparison of pre-test and post-test scores to determine the effectiveness of the PTP.

Research Variables

Independent Variable: Planned Teaching Programme (PTP) on prevention of medication administration errors.

Dependent Variables: Knowledge and attitude of B.Sc. Nursing students regarding prevention of medication administration errors.

Demographic Variables

The demographic variables included in this study are:

- Age in years (18-19 years, 20-21 years, 22 years and above)
- Gender (Male, Female)
- Current year of B.Sc. Nursing (I year, II year, III year, IV year)
- Language of instruction (Tamil, English, Malayalam, Hindi)
- Duration of current clinical exposure (1-3 months, 4-6 months, More than 6 months)
- Previous attendance at workshop/seminar on medication errors or patient safety (Yes, No)

The study was conducted at **Chettinad College of Nursing (CCN), Kelambakkam, Chengalpattu District, Tamil Nadu**. This setting was chosen because it is the researchers' home institution, providing easy access to the target population and facilitating the smooth conduct of the study. The college is well-established with adequate infrastructure and a sufficient number of B.Sc. Nursing students to achieve the desired sample size.

Population

Target Population:

The target population for this study was all B.Sc. Nursing students studying at Chettinad College of Nursing, Kelambakkam.

Accessible Population:

The accessible population consisted of all B.Sc. Nursing II-year students studying at Chettinad College of Nursing, Kelambakkam, who were available during the data collection period and met the inclusion criteria.

Sample

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The sample for this study was the B.Sc. Nursing II-year students who fulfilled the inclusion criteria and were present at the time of data collection.

Sample Size

The sample size for this study was 60 B.Sc. Nursing II-year students.

The sample size was calculated for a one-group pre-test and post-test study using the formula for paired mean difference:

$$n = [(Z\alpha/2 + Z\beta) \times \sigma d / \Delta]^2$$

Where:

- n = required sample size
- $Z\alpha/2$ = Z-value for significance (1.96 for 5% level)
- $Z\beta$ = Z-value for power (0.84 for 80% power)
- σd = standard deviation of the difference in scores (estimated from pilot study/literature)
- Δ = minimum expected mean difference (effect size)

Based on previous similar studies and considering a 10% dropout rate, a sample size of 60 was deemed adequate for this study.

Sampling Technique

The sampling technique used in this study was non-probability convenient sampling. In this technique, subjects are selected based on their availability and willingness to participate. The researcher approached all eligible B.Sc. Nursing II-year students who were present on the day of data collection and selected those who met the inclusion criteria until the desired sample size of 60 was achieved. This technique was chosen due to its practicality, cost-effectiveness, and feasibility given the time constraints of the study.

Criteria for Sample Selection

Inclusion Criteria

- Students of B.Sc. Nursing II year who were willing to participate in the study.
- Students who were available during the data collection period.
- Students who could read and understand English (as the tools and teaching programme were in English).

Exclusion Criteria

- Students who had previously attended any workshop or training on medication administration errors or patient safety. This criterion was applied to avoid bias, as prior exposure to the topic could influence pre-test scores and mask the true effectiveness of the Planned Teaching Programme.
- Students who were absent during the data collection period.
- Students who were not willing to provide informed consent.

Description of the Research Tool

The tool for data collection was developed by the investigator after an extensive review of literature and consultation with experts. The tool consisted of three sections.

Section A: Socio-Demographic Data

This section comprised 6 items designed to collect demographic information from the participants, including age, gender, current year of study, language of instruction, duration of clinical exposure, and previous workshop attendance. The items were presented in a multiple-choice format.

Section B: Structured Knowledge Questionnaire on Prevention of Medication Administration Errors

This section consisted of 10 multiple-choice questions (MCQs) to assess the students' knowledge regarding the prevention of medication administration errors. Each question had four options, with only one correct answer. Each correct response was awarded one mark, and incorrect responses received zero marks.

Scoring: Total Knowledge Score: 10 marks

Interpretation:

- Inadequate Knowledge: 0–3 marks
- Moderately Adequate Knowledge: 4–7 marks
- Adequate Knowledge: 8–10 marks

The content of the questionnaire covered key areas including the "Rights" of medication administration, checking protocols, types of errors, high-alert drugs, and error reporting procedures.

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Section C: Attitude Scale Regarding Prevention of Medication Administration Errors

This section consisted of **10 statements** designed to assess the students' attitude towards medication administration errors and their prevention. A 5-point Likert scale was used to record responses, ranging from Strongly Agree (5) to Strongly Disagree (1). The statements included both positively worded and negatively worded items. For positively worded statements (e.g., "Reporting medication administration errors helps improve patient safety"), a response of Strongly Agree was scored as 5. For negatively worded statements (e.g., "Student nurse should be punished for making medication administration errors"), reverse scoring was applied, where Strongly Disagree was scored as 5.

Scoring: Total Attitude Score Range: 10 to 50 marks

Interpretation:

- Negative Attitude: 10–19 marks (<40%)
- Neutral Attitude: 20–33 marks (40–67%)
- Positive Attitude: 34–50 marks (≥68%)

Content Validity

The validity of the tool was established in consultation with guide and two experts in the field of Medical-Surgical Nursing.

Procedure for the Data Collection

The data collection was conducted in three phases over a period of one week.

Phase I: Pre-test (Day 1)

- Formal permission was obtained from the relevant authorities.
- The researcher met the B.Sc. Nursing II-year students in their classroom, explained the purpose of the study, and built rapport.
- Participants who met the inclusion criteria were provided with the Participant Information Sheet (PIS) and given time to read it.
- Written informed consent was obtained from willing participants.
- The pre-test was administered using the structured questionnaire (Sections A, B, and C). Participants were given 20-25 minutes to complete the questionnaire. The researcher was present to clarify any doubts.

Phase II: Intervention (Day 1, after pre-test)

- Immediately after the pre-test, the Planned Teaching Programme (PTP) was implemented.
- The PTP was a 60-minute structured teaching session conducted in the classroom using a PowerPoint presentation.
- The content covered:
- Definition and types of medication errors.
- Epidemiology and significance.
- Common causes of medication errors, especially among nursing students.
- The "Rights of Medication Administration" (5, 10, and expanded rights).
- Strategies for prevention, including three-check protocols, double-checking high-alert drugs, and proper patient identification.
- Importance of error reporting and the concept of a "just culture."
- Role of the nurse in ensuring medication safety.
- The session included opportunities for questions and discussion.

Phase III: Post-test (Day 7)

- On the seventh day after the intervention, the researcher met the same group of participants.
- The post-test was administered using the same knowledge and attitude questionnaire (Sections B and C only).
- Participants were given 20-25 minutes to complete the questionnaire.
- The completed questionnaires were collected, and the participants were thanked for their cooperation.

Data Analysis Procedure

OBJECTIVES	STATISTICAL TEST
To assess the pre-test and post-test levels of knowledge and attitude.	Descriptive statistics: Frequency, percentage, mean, standard deviation. Presented in tables

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	and figures.
To determine the effectiveness of the Planned Teaching Programme.	Inferential statistics: Paired 't' test (to compare mean pre-test and post-test scores within the same group).

Level of Significance: The level of significance was set at $p < 0.05$, indicating a 95% confidence level.

Analysis and Interpretation

The systematic analysis and interpretation of data collected from 60 B.Sc. Nursing II-year students at Chettinad College of Nursing, Kelambakkam. The data were collected, coded, and analyzed using descriptive and inferential statistics in accordance with the study objectives. The findings are presented in tables and figures to provide a clear and concise overview of the results. The analysis is organized into the following sections:

Section A: Description of Demographic Variables

This section presents the frequency and percentage distribution of the 60 B.Sc. Nursing students based on their demographic characteristics, including age, gender, current year of study, language of instruction, duration of clinical exposure, and previous workshop attendance.

Table 2: Frequency and percentage distribution of B.Sc. Nursing students based on demographic variables (N=60)

S. No.	Demographic Variable	Category	Frequency (f)	Percentage (%)
1	Age in years	18–19 years	18	30.0
		20–21 years	32	53.3
		22 years	10	16.7

		and above		
2	Gender	Male	14	23.3
		Female	46	76.7
3	Current Year of B.Sc. Nursing	I Year	0	0
		II Year	60	100
		III Year	0	0
		IV Year	0	0
4	Language of Instruction	Tamil	0	0
		English	60	100
		Malayalam	0	0
		Hindi	0	0
5	Duration of Current Clinical Exposure	1–3 months	42	70.0
		4–6 months	12	20.0
		More than 6 months	6	10.0
6	Previous workshop/seminar attended on medication errors/patient safety	Yes	8	13.3
		No	52	86.7

Interpretation of Table 2:

Age: The majority of participants (53.3%) were in the age group of 20-21 years, followed by 30% in the 18-19 years group, and only 16.7% were 22 years

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and above. This age distribution is typical for II-year B.Sc. Nursing students.

Gender: A large majority of the participants were female (76.7%), while males constituted 23.3%. This reflects the typical gender distribution in nursing education in India.

Year of Study: As per the inclusion criteria, all 60 participants (100%) were II-year B.Sc. Nursing students.

Language of Instruction: All participants (100%) reported English as their language of instruction, which is the medium of instruction in professional nursing education in this institution.

Clinical Exposure: The majority of students (70%) had 1-3 months of clinical exposure, which is consistent with II-year students beginning their clinical postings. Twenty percent had 4-6 months, and 10% had more than 6 months of exposure.

Previous Training: A significant majority (86.7%) had not attended any previous workshop or seminar on medication errors or patient safety. Only 13.3% reported having prior exposure. This low baseline highlights the need for the Planned Teaching Programme.

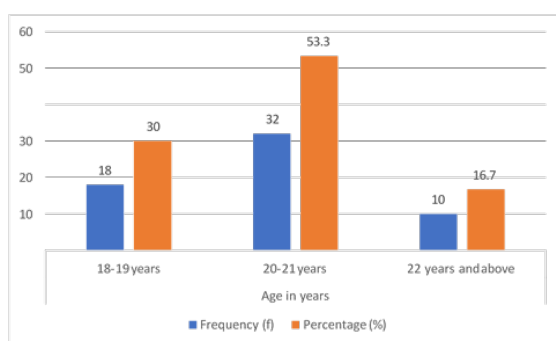


Figure 1: Age distribution of participants

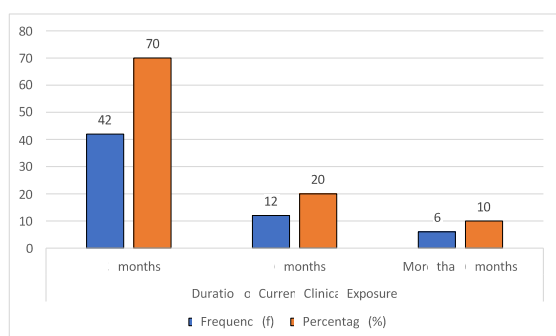


Figure 2: Duration of clinical exposure

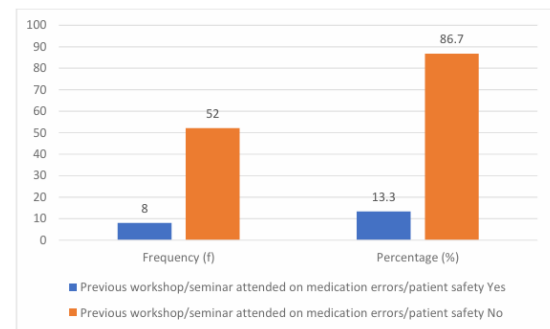


Figure 3: Previous workshop attendance

Section B: Assessment of Pre-Test and Post-Test Knowledge Levels

Pre-test Knowledge Scores

Table 3: Mean and standard deviation of pre-test knowledge scores (N=60)

Parameter	Mean	Standard Deviation
Pre-test Knowledge Score	4.68	1.56

Table 3 shows that the mean pre-test knowledge score among B.Sc. Nursing students was 4.68 out of a maximum score of 10, with a standard deviation of 1.56. This indicates a low to moderate level of baseline knowledge.

Table 4: Level of pre-test knowledge on prevention of medication administration errors (N=60)

Level of Knowledge	Score Range	Frequency (f)	Percentage (%)
Inadequate Knowledge	0-3	20	33.3
Moderately Adequate Knowledge	4-7	36	60.0
Adequate Knowledge	8-10	4	6.7
Total		60	100

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Interpretation of Table 4: The pre-test assessment revealed that the majority of students (60%) had moderately adequate knowledge. A significant proportion (33.3%) had inadequate knowledge, and only a very small minority (6.7%) demonstrated adequate knowledge regarding the prevention of medication administration errors. This reinforces the need for an educational intervention.

Post-test Knowledge Scores

Table 5: Mean and standard deviation of post-test knowledge scores (N=60)

Parameter	Mean	Standard Deviation
Post-test Knowledge Score	8.12	1.24

Table 5 shows that the mean post-test knowledge score increased substantially to 8.12 out of 10, with a standard deviation of 1.24. This indicates a high level of knowledge after the intervention.

Table 6: Level of post-test knowledge on prevention of medication administration errors (N=60)

Level of Knowledge	Score Range	Frequency (f)	Percentage (%)
Inadequate Knowledge	0–3	0	0.0
Moderately Adequate Knowledge	4–7	14	23.3
Adequate Knowledge	8–10	46	76.7
Total		60	100

Interpretation of Table 6: The post-test assessment showed a dramatic improvement. The majority of students (76.7%) achieved adequate knowledge, while the remaining 23.3% had moderately adequate knowledge. Significantly, no student was in the inadequate knowledge category post-intervention.

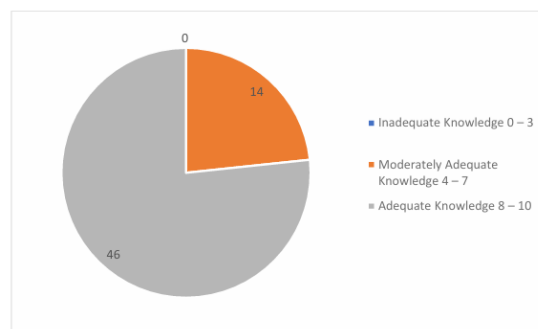


Figure 4: Comparison of pre-test and post-test knowledge levels

Section C: Assessment of Pre-Test and Post-Test Attitude Levels

Pre-test Attitude Scores

Table 7: Mean and standard deviation of pre-test attitude scores (N=60)

Parameter	Mean	Standard Deviation
Pre-test Attitude Score	28.54	5.21

Table 7 shows that the mean pre-test attitude score was 28.54 out of a maximum score of 50, with a standard deviation of 5.21. This falls within the neutral attitude range.

Table 8: Level of pre-test attitude towards prevention of medication administration errors (N=60)

Level of Attitude	Score Range	Frequency (f)	Percentage (%)
Negative Attitude	10–19	8	13.3
Neutral Attitude	20–33	42	70.0
Positive Attitude	34–50	10	16.7
Total		60	100

Interpretation of Table 8: The pre-test attitude assessment revealed that the majority of students (70%) had a neutral attitude towards medication

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error prevention and reporting. A concerning 13.3% had a negative attitude, while only 16.7% demonstrated a positive attitude. This indicates a significant need for an intervention to shape attitudes towards a more positive, safety oriented perspective.

Post-test Attitude Scores

Table 9: Mean and standard deviation of post-test attitude scores (N=60)

Parameter	Mean	Standard Deviation
Post-test Attitude Score	41.36	4.82

Table 9 shows that the mean post-test attitude score increased substantially to 41.36, with a standard deviation of 4.82. This falls within the positive attitude range.

Table 10: Level of post-test attitude towards prevention of medication administration errors (N=60)

Level of Attitude	Score Range	Frequency (f)	Percentage (%)
Negative Attitude	10–19	0	0.0
Neutral Attitude	20–33	8	13.3
Positive Attitude	34–50	52	86.7
Total		60	100

Interpretation of Table 10: The post-test attitude assessment showed a remarkable positive shift. The vast majority of students (86.7%) demonstrated a positive attitude post-intervention, while 13.3% remained in the neutral category. Significantly, no student had a negative attitude after the Planned Teaching Programme.

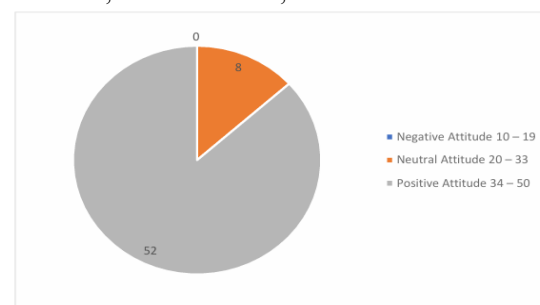


Figure 5: Comparison of pre-test and post-test attitude levels

Section D: Effectiveness of Planned Teaching Programme

To determine the effectiveness of the Planned Teaching Programme, the mean pre-test and post-test knowledge and attitude scores were compared using a paired 't' test.

Table 11: Comparison of mean pre-test and post-test knowledge scores

Assessment	Mean	SD	Mean Difference	Paired 't' Value	p-value
Pre-test Knowledge	4.68	1.56	3.44	18.45	<0.001
Post-test Knowledge	8.12	1.24			

Table 12: Comparison of mean pre-test and post-test attitude scores

Assessment	Mean	SD	Mean Difference	Paired 't' Value	p-value
Pre-test Attitude	28.54	5.21	12.82	16.32	<0.001
Post-test Attitude	41.36	4.82			

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Post-test	41.3	4.8			
Attitude	6	2			

Table 13: Effectiveness of Planned Teaching Programme on knowledge (Paired 't' test)

Know ledge	N	Me an	S D	Mean Differ ence	d f	Pai red 't' Val ue	p- val ue
Pre- test	60	4.68	1.56	3.44	59	18.45	<0.001
Post- test	60	8.12	1.24				

Interpretation of Table 13:

The calculated paired 't' value for knowledge (18.45) is much greater than the table value at $p < 0.05$. The p-value is < 0.01 , indicating that the difference between pre-test and post-test knowledge scores is highly statistically significant. Therefore, the research hypothesis H_1 is accepted. The Planned Teaching Programme was highly effective in improving the knowledge of B.Sc. Nursing students.

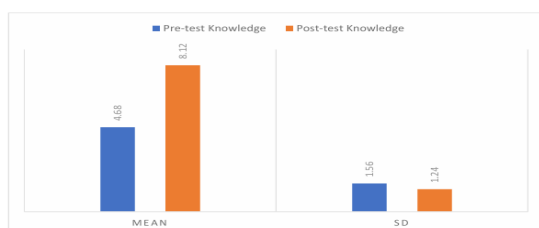


Figure 6: Bar diagram showing mean knowledge scores before and after intervention

Table 14: Effectiveness of Planned Teaching Programme on attitude (Paired 't' test)

Attit ude	N	Me an	S D	Mean Differ ence	d f	Pai red 't' Val ue	p- val ue
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Pre- test	60	28.54	5.21	12.82	59	16.32	<0.001
Post- test	60	41.36	4.82				

Interpretation of Table 14:

The calculated paired 't' value for attitude (16.32) is much greater than the table value at $p < 0.05$. The p-value is < 0.01 , indicating that the difference between pre-test and post-test attitude scores is highly statistically significant. Therefore, the research hypothesis H_2 is accepted. The Planned Teaching Programme was highly effective in improving the attitude of B.Sc. Nursing students.

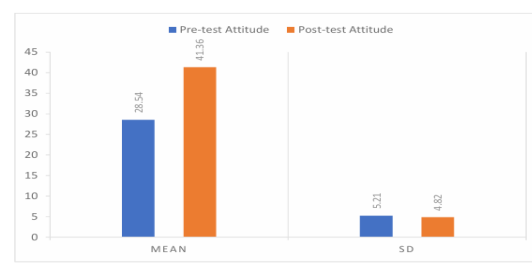


Figure 7: Bar diagram showing mean attitude scores before and after intervention

Discussion

The present study assessed the effectiveness of a Planned Teaching Programme (PTP) on knowledge and attitude regarding the prevention of medication administration errors among 60 II-year B.Sc. Nursing students at a selected nursing college in Kelambakkam, Chengalpattu District, Tamil Nadu. The demographic findings showed that most students were aged 20–21 years (53.3%), female (76.7%), had 1–3 months of clinical exposure (70%), and had not previously attended a workshop on medication errors or patient safety (86.7%). The pre-test results revealed a mean knowledge score of 4.68 ± 1.56 , with 60% having moderately adequate knowledge. The mean pre-test attitude score was 28.54 ± 5.21 , with 70% demonstrating a neutral attitude. Following the PTP, the mean knowledge score increased to 8.12 ± 1.24 , with 76.7% achieving adequate knowledge. Similarly, the mean attitude score increased to 41.36 ± 4.82 , with 86.7% demonstrating a positive attitude. The paired *t*-test showed a highly significant improvement in knowledge ($t=18.45$, $p<0.001$) and attitude ($t=16.32$, $p<0.001$), indicating that the PTP was effective.

Limitations

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The study was limited by its pre-experimental one-group design, small sample size, convenience sampling, short one-week follow-up period, and use of self-reported attitude data. These factors may limit the generalizability of the findings.

Implications of the Study

The findings of the study have important implications for nursing education, practice, administration, and research.

Nursing Education: Medication safety should be integrated and reinforced throughout the undergraduate nursing curriculum. Educators should use structured teaching programmes, case studies, interactive methods, and simulation-based learning to improve students' knowledge and attitudes. Theoretical concepts should also be closely linked with clinical exposure.

Nursing Practice: Improved knowledge and positive attitudes can enhance students' preparedness for clinical practice and promote a culture of patient safety. Students should be encouraged to report medication errors without fear and view errors as opportunities for learning and system improvement.

Nursing Administration: Nurse administrators should organize regular medication-safety workshops and in-service education programmes. Clear, supportive medication-error reporting policies should be developed, along with adequate educational resources and simulation facilities.

Nursing Research: The study provides a basis for further research using larger samples, control groups, longer follow-up periods, and multicentric designs. Future researchers may also compare simulation, virtual reality, and other innovative educational approaches and explore barriers influencing medication-error reporting among nursing students.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. **For Nursing Education Institutions:** Structured medication-error prevention programmes should be conducted for nursing students before clinical postings. Simulation-based learning, workshops, and seminars on medication safety and patient

safety should be incorporated into nursing education.

2. **For Nursing Curriculum Developers:** The curriculum should provide comprehensive content on medication safety, high-alert medications, error prevention, and reporting systems. The Rights of Medication Administration should be consistently taught and reinforced throughout clinical courses.
3. **For Nursing Administrators:** Clinical settings should promote a supportive and non-punitive environment for medication-error reporting. Regular faculty development programmes should be conducted to improve educators' skills in innovative medication-safety teaching methods.
4. **For Future Research:** Similar studies should be conducted with larger samples, control groups, and longer follow-up periods to assess knowledge and attitude retention. Comparative studies evaluating PTP, simulation, and case-based learning should be undertaken. Future research should also assess students' actual medication-administration practices and include multicentric studies across nursing colleges in Tamil Nadu and India.

Conclusions

The present study concluded that the Planned Teaching Programme was highly effective in improving the knowledge and attitude of II-year B.Sc. Nursing students regarding the prevention of medication administration errors. The pre-test mean knowledge score was 4.68 ± 1.56 , with 60% of students having moderately adequate knowledge and 33.3% having inadequate knowledge, while the mean pre-test attitude score was 28.54 ± 5.21 , with 70% demonstrating a neutral attitude. Following the Planned Teaching Programme, the mean knowledge score increased to 8.12 ± 1.24 , with 76.7% achieving adequate knowledge, and the mean attitude score increased to 41.36 ± 4.82 , with 86.7% demonstrating a positive attitude. The paired *t*-test showed a highly statistically significant improvement in knowledge ($t=18.45$, $p<0.001$) and attitude ($t=16.32$, $p<0.001$). Thus, the findings confirm that the Planned Teaching Programme was effective in enhancing both knowledge and attitude regarding medication administration error prevention among B.Sc. Nursing students.

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