Research Article

Demographic and Experiential Predictors of Medication Management Competency Among Nursing Interns: A NABH Aligned Cross-Sectional Study

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Abstract

Background:
Medication management is a critical component of nursing practice, directly influencing patient safety and quality of care. Variations in clinical competency among nursing interns varies, influenced by demographics and experience, warranting NABH-standardized evaluation.
Objective:
To identify the association between demographic variables and predictors of baseline clinical skill scores in medication management among nursing interns using a NABH standards-based assessment approach.
Methods:
A cross-sectional analytical study using baseline data derived from a quasi-experimental design among 400 nursing interns using non-probability purposive sampling technique. The clinical skill scores were assessed using a structured NABH-based observational checklist. Chi-square tests, independent t-test and multiple linear regression analysis, were applied to determine associations and predictors.
Results:
The majority of interns demonstrated average clinical skill levels (64%) (mean 13.08 ± 2.08), with 26% showing poor and 10% good competency. No significant difference was observed between experimental and control groups at baseline ($p > 0.05$). Significant associations were emerged between clinical skill scores and area of clinical posting ($\chi^2 = 6.82$, $p = 0.033$), previous training ($\chi^2 = 8.40$, $p = 0.004$), and average daily clinical duty hours ($\chi^2 = 18.62$, $p < 0.001$). Regression analysis identified clinical posting ($\beta = 0.31$, $p = 0.010$), previous training ($\beta = 0.38$, $p = 0.004$), and duty hours ($\beta = 0.29$, $p = 0.008$) as significant predictors, explaining 34% of the variance ($R^2 = 0.34$, $F=16.85$, $p<0.001$). Demographics like age/gender were nonsignificant ($p > 0.05$).
Conclusion:
Clinical competency in medication management is primarily influenced by experiential and training-related factors rather than demographic characteristics. Strengthening structured training, enhancing clinical exposure, and optimizing duty hours are essential to improve competency and ensure patient safety.

Keywords: Medication management, nursing interns, clinical competency, NABH, clinical exposure, predictors.

Introduction:

Medication management is a critical component of nursing practice, directly influencing patient safety, quality of care, and clinical outcomes. Errors in medication administration remain a global concern, contributing significantly to preventable adverse events in healthcare systems (Cleary-Holdforth & Leufer, 2020). Nursing interns, who transition from academic preparation to clinical practice, often encounter challenges in developing adequate competency in medication management due to variability in training, supervision, and clinical exposure (Prathibha et al., 2024). Consequently, assessing and strengthening their clinical skills has become a priority in nursing education and healthcare quality improvement initiatives.

Clinical competency in medication management encompasses a combination of knowledge, technical skills, critical thinking, and adherence to safety protocols. Evidence suggests that despite theoretical preparation, many nursing interns demonstrate gaps in safe medication practices, particularly in drug calculation, administration techniques, and error reporting (Qalawa, 2023). Furthermore, competency development is not uniform across individuals, as it is influenced by multiple demographic and contextual factors, including age, gender, educational qualifications, and prior clinical exposure (Mohamed et al., 2024). These demographic determinants can significantly affect learning outcomes, confidence levels, and clinical performance scores among nursing interns.

In recent years, competency-based education and structured clinical assessment frameworks have gained prominence in addressing these gaps. Studies indicate that competency-based training significantly improves

clinical performance and skill acquisition among nursing students (Mohamed et al., 2024). Additionally, simulation-based training and mentorship models have been shown to enhance medication safety competencies and reduce clinical errors (Geetha, 2023). However, the effectiveness of such interventions often varies depending on individual learner characteristics and institutional practices.

Healthcare accreditation systems, particularly the National Accreditation Board for Hospitals and Healthcare Providers (NABH), have introduced standardized protocols for medication management, emphasizing patient safety, documentation, and accountability. NABH standards mandate strict compliance with medication safety practices, including prescription verification, drug administration protocols, and monitoring of adverse drug reactions (Mitra et al., 2025). Accreditation-driven environments have been associated with improved clinical governance, enhanced staff competency, and better patient outcomes (Yoo et al., 2019). Despite these advancements, limited research has explored how NABH-based assessment frameworks can be utilized to systematically evaluate nursing interns' clinical skills.

Moreover, while existing studies have examined nursing competency and accreditation independently, there is a paucity of research integrating demographic variables with NABH-based clinical skill assessment scores, particularly in the context of medication management. Understanding these relationships is essential for identifying at-risk groups, tailoring educational interventions, and optimizing competency-based training programs. Evidence from healthcare education research suggests that demographic diversity among learners necessitates personalized and context-sensitive approaches to skill development (Rizk et al., 2025).

The transition from student to professional nurse is a complex process influenced by both individual and organizational factors. Studies have shown that interns often experience variability in readiness for medication administration, with confidence and competence evolving through clinical exposure and guided practice (Cleary-Holdforth & Leufer, 2020). Additionally, institutional factors such as training quality, supervision, and adherence to accreditation standards further shape clinical performance outcomes (Saini, 2025).

Given the increasing emphasis on patient safety and quality assurance in healthcare, there is a critical need to evaluate nursing interns' competency using standardized, evidence-based frameworks. Integrating NABH-based assessment tools with demographic analysis provides a comprehensive approach to understanding variations in clinical skill performance. Such insights can inform targeted educational strategies, policy development, and continuous quality improvement in nursing education and practice.

Therefore, the present study aims to unravel the demographic influence on clinical skill scores of nursing interns in medication management using a NABH-based practice assessment framework. By bridging the gap between accreditation standards and educational research, this study seeks to contribute to the development of robust, data-driven approaches for enhancing nursing competency and ensuring patient safety.

Aim of the Study:

The primary aim of this study is to assess and compare the pretest clinical skill scores of nursing interns in medication management between experimental and control groups and to determine the association between baseline clinical skill scores in medication management and selected demographic variables among nursing interns using a NABH-based assessment framework.

Objective:

1. To assess and compare the pretest clinical skill scores of nursing interns in medication management between experimental and control groups
2. To find the association between baseline (pretest) clinical skill scores in medication management and selected demographic variables (age, gender, educational qualification, clinical exposure, and prior training) among nursing interns.
3. To identify the predictors of baseline clinical skill scores in medication management among nursing interns.

Research Hypotheses: ($p<0.05$ level of significance)

The study tested both association and predictive hypotheses to examine the relationship and influence of demographic variables on baseline clinical skill scores.

1. Comparative Hypothesis:

H_{o1} (Null Hypothesis):

There is no significant difference in pretest clinical skill scores in medication management between the experimental and control groups of nursing interns.

$H1_1$ (Alternative Hypothesis):

There is a significant difference in pretest clinical skill scores in medication management between the experimental and control groups of nursing interns.

2. Associative Hypothesis:

(H_{o2}) (Null Hypothesis):

There is no significant association between baseline (pretest) clinical skill scores in medication management and selected demographic variables (age, gender, educational qualification, clinical exposure, and prior training) among nursing interns.

($H1_2$) (Alternative Hypothesis):

There is a significant association between baseline clinical skill scores in medication management and their selected socio-demographic variables among nursing interns.

3. Predictive Hypothesis:

(H_{o3}) (Null Hypothesis):

Selected demographic variables do not significantly predict baseline clinical skill scores in medication management among nursing interns.

($H1_3$) (Alternative Hypothesis):

Selected demographic and experiential variables significantly predict baseline clinical skill scores in medication management among nursing interns.

Assumptions:

The study is based on the following assumptions:

- It is assumed that the nursing interns included in the study possess basic theoretical knowledge of medication management prior to clinical assessment.
- It is assumed that the baseline (pretest) clinical skill scores accurately reflect the true competency level of nursing interns in medication management.
- It is assumed that the NABH-based clinical skill checklist is a valid and reliable tool for assessing medication management practices.
- It is assumed that participants provided accurate and truthful demographic information**.**
- It is assumed that the clinical environment and assessment conditions were similar for all participants during the pretest.
- It is assumed that demographic variables may influence clinical skill performance, forming the basis for examining their association.

Delimitations:

- The study is limited to nursing interns undergoing clinical training in selected hospitals and does not include staff nurses or other healthcare professionals.
- The study focuses only on medication management clinical skills based on NABH standards and does not assess other areas of clinical competency.
- The research is confined to selected demographic variables such as age, gender, educational background, and prior clinical exposure.
- The study includes only interns available during the data collection period, excluding those absent or unwilling to participate.
- The assessment of clinical skills is restricted to a structured NABH-based checklist, and no alternative tools are used.
- The study is conducted within a specific clinical setting, which may limit generalization to other institutions or regions.
- The study evaluates only pretest (baseline) and group comparison, without long-term follow-up of competency retention.

Conceptual Framework:

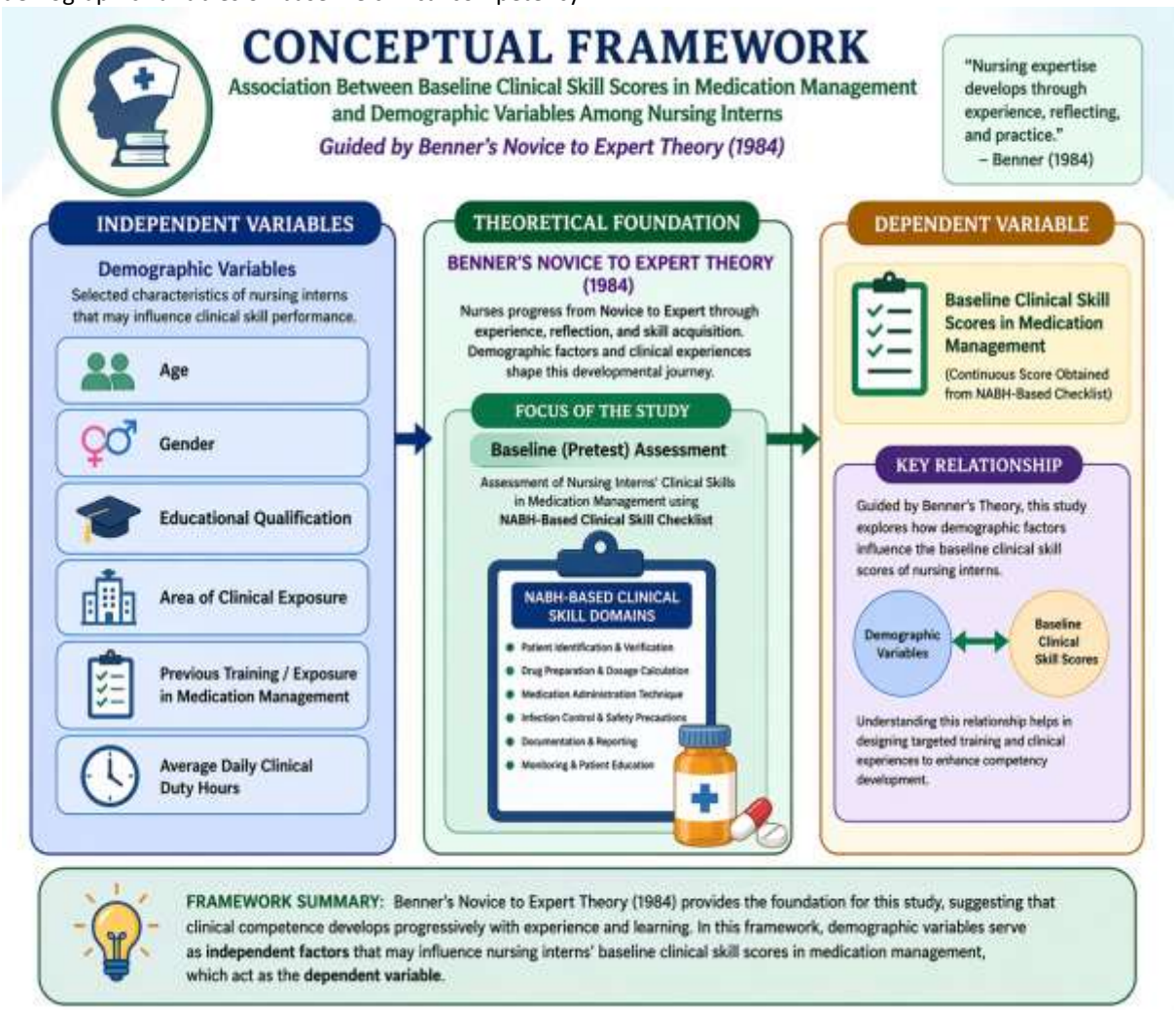
The conceptual framework of the present study is based on Benner's Novice to Expert Theory (1984)**,** which explains the progressive development of clinical competence among nursing professionals through experience and exposure. According to Benner, nurses advance through different levels of proficiency—novice, advanced beginner, competent, proficient, and expert—depending on their clinical experience, knowledge acquisition, and skill development.

In the context of the present study, nursing interns are considered to be at the novice or advanced beginner stage, where their clinical performance is influenced by individual characteristics and experiential factors. The

theory emphasizes that competency development is not uniform and varies based on exposure, training, and personal attributes.

Based on this theoretical foundation, the study identifies demographic variables-including age, gender, educational qualification, duration of clinical exposure, and previous training in medication management—as independent variables that may influence clinical competence. The dependent variable is the baseline (pretest) clinical skill score in medication management**,** assessed using a NABH-based clinical skill checklist.

The framework proposes that variations in demographic characteristics may lead to differences in clinical skill performance among nursing interns. Thus, the study examines the association and predictive influence of these demographic variables on baseline clinical competency.



Methodology:

Materials and Methods:

The present study utilized a cross-sectional analytical study using baseline data derived from a quasi-experimental design conducted among nursing interns.

Although the larger study followed a quasi-experimental framework, only pretest data from both experimental and control groups (N = 400) were considered for the current analysis to examine the relationship between clinical skill scores and demographic variables.

The baseline analysis was undertaken to identify demographic determinants of clinical competency prior to intervention, ensuring better interpretation of post-intervention outcomes and supporting targeted educational strategies."

Research Setting:

The study was conducted in three nursing colleges-All India Children Care & Educational Development Society Nursing College, Maa Kaushilya School of Nursing and Paramedical Sciences and Maa Shahzadi Devi Memorial Nursing College, Azamgarh, Uttar Pradesh. These settings ensure uniformity in clinical exposure and adherence to patient safety standards.

Population:
The target population comprised nursing interns undergoing clinical training during the data collection period in All India Children Care & Educational Development Society Nursing College, Maa Kaushilya School of Nursing and Paramedical Sciences and Maa Shahzadi Devi Memorial Nursing College, Azamgarh, Uttar Pradesh.

Sample and Sampling Technique:
A total of 400 nursing interns were included in the study. Participants were selected using a non-probability purposive sampling technique due to feasibility; however, efforts were made to ensure representativeness by including all eligible interns across selected institutions. It was based on availability and willingness to participate during the data collection period. For the purpose of the present analysis, baseline data from both experimental and control groups **were** combined, as the focus was on examining associations rather than intervention effects.

Sample Size Determination:
The total sample size was 400 nursing interns, selected to ensure sufficient power for statistical analysis and generalizability of results. The sample size was estimated using the formula for comparing two means in quasi-experimental studies:

$$n = \frac{2(Z\alpha/2+Z\beta)2\sigma^2}{\Delta^2}$$

Where:

- $Z\alpha/2=1.96$ (for 95% confidence level)
- $Z\beta=0.84$ (for 80% power)
- $\sigma=4.5$ (standard deviation of knowledge scores from pilot study)
- $\Delta=2$ (expected mean difference between groups)

Substituting the values:
$n=2(1.96+0.84)^2(4.5)^2/2^2=190.35\approx200$ per group
Thus, 200 nursing interns were included in the experimental group and 200 in the control group, resulting in a total sample of 400 participants. This sample size was sufficient to detect a minimum clinically important difference in knowledge and skill performance scores at a significance level of $p < 0.05$ and a power of 80%.

The sampling procedure involved the following steps:

- Listing of all eligible nursing interns from nursing colleges.
- Screening based on inclusion and exclusion criteria.
- Assignment of participants into two groups:
    - **Experimental Group (n = 200)**
    - **Control Group (n = 200)**
- Matching of groups based on demographic variables such as age, gender, area of clinical posting, average daily clinical duty hours, course of study and previous medication management training to minimize selection bias.

Inclusion Criteria:

- Nursing interns currently posted in clinical areas during the study period.
- Interns willing to participate and provide informed consent.
- Available during the data collection period.

Exclusion Criteria:

- Interns who had undergone specialized training in medication management immediately prior to the study.
- Interns on medical or academic leave during the study period.

Variables of the Study:

- **Dependent Variable:** Baseline clinical skill scores in medication management.
- **Independent Variable:** Demographic variables including age, gender, area of clinical posting, average daily clinical duty hours, course of study and previous medication management training**.**

Description of the Tool:

Data were collected using a structured tool consisting of two sections:

Section A: Demographic Data

This section included variables such as age, gender, educational qualification, duration of clinical exposure, and prior training in medication management.

Section B: NABH-Based Clinical Skill Checklist

A structured observational checklist was systematically developed by the investigator after an extensive review of literature, national standards, and NABH Nursing Excellence guidelines related to medication management and nursing competency evaluation covering the following domains:

1. Patient identification and verification
2. Drug preparation and dosage calculation
3. Medication administration technique
4. Infection control and safety precautions
5. Documentation and reporting
6. Monitoring and patient education

Scoring Procedure:

Each item in the checklist was scored as follows:

2 = Competent performance
1 = Partially competent
0 = Not competent

The total score was calculated and interpreted as:

- **0–50% → Poor skill**
- **51–75% → Average skill**
- **76–100% → Good skill**

Validity and Reliability:

- Content validity of the tool was established through expert evaluation from nursing academicians, clinical specialists, Dept. of Medicine and NABH assessors (n=7). Modifications were made based on their suggestions for clarity, relevance, and alignment with the study objectives.
- Reliability was assessed using appropriate statistical methods-Cronbach's alpha which was 0.82, indicating good internal consistency). Thus, the developed tools were found to be valid, reliable, and suitable for assessing the skill levels of nursing interns in medication management as per NABH Nursing Excellence criteria.

Pilot Study:

A pilot study was conducted on approximately 10% of the sample to assess feasibility, clarity, and reliability of the tool. Necessary modifications were made prior to the main study.

Ethical Considerations:

Prior to data collection, ethical clearance was obtained from the Institutional Ethics Committee of Swami Vivekanand Subharti University, Meerut**,** ensuring compliance with institutional and national research ethics guidelines. Formal permission was also secured from the principals of the participating nursing colleges at Azamgarh. All participants were informed about the purpose, objectives, and procedures of the study, and written informed consent was obtained before participation.

Confidentiality and anonymity of responses were strictly maintained throughout the research process. Participation was entirely voluntary, with the right to withdraw at any time without penalty. The study adhered to the ethical principles outlined in the Indian Council of Medical Research (ICMR) 2017 guidelines and

the Declaration of Helsinki (2013), ensuring respect for human dignity, privacy, and the right to informed decision-making.

Data Collection Procedure:

- Formal permission was obtained from institutional authorities.
- Ethical clearance was secured prior to data collection.
- Informed consent was obtained from all participants.
- Baseline (pretest) clinical skill assessment was conducted using the NABH-based checklist under standardized clinical conditions.

The baseline data collection was carried out over a period of three months and organized into four phases.

Phase I: Administrative and Ethical Clearance (Weeks 1–2)

Permission was obtained from institutional authorities. Ethical clearance was secured, and the data collection tool was finalized.

Phase II: Pilot Study and Tool Finalization (Weeks 3–4)

A pilot study was conducted among 10% of the sample to assess feasibility and reliability. Necessary modifications were made.

Phase III: Participant Recruitment (Month 2)

Eligible nursing interns were recruited using convenience sampling. Informed consent was obtained, and demographic data were collected.

Phase IV: Baseline Clinical Skill Assessment (Months 2–3)

Pretest clinical skill assessment was conducted using the NABH-based checklist under standardized conditions. Each participant was observed individually, and scores were recorded.

Phase V: Data Processing and Statistical Analysis (Month 4):

The collected data were reviewed for completeness and accuracy. Data coding, entry, and cleaning were performed prior to analysis. Statistical analysis was carried out using SPSS software (version 26.0). Descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (Chi-square test, t-test/ANOVA and multiple linear regression) were used to determine the association and predictive influence of demographic variables on baseline clinical skill scores.

Data analysis plan and statistical tests:

The collected data were coded, entered, and analyzed using the Statistical Package for the Social Sciences (SPSS), version 26.0. Both descriptive and inferential statistics were employed to address the study objective of examining the association between baseline clinical skill scores in medication management and selected demographic variables among nursing interns.

Descriptive Statistics:

Descriptive statistics were used to summarize the characteristics of the study sample and baseline clinical skill scores:

- Frequency and percentage were used to describe demographic variables such as age, gender, educational qualification, clinical exposure, and prior training.
- Mean and standard deviation were calculated to determine the overall baseline clinical skill scores.
- Domain-wise mean scores were computed to identify areas of strength and deficiency in medication management skills.

Inferential Statistics:

Inferential statistics were applied to examine the association and predictive influence of demographic variables on baseline clinical skill scores in medication management among nursing interns.

1. **Chi-Square Test (χ^2)**

- Used to determine the association between categorical demographic variables (e.g., gender, qualification, prior training) and categorized clinical skill levels (inadequate, moderate, adequate).

2. **Independent t-test/ANOVA:**
- Used to compare the mean baseline clinical skill scores between two groups (e.g., male vs female, trained vs untrained).

3. **Multiple Linear Regression Analysis (Key Analysis):**
- Multiple linear regression was performed to identify the predictive influence of demographic variables on baseline clinical skill scores.

Statistical Significance:
- A p-value < 0.05 was considered statistically significant.
- Confidence interval was set at 95%**.**
- Results:

Table 1: Frequency and Percentage Distribution of Demographic Variables among Nursing Interns. N=400

S.No.	Demographic Variable	Category	Experimental Group (n=200)	Control Group (n=200)	Total (N=400)	Percentage (%)
1	Age (in years)	20–21	78	82	160	40.0
		22–23	96	90	186	46.5
		≥24	26	28	54	13.5
2	Gender	Male	38	42	80	20.0
		Female	162	158	320	80.0
3	Course of Study	GNM	82	88	170	42.5
		B.Sc. (Nursing)	118	112	230	57.5
4	Area of Clinical Posting	Medical-Surgical Ward	108	96	204	51.0
		ICU / Critical Care	46	50	96	24.0
		OBG / Pediatric	46	54	100	25.0
5	Average Daily Clinical Duty Hours	6 hours	60	60	120	30.0
		7-8 hours	92	88	180	45.0
		>8 hours	48	52	100	25.0
6	Previous Medication Management Training	Yes	68	60	128	32.0
		No	132	140	272	68.0

The table shows that the majority of nursing interns were aged 22–23 years (46.5%)**,** followed by 20–21 years (40%), with a smaller proportion aged ≥24 years (13.5%). Most participants were female (80%)**,** and more than half were enrolled in B.Sc. Nursing (57.5%)**.**

Regarding clinical exposure, over half of the interns were posted in medical-surgical wards (51%), while the remaining were distributed across ICU/critical care (24%) and OBG/pediatric units (25%).

In terms of clinical duty hours, the majority reported 7–8 hours of daily duty (45%)**,** followed by ≤6 hours (30%) and >8 hours (25%), indicating moderate to high levels of clinical exposure.

Additionally, a larger proportion of interns had not received prior medication management training (68%), highlighting a potential gap in structured training.

Table 2: Baseline (Pretest) Clinical Skill Scores in Medication Management among Nursing Interns (N = 400)

Skill Level	Experimental Group Pre-Test (f)	Control Group Pre-Test (f)	Total	Percentage (%)

Good Skill	18	22	40	10.0
Average Skill	130	126	256	64.0
Poor Skill	52	52	104	26.0

The table shows the baseline (pretest) assessment of clinical skill scores in medication management reveals that the majority of nursing interns **(**64.0%**)** demonstrated an average level of competency, indicating moderate preparedness in medication-related practices. A considerable proportion of participants (26.0%**)** exhibited poor skill levels, highlighting notable gaps in essential clinical competencies. In contrast, only a small percentage **(**10.0%**)** of interns demonstrated good clinical skills at baseline**.**

A similar distribution of skill levels was observed between the experimental and control groups, suggesting comparability between the groups prior to intervention. Overall, these findings indicate that most nursing interns possessed only moderate competency in medication management at baseline, emphasizing the need for skill competency programme to enhance clinical skill performance.

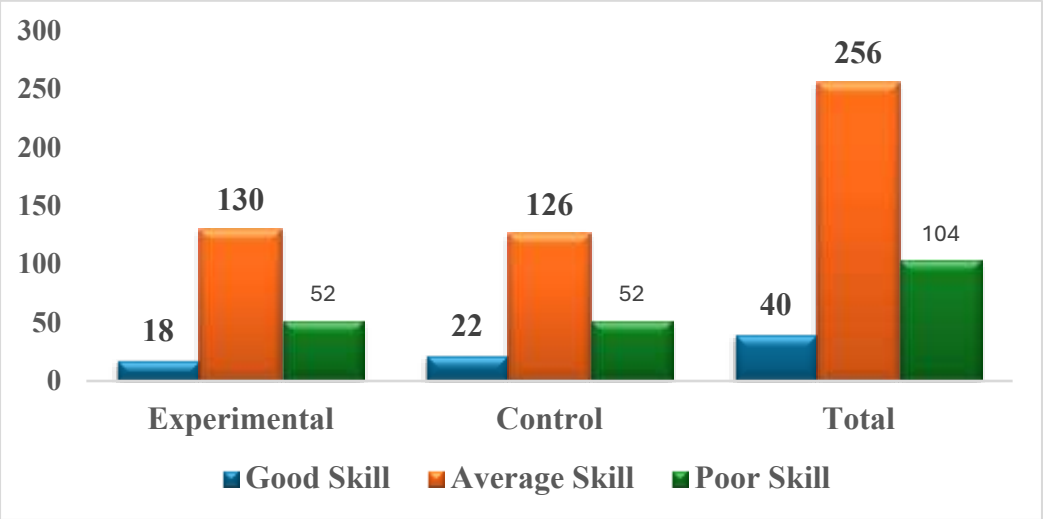


Table 3: Comparison of Mean Baseline Clinical Skill Scores between Experimental and Control Groups (N = 400)

N=400

Group	Pre-Test Mean	SD	t-value	df	p-value (p<0.05)	Significance
Experimental Group	13.12	2.14	0.34	398	0.73	Not Significant
Control Group	13.05	2.02				

The table shows an independent t-test was conducted to compare the mean baseline clinical skill scores between the experimental and control groups. The results showed that the mean pretest score of the experimental group (13.12 ± 2.14) was slightly higher than that of the control group (13.05 ± 2.02); however, the difference was not statistically significant (t = 0.34, df = 398, p = 0.73). With regard to hypothesis testing, the null hypothesis (H_0), stating that there is no significant difference in baseline clinical skill scores between the groups, was accepted, and the alternative hypothesis (H_1) was rejected. These findings indicate that both groups were homogeneous at baseline, confirming comparability prior to intervention.

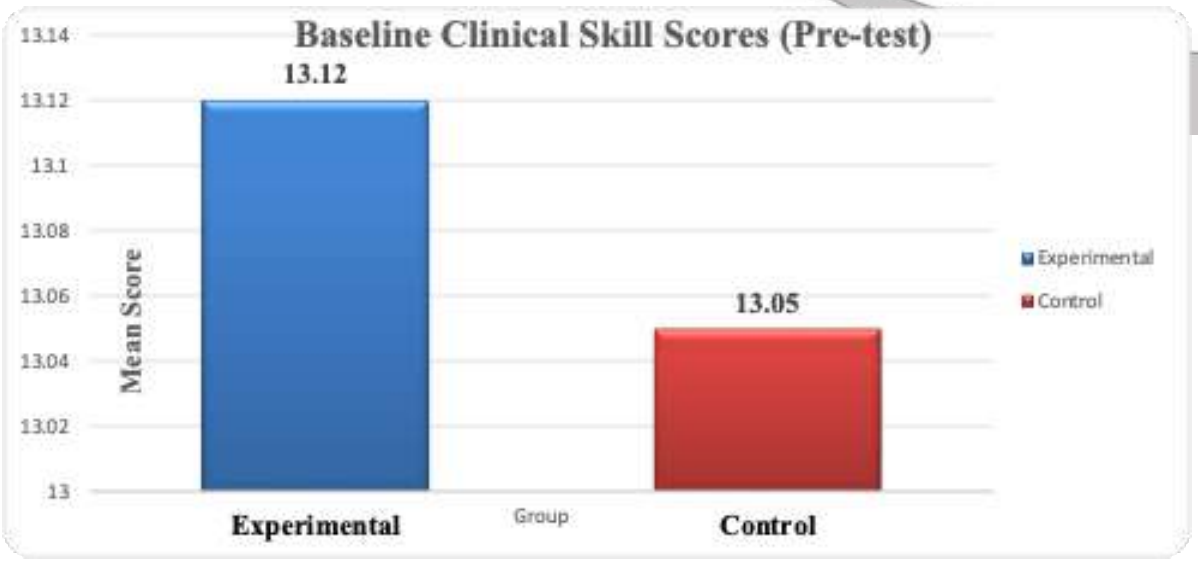


Table 4: Chi-square value showing an association between pre-test skill scores among nursing intern with their selected socio- demographic variables in experimental and control group.

N=400

S.No.	Demographic Variable	Category	Good Skill (≥18)	Average Skill (10–17)	Poor Skill (<10)	χ^2-value	df	p-value	Significance
1	Age (in years)	20–21	16	102	42	2.10	2	0.35	Not Significant
		22–23	20	120	46				
		≥24	4	34	16				
2	Gender	Male	8	52	20	0.02	1	0.88	Not Significant
		Female	32	204	84				
3	Course of Study	GNM	17	108	45	0.10	1	0.75	Not Significant
		B.Sc. (Nursing)	23	148	59				
4	Area of Clinical Posting	Medical-Surgical Ward	12	140	52	6.82	2	0.033	Significant
		ICU / Critical Care	16	56	24				
		OBG / Pediatric	12	60	28				
5	Average Daily Clinical Duty Hours	6 hours	6	70	44	18.62	2	<0.001	Significant
		7-8 hours	14	120	46				
		>8 hours	20	66	14				
6	Previous Training on Medication Management	Yes	20	78	30	8.40	1	0.004	Significant
		No	20	178	74				

Significant at $p < 0.05$

Chi-square analysis revealed that area of clinical posting ($\chi^2 = 6.82$, $p = 0.033$), previous training on medication management ($\chi^2 = 8.40$, $p = 0.004$), and average daily clinical duty hours ($\chi^2 = 18.62$, $p < 0.001$) were significantly associated with baseline clinical skill levels ($p < 0.05$). In contrast, age, gender, course of study, prior NABH exposure, and residential background showed no statistically significant association ($p > 0.05$). Thus, the null hypothesis (H_o) was partially rejected, indicating that clinical exposure and training-related factors significantly influence clinical competency among nursing interns.

Table 5: Multiple Linear Regression Analysis of Factors Associated with Baseline Clinical Skill Scores among Nursing Interns

(N = 400)

Variables	β Coefficient	Std. Error	t-value	p-value
Age	0.11	0.08	1.38	0.17
Gender	0.02	0.15	0.13	0.89
Course of study	0.08	0.17	0.47	0.63
Area of Clinical Posting	0.31	0.12	2.58	0.010*
Average Daily Clinical Duty Hours	0.29	0.11	2.64	0.008*
Previous Training on Medication Management	0.38	0.13	2.92	0.004*

Significant at $p < 0.05$

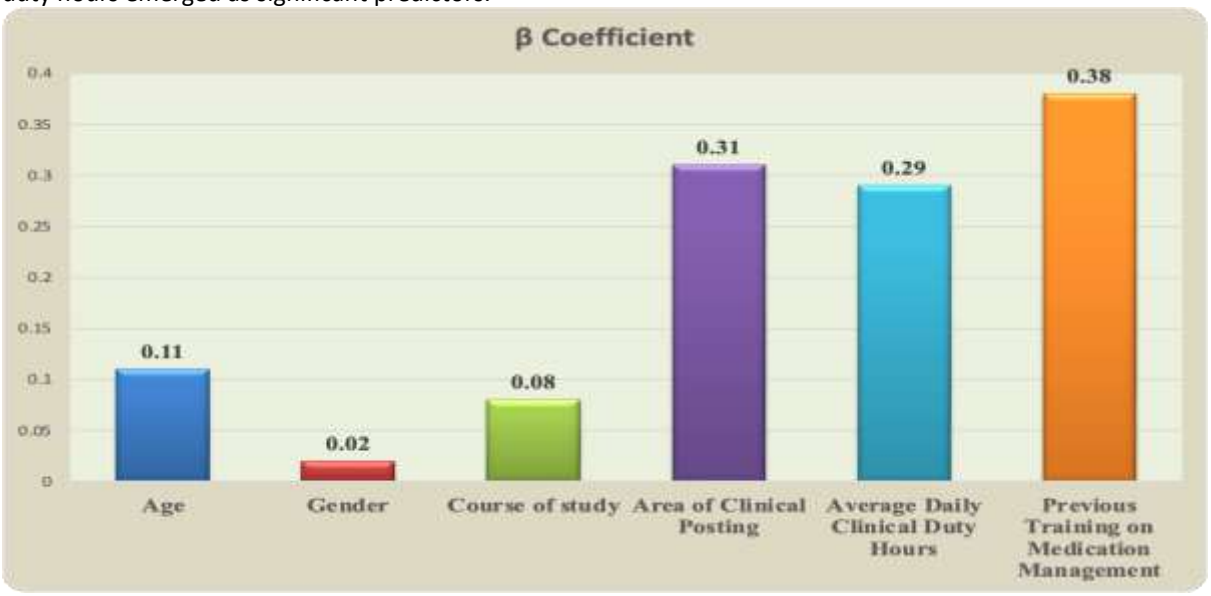
Multiple linear regression analysis was performed to identify predictors of baseline clinical skill scores in medication management among nursing interns. The overall model was statistically significant ($F = 16.85$, $p < 0.001$), explaining 34% of the variance ($R^2 = 0.34$) in clinical skill scores.

Among the predictors, average daily clinical duty hours ($\beta = 0.29$, $p = 0.008$) demonstrated a significant positive influence on clinical skill scores. Interns with longer duty hours (>8 hours; 25%) exhibited relatively higher competency compared to those with fewer hours, while the majority (45%) reported 7–8 hours of duty, indicating moderate clinical exposure.

Additionally, clinical posting ($\beta = 0.31$, $p = 0.010$) and previous training on medication management ($\beta = 0.38$, $p = 0.004$) were identified as significant predictors, highlighting the importance of experiential and training-related factors in enhancing clinical competency.

In contrast, demographic variables such as age, gender, course of study, prior NABH exposure, and residential background were not statistically significant predictors ($p > 0.05$).

With regard to hypothesis testing, the null hypothesis (H_{03}) stating that selected variables do not significantly predict clinical skill scores was partially rejected, as clinical posting, previous training, and average daily clinical duty hours emerged as significant predictors.



Summary:

This study explored the association between demographic characteristics and baseline clinical skill scores in medication management among nursing interns within a NABH standards-based framework. The findings revealed that demographic variables had minimal influence on clinical competency**,** whereas experiential factors such as clinical posting, prior training, and daily clinical duty hours played a significant role.

Interns with greater exposure to high-acuity settings, structured training, and longer clinical duty hours demonstrated better clinical skill performance. The study highlights that clinical competency is primarily shaped by practice-based learning and training environments rather than inherent demographic factors.
Overall, the findings emphasize the importance of strengthening clinical exposure and structured training programs to enhance medication management competency and ensure patient safety.

Major Findings of the study:

- At baseline, the majority of nursing interns demonstrated average clinical skill levels (64%)**,** followed by poor (26%) and good skills (10%), indicating moderate competency in medication management.
- The experimental and control groups showed comparable baseline clinical skill scores (Mean ± SD: 13.12 ± 2.14 vs. 13.05 ± 2.02; $p > 0.05$), confirming group homogeneity prior to intervention.
- Significant associations were observed between clinical skill scores and area of clinical posting ($\chi^2 = 6.82$, $p = 0.033$), previous training on medication management ($\chi^2 = 8.40$, $p = 0.004$), and average daily clinical duty hours ($\chi^2 = 18.62$, $p < 0.001$).
- Interns with greater clinical exposure (ICU/critical care), prior training, and longer duty hours (>8 hours) demonstrated relatively higher proportions of good clinical skills.
- No significant association was found with age, gender and course of study ($p > 0.05$) indicating limited influence of demographic factors.
- Multiple linear regression analysis further identified clinical posting ($\beta = 0.31$, $p = 0.010$), previous training ($\beta = 0.38$, $p = 0.004$), and duty hours ($\beta = 0.29$, $p = 0.008$) as significant predictors, explaining 34% of the variance ($R^2 = 0.34$) in clinical skill scores.

Discussion of Findings:

The present study examined the association between baseline clinical skill scores in medication management and selected demographic and experiential variables among nursing interns. The findings indicate that clinical exposure and training-related factors, particularly area of clinical posting, previous training on medication management, and average daily clinical duty hours, were significantly associated with clinical competency, whereas demographic variables showed no significant influence.
Interns posted in specialized units such as ICU and critical care demonstrated higher competency levels, likely due to increased exposure to complex clinical situations and supervised practice. This supports existing evidence that intensive clinical environments enhance skill acquisition and clinical reasoning (Kavanagh & Szweda, 2017; Phillips et al., 2020).
Similarly, prior training in medication management significantly improved clinical skill performance, emphasizing the importance of structured educational interventions in promoting safe medication practices (Aebersold, 2018; Lee et al., 2021).
The study also identified a significant association between average daily clinical duty hours and clinical skill scores, indicating that increased clinical exposure contributes to better competency. This finding aligns with Benner's Novice to Expert Theory, which highlights the role of repeated practice and experiential learning in skill development (Benner, 1984).
In contrast, variables such as age, gender and course of study were not significantly associated with clinical skill levels, suggesting that competency is primarily influenced by practice-based learning rather than demographic characteristics (Liaw et al., 2018; Shin et al., 2015).
Regression analysis further confirmed that clinical posting, previous training, and duty hours were significant predictors of clinical skill scores, reinforcing the critical role of experiential and training factors in shaping clinical performance.
Overall, the findings highlight the need to strengthen clinical training strategies, including structured skill competency medication management programs, enhanced supervised clinical exposure, and balanced duty schedules, to improve competency and ensure patient safety.

Limitations:

- Although the study was conducted within a quasi-experimental non-equivalent control group design, the present analysis was limited to baseline (pretest) data, restricting the ability to assess the full impact of the intervention.
- The use of non-equivalent groups may introduce selection bias, as participants were not randomly assigned, which could influence baseline comparability. This may limit external validity.

- The analysis focused solely on associations between demographic variables and clinical skill scores, and therefore causal relationships cannot be established.
- Data were collected from a specific institutional setting, which may limit the generalizability of the findings to other contexts.
- Potential confounding factors such as quality of supervision, individual learning ability, and clinical workload variations were not controlled.

Conclusion:

This study highlights that while demographic characteristics such as age, gender, course of study, and residential background show limited influence, clinical skill competency is predominantly shaped by experiential and training-related factors**.**

The findings underscore that clinical posting in high-acuity settings, prior medication management training, and greater clinical duty hours significantly enhance the clinical skill scores of nursing interns within a NABH standards-based framework. These results emphasize that competency in medication management is less dependent on inherent demographic factors and more reliant on structured clinical exposure and skill-oriented training environments**.**

Overall, the study reinforces the need to prioritize practice-based learning and competency-driven training approaches to improve clinical performance and ensure adherence to quality and safety standards in healthcare.

Implications:

The results have the following implications for practice, education, administration and research**:**

- **Nursing Education:**
  Emphasizes the need to incorporate competency-based and simulation-driven training in medication management within nursing curricula.
- **Clinical Practice:**
  Highlights the importance of enhanced clinical exposure and supervised practice to improve medication safety and reduce errors.
- **Policy and Administration:**
  Supports integration of NABH standards into internship training and hospital protocols to ensure quality care.
- **Future Research:**
  Suggests further studies to explore interventional strategies and long-term impact of training on clinical competency.

Recommendations:

Based on the findings of the present study, the following recommendations are proposed:

1. Nursing interns should be provided with structured and supervised postings in high-acuity areas such as ICU and critical care units to strengthen clinical skill development in medication management.
2. Regular training sessions and simulation-based workshops on medication management should be incorporated into internship programs to improve competency and reduce medication errors.
3. Clinical duty schedules should be designed to ensure adequate exposure while preventing fatigue, thereby promoting effective learning and safe practice.
4. Nursing education and internship programs should align with NABH standards, emphasizing patient safety, medication accuracy, and quality care practices.
5. Periodic evaluation of clinical skills using standardized assessment tools should be conducted to monitor progress and identify areas needing improvement.
6. Introducing pre-internship orientation and skill-based training modules can help bridge the gap between theoretical knowledge and clinical practice.
7. Encourage continuous skill evaluation and refresher training to sustain clinical competency.

Declarations:

Conflict of Interest:

The authors declare that there is no conflict of interest regarding the conduct, analysis, authorship, or publication of this research study. No financial, professional, or personal relationships influenced the outcomes

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Ethical Approval:
Ethical clearance for conducting this study was obtained from the Institutional Ethics Committee (IEC) of Swami Vivekanand Subharti University, Meerut, UP. All participants were informed about the objectives of the study, and informed consent was obtained prior to data collection. Confidentiality and anonymity were maintained throughout the research process, in accordance with the Declaration of Helsinki (2013) ethical principles for research involving human subjects.

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Author Contribution:

1. **Hepsi Natha:** Conceptualization, design of the study, data collection, data analysis, interpretation of results, and manuscript drafting.
2. **Geeta Parwanda:** Critical guidance in study design, academic supervision, critical feedback, supervised the research process, contributed to data interpretation, reviewed and editorial revisions throughout the research process.

All authors have read and approved the final version of the manuscript.

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