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Effect of Virtual Reality-Based Learning on Skill Acquisition among Nursing Students: A Survey Study

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Introduction

Nursing education has historically used lectures, demonstrations, and clinical experience. Yet, fast-changing healthcare demands innovative pedagogies that offer safe, authentic, and interactive learning environments. Virtual Reality (VR) learning is a developing technology that immerses students in simulated clinical environments to allow repetitive practice without patient risk. The evidence demonstrates VR to improve psychomotor skills, critical thinking, and clinical confidence. Even with increasing worldwide uptake, there is relatively little research in the Indian setting assessing VR-based learning.

Background:

Nursing education increasingly incorporates new teaching modalities to improve skill acquisition. Virtual Reality (VR)-based learning provides interactive, immersive experiences that could enhance nursing students' psychomotor and cognitive abilities.

Objective:

To evaluate the impact of VR-based learning on skill acquisition among undergraduate nursing students.

Methods:

A descriptive survey design was used with 60 B.Sc. Nursing students of a tertiary nursing college. Data collection was done through a structured questionnaire measuring demographic variables and self-rated skill acquisition after VR-based sessions on chosen nursing procedures. Descriptive and inferential statistics (t-test, chi-square) were used.

Table 1: Demographic Characteristics of Nursing Students (N=60)

Variable	Categories	Frequency (n)	Percentage (%)
Age (years)	18–20	20	33.3
	21–23	30	50.0
	24–26	10	16.7
Gender	Female	44	73.3
	Male	16	26.7
Year of Study	2nd year	25	41.7
	3rd year	20	33.3
	4th year	15	25.0
Prior exposure to digital learning	Yes	28	46.7
	No	32	53.3

Table 1 presents the demographic characteristics of the 60 nursing students who participated in the study. The majority of the students (50%) belonged to the age group of 21–23 years, followed by 33.3% in the age group of 18–20 years, and only 16.7% were aged between 24–26 years. In terms of gender distribution, females constituted a higher proportion (73.3%) compared to males (26.7%), which is consistent with the gender ratio commonly observed in nursing education in India. Regarding the year of study, the highest proportion of students were in their 2nd year (41.7%), followed by 3rd year (33.3%), and 4th year (25%). Nearly half of the participants (46.7%) had prior exposure to digital learning platforms, while 53.3% had no such exposure, suggesting a balanced mix for comparison.

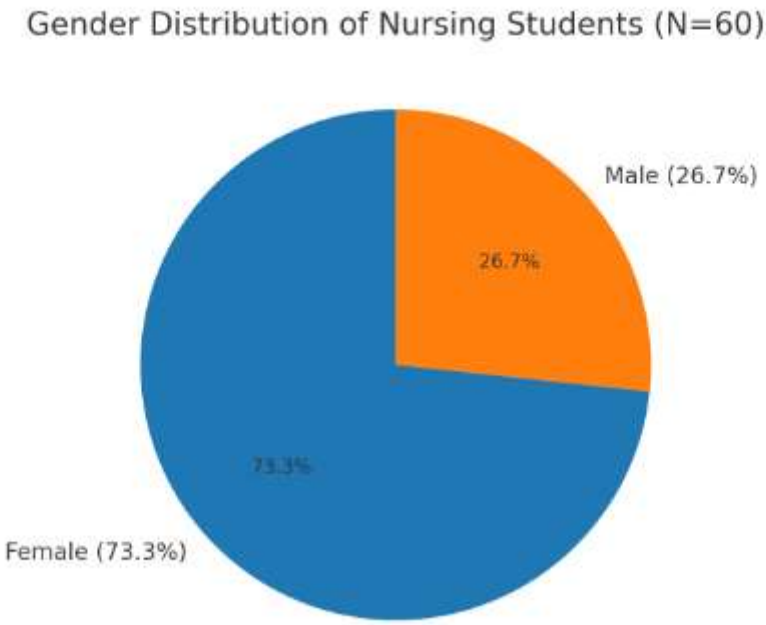

Figure 1: Pie Chart – Gender distribution of nursing students (N=60).

Table 2: Skill Acquisition Scores of Students (N=60)

Skill Domain	**Mean Score (±SD)**	**Range (Max = 25)**
IV Cannulation	20.2 ± 2.1	16–24
CPR	21.5 ± 1.8	18–25
Urinary Catheterization	19.7 ± 2.5	15–24
Overall Skill Score	**61.4 ± 5.6**	49–73

Table 2 highlights the skill acquisition scores of students across different nursing procedures. The mean score for IV cannulation was 20.2 (±2.1), while CPR showed the highest mean score of 21.5 (±1.8), indicating better skill acquisition in resuscitation-related competencies. Urinary catheterization had a mean score of 19.7 (±2.5). The overall mean skill acquisition score was 61.4 (±5.6) out of a possible 75, suggesting that most students achieved above-average skill proficiency after the VR-based training sessions. The relatively higher performance in CPR may be attributed to the interactive and repetitive nature of VR simulations that enhance psychomotor learning in emergency skills

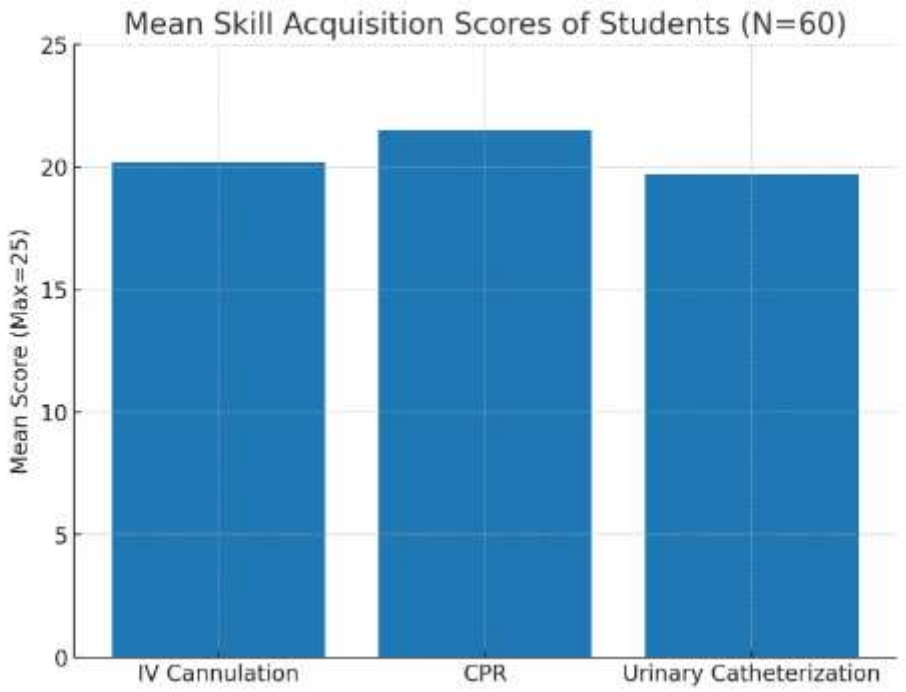

Figure 2: Bar Chart – Mean skill acquisition scores across different procedures (IV cannulation, CPR, urinary catheterization)

Table 3: Association of Demographic Variables with Skill Acquisition Score

Variable	**Mean Score**	**Test Applied**	**p-value**	**Result**
Gender	Male: 62.1	t = 0.89	0.37	NS
	Female: 60.9			
Year of Study	2nd: 59.8, 3rd: 61.2, 4th: 62.3	ANOVA F=1.12	0.33	NS
Digital Learning Exposure	Yes: 63.8	t = 2.56	0.013	**Significant**
	No: 59.2			

Interpretation: Students with prior digital learning exposure scored significantly higher in skill acquisition.

Table 3 examines the association between demographic variables and overall skill acquisition scores using inferential statistics. Gender did not show a statistically significant difference in skill acquisition (t=0.89, p=0.37), indicating that both male and female students benefited equally from VR-based learning. Similarly, the year of study was not significantly associated with skill acquisition scores (F=1.12, p=0.33), which suggests that VR learning is equally effective regardless of academic seniority. However, a statistically significant association was observed with prior digital learning exposure (t=2.56, p=0.013). Students with previous experience in digital learning scored higher (mean = 63.8) compared to those without such exposure (mean = 59.2). This finding suggests that familiarity with digital platforms enhances adaptability and learning outcomes when using VR technologies.

Results:

Majority of students (65%) reported high satisfaction with VR sessions. Mean skill acquisition score was significantly higher among students with prior exposure to digital learning compared to those without (t=2.56, p=0.013). No significant association was found between demographic variables such as gender and year of study with skill acquisition scores.

Conclusion:

VR-based learning significantly enhances skill acquisition among nursing students and may be effectively integrated into nursing curricula to complement traditional methods.

Keywords: Virtual Reality, Nursing Education, Skill Acquisition, Simulation, Survey

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