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A study to assess the effectiveness of video assisted teaching programs on knowledge regarding endotracheal tube suctioning among B.Sc. nursing 2nd year students at selected nursing colleges Jabalpur (M.P.)

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Abstract
Background: Endotracheal tube suctioning (ETS) is a vital clinical skill for maintaining airway patency in mechanically ventilated patients. Despite its significance, knowledge gaps exist among nursing students, which can impact patient safety. This study evaluates the effectiveness of a video-assisted teaching program (VATP) on enhancing the knowledge of B.Sc. Nursing 2nd-year students regarding ETS.

Objectives
1. To assess pre-test and post-test knowledge scores regarding ETS.
2. To determine the difference between pre- and post-test knowledge scores.
3. To find the association between pre-test knowledge and selected demographic variables.

Methodology: A quasi-experimental one-group pre-test and post-test design was employed among 60 second-year B.Sc. Nursing students. A structured knowledge questionnaire assessed understanding before and after an intervention via a video-assisted teaching program. Data were analyzed using descriptive statistics, paired *t*-test, and chi-square test.

Results: Pre-test findings revealed that 18.33% of students had poor knowledge and 81.66% had average knowledge, with no students scoring in the good knowledge category. Post-test results showed a significant improvement, with 60% achieving good knowledge and 40% attaining average knowledge. The paired *t*-test showed a statistically significant increase in knowledge scores post-intervention ($p < 0.05$). A significant association was found between pre-test knowledge and demographic variables such as age and source of prior knowledge.

Conclusion: The video-assisted teaching program effectively enhanced students' knowledge of endotracheal tube suctioning. These findings support the integration of innovative teaching methodologies like VATPs in nursing education to improve clinical competencies and patient safety.

Keywords: Endotracheal tube suctioning, ETS, nursing education

Introduction
Endotracheal tube suctioning (ETS) is a critical procedure in respiratory care, primarily performed in intensive care units (ICUs), emergency departments, and surgical settings to maintain airway patency and prevent complications in patients requiring mechanical ventilation. This procedure involves the removal of secretions from the trachea and lower airways via a suction catheter inserted through an endotracheal tube (ETT). It is an essential intervention for patients with impaired airway clearance due to conditions such as acute respiratory distress syndrome (ARDS), chronic obstructive pulmonary disease (COPD), pneumonia, neuromuscular disorders, and post-operative respiratory complications. While ETS is a life-saving technique, it is also associated with various risks, including hypoxia, airway trauma, infection, and hemodynamic instability, necessitating careful execution based on established clinical guidelines.

Objectives of the study
1. To assess the pretest knowledge score regarding Endotracheal tube Suctioning among BSc nursing 2nd year students.

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2. To assess the posttest knowledge score regarding Endotracheal tube Suctioning among BSc nursing 2nd year students.
3. To assess the difference pretest and posttest knowledge score regarding Endotracheal tube Suctioning among BSc nursing 2nd year students.
4. To find out the association between pretest knowledge score regarding Endotracheal tube Suctioning among BSc nursing 2nd year students.

Hypotheses

- **H₁:** There will be a significant difference in the mean pre test and post test level of knowledge regarding endotracheal tube suctioning among B.Sc. nursing 2nd year colleges students.
- **H₂:** There will be a significant between association pre test knowledge score with selected Demographical variables.

Jones, A., & Smith, R. (2023) [5]. Endotracheal tube (ETT) suctioning is a critical procedure performed in intensive care units (ICUs) to maintain airway patency in intubated patients. Adequate knowledge among nurses about the indications, techniques, and potential complications of ETT suctioning is crucial for patient safety. This study aims to assess the knowledge level of critical care nurses regarding ETT suctioning and identify the factors influencing their knowledge. A cross-sectional study was conducted among 200 ICU nurses from three tertiary hospitals. A validated, self-administered questionnaire assessed knowledge across five domains: indications, preparation, suctioning techniques, monitoring, and complication management. Data were analyzed using descriptive statistics and multiple regression analysis to determine factors associated with knowledge levels. Findings showed that 45% of nurses had good knowledge, 40% had moderate knowledge, and 15%

had poor knowledge regarding ETT suctioning. The highest knowledge scores were observed in the domains of indications and preparation, while the lowest were in complication management. Factors such as years of experience in the ICU, attendance at workshops, and continuing education were significantly associated with higher knowledge scores ($p < 0.05$). The study highlights the need for regular training and standardized protocols to improve nurses' knowledge of ETT suctioning, particularly in complication management. Enhanced knowledge may lead to better patient outcomes and reduced complications.

Methodology
A quasi-experimental pre-test and post-test design was used. A total of 60 second- year B.Sc. Nursing students participated in the study. Data were collected using a structured knowledge questionnaire before and after the intervention. The video- assisted teaching program covered key aspects of endotracheal suctioning, including indications, techniques, precautions, and infection control measures. Descriptive and inferential statistics were used to analyze the data.

Assess the pre test knowledge regarding endotracheal tube suctioning

Table 1: Frequency and percentage distribution of *assess the pre test knowledge* regarding endotracheal tube suctioning among B.Sc. nursing 2nd year colleges students. N=60

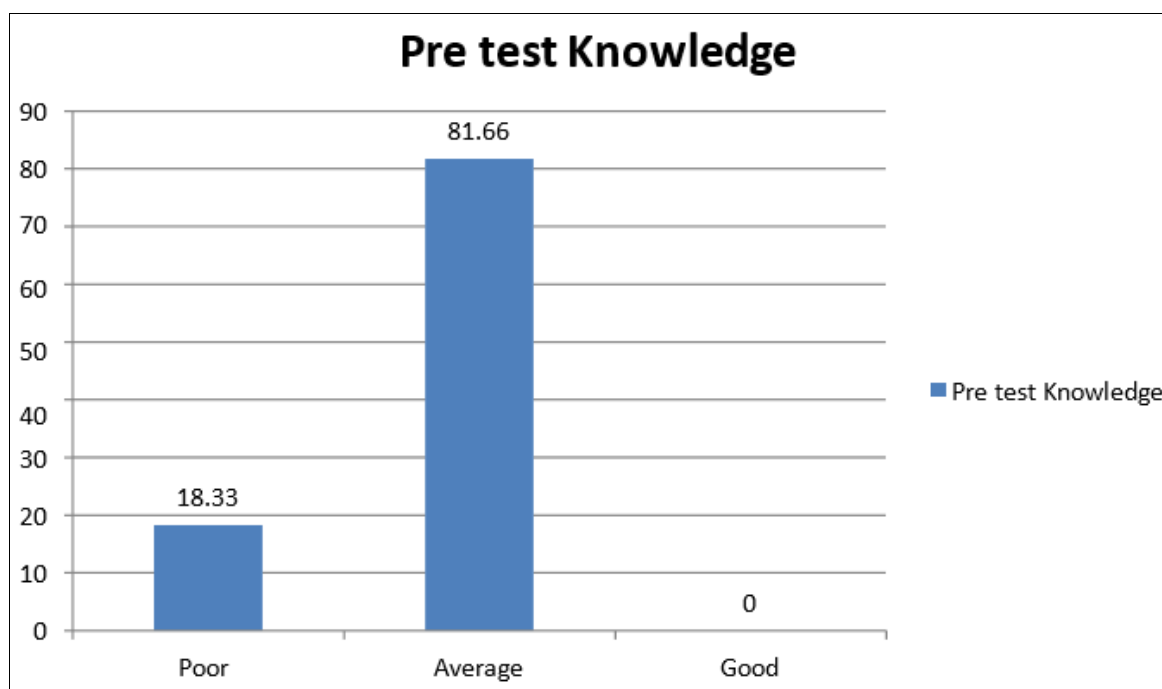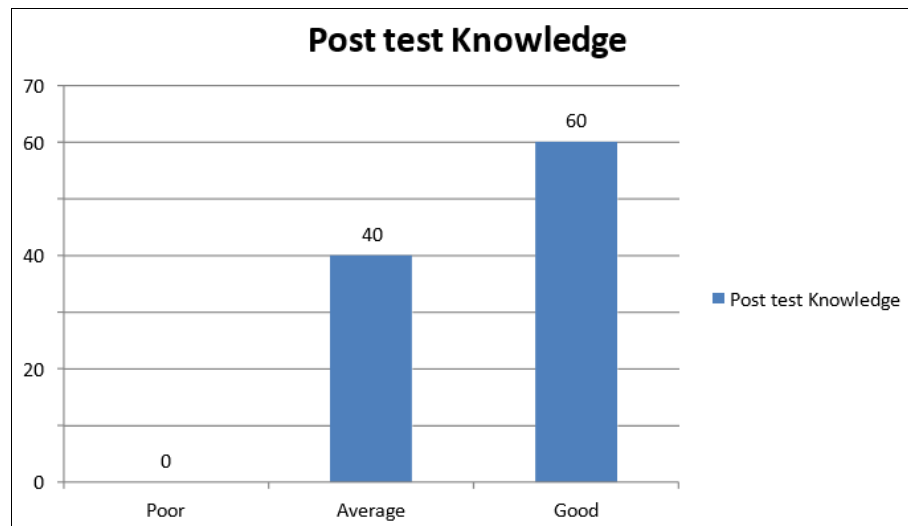| Score | Grading | Pre test knowledge | | Mean | SD |
		Frequency (f)	Percentage (%)		
1 – 8	Poor	11	18.33%		
9-16	Average	49	81.66%	11.03	3.09
17-25	Good	0	0%		
		30	100		

Fig 1: Column diagram showing percentage distribution of pre test knowledge The above table shows of b.sc 2nd year students 11 (18.33%) have poor knowledge, between 1-10, whereas 49 (81.66%) was in the average knowledge between 11-20. none of them had good knowledge ranging from 21-30.

Assess the post test knowledge regarding endotracheal tube suctioning

Table 2: Frequency and percentage distribution of *post test knowledge* endotracheal tube suctioning among B.Sc. nursing 2nd year colleges students. N=60

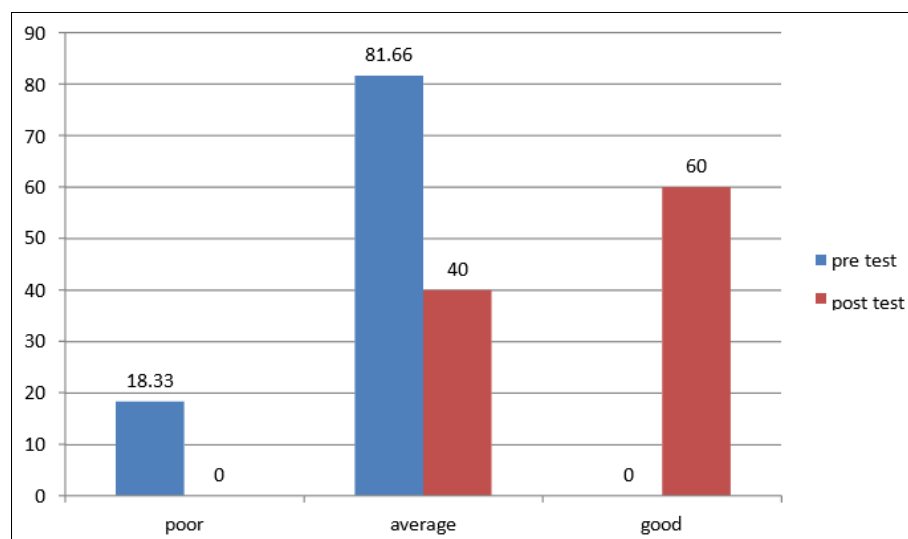| Score	Grading	Post test knowledge		Mean	SD
		Frequency (f)	Percentage (%)		
1 – 10	Poor	0	0%		
11 - 20	Average	24	40%	17.6	4.17
21 - 30	Good	36	60%		
			100		

Fig 2: Column diagram showing percentage distribution of post test knowledge. The above table shows of b.sc 2nd year students, none of them had poor knowledge between 1-10, whereas 24 (40%) was in the average knowledge between 11-20. 36(60%) had good knowledge ranging from 21-30.

Comparision between pre and post test of knowledge regarding endotracheal tube suctioning
This section deals with the, *compare between pretest and post test knowledge* regarding endotracheal tube suctioning among B.Sc. nursing 2nd year colleges students.

Table 3: Comparision between pre test and post test knowledge scores using t-test, n =60

S. No.	Test	Mean	Mean Difference	S D	SED	t value	Significance
1	Pre test	11.03	6.57	3.67	0.62	10.59	t = 10.59
2	Post test	17.6					p<0.05 Most significant at 118df
							p=1.98

Comparision between pre and post test of knowledge regarding endotracheal tube suctioning.

Fig 3: Bar diagram showing the comparison between pre and post test of knowledge regarding endotracheal tube suctioning among B.Sc. nursing 2nd year colleges students

Despite that in pretest knowledge of b.sc 2nd year students 11 (18.33%) have poor knowledge, between 1-10, whereas 49 (81.66%) was in the average knowledge between 11-20. none of them had good knowledge ranging from 21-30. Whereas in post test, of b.sc 2nd year students, none of them had poor knowledge between 1-10, whereas 24 (40%) was in the average knowledge between 11-20. 36(60%) had good knowledge ranging from 21-30.

Hence H$_1$: There will be a significant difference between pre test and post test knowledge score regarding endotracheal tube suctioning among B.Sc. nursing 2nd year colleges students." is accepted.

Association between the pre-test knowledge scores with their selected socio -demographic variables

Table 4: Chi square value showing association of pre-test knowledge with their selected demographic variable, N – 60

Demographic variable	Pre test knowledge				Chi score χ2	Df	Tabula ted value	Inference
	Poor	Averag e		Good				
Age in Year								
18-19 year	6	24	0	30	30	4	9.49	Most Significant
20-21 year	0	0	0	0				
21 year to above	6	24	0	30				
If Yes Source of Knowledge								
Mass media	0	0	0	0	114	4	9.49	Most Significant
Seniors	10	49	0	59				
Other sources	1	0	0	1				
Education Qualification								
Higher secondary	8	26	0	34	1.06	2	5.99	Non significant
Graduation	3	23	0	26				

Designation: * indicates significant at the level of 0.05.

Recommendation
A similar studycan be conducted:
1. Among nursing students in private nursing colleges to compare results with government institutions.
2. In a different geographical location to assess regional variations in knowledge.
3. Across various academic levels (e.g., 1st year, 3rd year) to analyze knowledge progression.
4. With a larger sample size to enhance the generalizability of findings.
5. Using other teaching methods (e.g., simulation-based training or workshops) for comparative effectiveness.
6. Focusing on different clinical procedures, such as catheterization or IV cannulation.
7. Among healthcare professionals like paramedics to explore interdisciplinary applications.
8. To evaluate long-term retention of knowledge and skills post-intervention.

Implication of the study Nursing Administration
The findings of this study highlight the importance of integrating innovative teaching methodologies, such as video-assisted teaching programs (VATPs), into routine training modules for nursing students. Nursing administrators can utilize these insights to revise training protocols, ensuring competency in technical skills like endotracheal tube suctioning. By adopting VATPs, administrators can promote standardized practices, minimize variations in skill levels, and enhance patient safety across healthcare settings. The study also supports resource allocation for acquiring and maintaining audio-visual equipment, advocating for budgetary provisions to include advanced teaching aids. Furthermore, administrators can use this model to train clinical staff, fostering a culture of continuous professional development.

Nursing Practice
This study underscores the critical role of evidence-based teaching methods in improving clinical competencies among nursing students. By enhancing knowledge and skills in endotracheal tube suctioning, VATPs prepare students to deliver high-quality patient care in real-world settings. The findings emphasize the need for practicing nurses to adopt a systematic approach when performing suctioning to prevent complication slike hypoxiaorin fection. It also encourages practicing nurses to act as mentors, utilizing such teaching tools to guide students during clinical rotations. Moreover, the study advocates for incorporating simulated VATPs into on-the-job training programs, ensuring all healthcare personnel stay updated on best practices.

Nursing Research
This study opens avenues for further research in evaluating the effectiveness of VATPs across diverse nursing skills and populations. Researchers can build upon these findings to explore long-term retention of knowledge and skills imparted through video-assisted methods. Comparative studies can also assess VATPs against traditional teaching techniques or other innovative methods like virtual reality. The study highlights the need for multi-institutional research to standardize VATP implementation and identify factors influencing its success. Additionally, future research could explore the cost-effective ness of such programs, thus providing administrators with evidence to justify investments in technological tools.

Nursing Education
The study highlights the transformative potential of VATPs in nursing education. By integrating such methods, educators can bridge the gap between theoretical knowledge and practical application, making learning more engaging and effective. It encourages nursing colleges to revamp their curricula to include audio-visual teaching aids as part of their standard pedagogy. Furthermore, the study supports the use of VATPs to cater to diverse learning styles, enabling students to learn at their own pace. It also advocates for training faculty members to effectively use these tools, ensuring optimal delivery of content. By

fostering competency in endotracheal tube suctioning, educators can produce graduates who are confident and prepared for clinical challenges.

Results

The pre-test findings revealed that 18.33% of students had poor knowledge, while 81.66% demonstrated an average understanding of ETS. None of the participants scored in the" good knowledge" category. After the intervention, post-test results showed significant improvement: 60% of students attained good knowledge scores, and 40% achieved average scores, with none remaining in the poor category. Statistical analysis using the t-test confirmed a significant increase in post-test mean knowledge scores compared to pre-test scores ($p<0.05$), supporting the hypothesis that video-assisted teaching effectively enhances learning. The Chi-square test indicated a significant association between pre-test knowledge scores and demographic factors like age and the source of prior knowledge ($p<0.05$), while educational qualification showed no significant impact.

Conflict of Interest

Not available.

Financial Support

Not available.

Reference

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