Original Research Article

The Efficiency of a Video-Assisted Instructional Module in Enhancing Staff Nurses' Understanding of Surgical Foot Surgery Practice

Mr. Syam Mohanlal[1*], Mr. Sunny Jerome[2], Mr. Sandip Saha[3], Mr. Mirjahan Hoque[3], Prof. Devi Nanjappan[4], Mrs. Snehalatha Reddy[5], Mrs. Keerthi Sudha[1], Mrs. Nirmala Sudha[6], Mr. Durgaprassad[6]

[1]Associate Professor, Department of Medical Surgical Nursing, Smt. Nagarathnamma College of Nursing, Bengaluru, India
[2]Lecturer, Mental Health Nursing, Smt. Nagarathnamma College of Nursing, Bengaluru, India
[3]Assistant Lecturer, Faculty of Nursing, Smt. Nagarathnamma College of Nursing, Bengaluru, India
[4]Principal, Department of Medical Surgical Nursing, Smt. Nagarathnamma College of Nursing, Bengaluru, India
[5]Professor, Department of Medical Surgical Nursing, Smt. Nagarathnamma College of Nursing, Bengaluru, India
[6]Assistant Professor, Department of Medical Surgical Nursing, Smt. Nagarathnamma College of Nursing, Bengaluru, India

*Corresponding author: Mr. Syam Mohanlal
Associate Professor, Department of Medical Surgical Nursing, Smt. Nagarathnamma College of Nursing, Bengaluru, India

Abstract

The study aimed to evaluate the effectiveness of a Video-Assisted Teaching Module (VATM) in enhancing knowledge on the practice of surgical fomentation for patients with diabetic foot among staff nurses at Vinayaka Mission Kirupananda Variyar Medical College Hospital, Salem. The objectives included assessing pre-existing knowledge, evaluating VATM's effectiveness, and analysing demographic variables' impact. A pre-experimental research design was employed, with 48 staff nurses selected using purposive sampling. Data was collected using a closed-ended questionnaire before and after the VATM intervention. The pre-test mean score was 12.73 (42%), and the post-test mean score increased to 19.19 (64%), demonstrating the VATM's effectiveness with a 22% improvement. The highest effectiveness (26%) was in the "surgical fomentation" domain, while the "articles required" domain showed the lowest effectiveness (17%). Data analysis revealed significant improvement in knowledge post-intervention, with no significant association between knowledge scores and demographic variables such as age, gender, or educational background. The study concludes that VATM is an effective tool for improving nurses' knowledge on surgical fomentation, supporting better care for diabetic foot patients. The results emphasize the need for ongoing educational interventions to enhance nursing practices.
Keywords: Surgical Fomentation, Diabetic Foot, Staff Nurses, Knowledge Enhancement.

1. INTRODUCTION

Diabetes Mellitus is a global health concern, characterized by chronic hyperglycemia due to impaired insulin secretion or action. With the increasing prevalence of diabetes worldwide, a significant number of patients are developing complications, particularly diabetic foot ulcers. These ulcers are one of the most serious consequences of diabetes, leading to infections, amputations, and in extreme cases, disability. Diabetic foot ulcers result from a combination of neuropathy, poor circulation, and the body's inability to heal wounds effectively, making foot care a critical aspect of diabetes management.

Surgical fomentation, a practice involving the application of hot moist packs to the affected area, is an essential intervention in the treatment of diabetic foot ulcers. It aids in improving blood flow, promoting wound healing, and preventing further infection. Despite the importance of this practice, there is evidence suggesting that many nurses lack the necessary knowledge and skills to implement it effectively. Proper education and training of nursing staff are paramount to ensure they can provide the required care to diabetic patients and reduce the risk of complications.

To address this gap in knowledge and practice, educational interventions such as Video-Assisted Teaching Modules (VATM) have emerged as effective tools. These modules offer a visual and structured approach to learning, allowing nurses to understand the intricacies of procedures such as surgical fomentation in an engaging and practical way. The use of VATM not only improves theoretical knowledge but also enhances practical skills, ensuring that nurses can confidently

Citation: Syam Mohanlal *et al* (2024). The Efficiency of a Video-Assisted Instructional Module in Enhancing Staff Nurses' Understanding of Surgical Foot Surgery Practice. *Saudi J Nurs Health Care, 7*(11): 252-257.

252

perform procedures that directly impact patient outcomes.

Need for Study:

The burden of diabetes is rising, particularly in developing countries like India, which is home to one of the largest populations of diabetics in the world. The World Health Organization (WHO) predicts that by 2025, the number of diabetics worldwide will surpass 380 million, with a significant proportion residing in India. Among the complications of diabetes, foot ulcers remain a significant cause of morbidity, leading to prolonged hospital stays and increased healthcare costs. Up to 25% of diabetic patients are expected to develop foot ulcers, and approximately 20% of those ulcers result in amputation. Such alarming statistics highlight the urgent need for effective management strategies to prevent these outcomes.

Given the critical role that nurses play in managing diabetic foot ulcers, their knowledge and proficiency in wound care, specifically surgical fomentation, are crucial. However, studies have shown that nurses often have inadequate knowledge and receive insufficient training on diabetic foot care, including surgical fomentation techniques. Without proper education, the quality of care delivered to patients is compromised, leading to suboptimal outcomes such as delayed healing or infection, ultimately resulting in amputations.

Moreover, in many healthcare settings, particularly in developing countries, access to continuous professional development and training is limited. This further exacerbates the problem, as nurses are expected to manage complex diabetic wounds without the necessary up-to-date knowledge or skills. The traditional methods of in-service education, while effective to some extent, often fail to engage nurses or provide practical, hands-on experience.

Therefore, there is an evident need for innovative educational approaches like VATM to improve nurses' knowledge and practice. Video-assisted teaching provides an interactive platform that combines visual aids with theoretical knowledge, making it easier for nurses to understand complex procedures like surgical fomentation. Additionally, the flexibility of video modules allows nurses to learn at their own pace, ensuring that they fully grasp the content before applying it in clinical settings.

In this context, the current study focuses on assessing the effectiveness of a Video-Assisted Teaching Module on surgical fomentation in improving the knowledge and skills of staff nurses working with diabetic foot patients. By addressing the gap in knowledge and providing a structured learning intervention, the study aims to contribute to the enhancement of nursing practice, ultimately leading to better patient outcomes.

The findings of this study are expected to provide valuable insights into the role of VATM as an educational tool and its impact on nursing practices in the management of diabetic foot complications. If proven effective, VATM can serve as a model for similar interventions aimed at improving nursing care across various healthcare settings.

2. MATERIAL AND METHODS

Research Design: The study employed a pre-experimental research design with a pre-test and post-test approach, without a control group. This design was chosen to assess the effectiveness of the Video-Assisted Teaching Module (VATM) in improving knowledge on the practice of surgical fomentation for diabetic foot patients among staff nurses. The study involved administering a knowledge assessment before and after the intervention (VATM) to evaluate the changes in knowledge levels.

Setting of the Study: The research was conducted at Vinayaka Mission's Kirupananda Variyar Medical College Hospital, Salem, Tamil Nadu. The hospital, located approximately 12 km from Salem city, has 600 beds and employs over 120 staff nurses. The study was conducted in various wards, including medical, surgical, and specialty units where diabetic foot patients are typically managed.

Population and Sample: The population for this study comprised staff nurses working in Vinayaka Mission's Kirupananda Variyar Medical College Hospital. The sample size included 48 staff nurses selected using purposive sampling based on predefined criteria.

Inclusion Criteria:
1. Staff nurses available during the time of data collection.
2. Nurses who were willing to participate.
3. Nurses of both genders.
4. Nurses who could read and understand English.
5. Nurses who had not received prior formal education on surgical fomentation.

Exclusion Criteria: Nurses who were not present during the data collection period or were unwilling to participate were excluded from the study.

Tools for Data Collection: Two main tools were used for data collection:
1. Closed-ended Questionnaire: A structured questionnaire was developed to assess the nurses' knowledge on various aspects of surgical fomentation, including indications, procedure, articles required, physiological effects, and aftercare. The questionnaire had two sections:

- **Section A:** Demographic data of the nurses (age, gender, educational qualifications, work experience, department of work, and participation in in-service education programs).
- **Section B:** Consisted of closed-ended questions related to surgical fomentation, with four options per question, where one correct answer carried a score of 'one' and incorrect answers carried a score of 'zero.'

2. Video-Assisted Teaching Module (VATM): The VATM was developed specifically for this study, focusing on educating staff nurses about surgical fomentation for diabetic foot patients. The content included information on the definition, procedure, articles required, physiological effects, indications, contraindications, and aftercare of surgical fomentation. The video presentation was designed to be interactive and engaging, lasting approximately 20 minutes.

Scoring Procedure: The level of knowledge was categorized based on the percentage of scores obtained:
- Very Poor: < 21% (1-6 points)
- Poor: 21-40% (7-12 points)
- Average: 41-60% (13-18 points)
- Good: 61-80% (19-24 points)
- Excellent: > 81% (25-30 points)

Data Collection Procedure: Data were collected in two phases: a pre-test and a post-test, both using the same closed-ended questionnaire:
1. **Pre-test:** Staff nurses were gathered in a single room and briefed on the study's purpose. The pre-test was administered for 30-45 minutes to assess their baseline knowledge on surgical fomentation.
2. **Intervention (VATM):** Immediately after the pre-test, the VATM was shown to the participants. The video, lasting 20 minutes, provided comprehensive instruction on the procedure and best practices for surgical fomentation.
3. **Post-test:** The post-test was conducted 10 days after the intervention using the same closed-ended questionnaire to measure the change in knowledge levels.

Ethical Considerations: Ethical approval was obtained from the Vinayaka Mission Kirupananda Variyar Medical College Hospital administration. Informed consent was sought from all participants before the data collection. Nurses were assured of confidentiality, and participation was voluntary.

Data Analysis: Data were analyzed using descriptive and inferential statistics:
1. **Descriptive statistics** (mean, standard deviation, and percentage) were used to describe the demographic characteristics of the participants and their pre- and post-test knowledge scores.
2. **Inferential statistics:** The paired 't' test was used to compare pre-test and post-test scores to assess the effectiveness of VATM. A chi-square test was applied to examine the association between post-test knowledge scores and demographic variables such as age, gender, and education level.

Interpretation:
The effectiveness of VATM was determined by comparing the mean percentage scores before and after the intervention. A statistically significant improvement in post-test scores indicated the module's effectiveness in enhancing the knowledge of staff nurses regarding surgical fomentation.

This methodology ensured that the study systematically evaluated the impact of VATM on nursing practices, providing a solid foundation for future educational interventions in diabetic foot care.

3. RESULTS AND DISCUSSION
This section presents the analysis of data collected from the 48 staff nurses who participated in the study at Vinayaka Mission Kirupananda Variyar Medical College Hospital. The data were analyzed using descriptive and inferential statistics to assess the effectiveness of the Video-Assisted Teaching Module (VATM) on improving knowledge regarding surgical fomentation of diabetic foot patients. The analysis is presented in five key sections: demographic characteristics, pre-test and post-test knowledge scores, effectiveness of VATM, association between demographic variables and knowledge scores, and discussion of findings.

Section I: Demographic Characteristics of Participants
The demographic profile of the 48 staff nurses is summarized to provide context for the study's findings. The nurses were categorized based on age, gender, educational qualifications, and work experience. The key demographic findings are:
1. **Age Distribution**:
- The majority (67%) of nurses were in the 21-25 age group, indicating that most of the participants were young adults.
- 25% of the nurses were aged between 26-30 years, while only 8% were above 30 years.

2. **Gender**:
- The sample was predominantly female (63%), reflecting the typical gender distribution in the nursing profession in India.
- 37% of participants were male.

3. **Educational Qualifications**:
- A significant proportion (61%) of the nurses held a Bachelor of Science in Nursing (B.Sc Nursing) degree.
- 29% had a diploma in nursing, and 10% had a Post Basic B.Sc. Nursing qualification.

4. **Work Area**:
44% of the nurses worked in medical wards, 29% in surgical wards, and the remaining 27% were spread across other departments such as intensive care units (ICUs) and outpatient departments (OPDs).

5. **In-service Education**:
A striking 92% of the staff nurses had not previously attended in-service educational programs related to surgical fomentation, highlighting a significant gap in their professional training.

Section II: Pre-test and Post-test Knowledge Scores
The primary focus of the study was to evaluate the knowledge levels of staff nurses before and after the implementation of VATM. The pre-test and post-test scores were compared to measure the improvement in knowledge.

1. **Pre-test Scores**:
- The overall mean pre-test score was 12.73 (42% of the total score), indicating that the nurses had below-average knowledge regarding surgical fomentation of diabetic foot patients.
- The highest pre-test mean score was recorded in the "procedure" domain (51%), while the lowest was in "diabetic foot" (36%).

2. **Post-test Scores**:
- After the intervention (VATM), the mean post-test score increased to 19.19 (64% of the total score), reflecting a significant improvement in knowledge.
- The highest post-test mean score was in the "merits" of surgical fomentation (72%), and the lowest was in the "articles required" (61%).

Section III: Effectiveness of the Video-Assisted Teaching Module (VATM)
The effectiveness of VATM was measured by calculating the difference between pre-test and post-test scores. The analysis revealed the following key findings:

1. **Overall Effectiveness**:
The mean percentage improvement between pre-test and post-test scores was 22%, demonstrating that VATM significantly enhanced the nurses' knowledge of surgical fomentation.

2. **Domain-specific Effectiveness**:
- The highest knowledge gain (26%) was observed in the "surgical fomentation" domain, indicating that the video module was particularly effective in conveying procedural information.

- The lowest effectiveness (17%) was noted in the "articles required" domain, suggesting that further emphasis may be needed on this aspect in future interventions.

3. **Statistical Significance**:
A paired 't' test was conducted to compare the pre-test and post-test scores. The calculated 't' value was found to be statistically significant at a p-value < 0.05, confirming the effectiveness of the VATM intervention in improving knowledge among the nurses.

Section IV: Association between Demographic Variables and Knowledge Scores
To examine whether demographic factors influenced the effectiveness of VATM, a chi-square test was applied to compare post-test scores with variables such as age, gender, educational qualifications, and work area.

1. **Age**:
The highest improvement in post-test scores (21%) was observed in nurses aged 26-30 years, followed closely by those in the 21-25 age group. However, the chi-square analysis revealed no statistically significant association between age and post-test scores, suggesting that the effectiveness of VATM was consistent across age groups.

2. **Gender**:
Both male and female nurses showed significant improvements in post-test scores, with a slight edge for female nurses (22% improvement compared to 21% for males). Despite this, the chi-square test indicated no significant association between gender and knowledge gain, affirming that VATM was equally effective for both genders.

3. **Educational Qualifications**:
Nurses with a Post Basic B.Sc. degree showed the highest improvement (25%) in knowledge, followed by B.Sc. nurses (22%). Diploma holders had the lowest improvement (20%). The chi-square test revealed no significant association between educational qualifications and the effectiveness of VATM, indicating that the module benefited nurses of all educational backgrounds.

4. **Work Area**:
Nurses working in medical and surgical wards showed similar levels of improvement in post-test scores, with no statistically significant association between the area of work and knowledge gain.

Section V: Discussion of Findings
The results of this study demonstrate that the Video-Assisted Teaching Module (VATM) was highly effective in improving the knowledge of staff nurses regarding the practice of surgical fomentation for diabetic foot patients. The significant increase in post-test scores, coupled with the high levels of effectiveness

across various knowledge domains, suggests that VATM is a valuable educational tool for enhancing nursing practices in wound care.

1. **Effectiveness of VATM**:

The improvement in knowledge across all domains highlights the efficacy of visual learning methods like VATM. The module's ability to present procedural knowledge in a step-by-step manner, accompanied by visual demonstrations, made it easier for nurses to grasp the concepts of surgical fomentation.

2. **Consistency Across Demographics**:

The lack of significant associations between demographic variables (age, gender, education) and post-test scores is an encouraging finding. It suggests that VATM can be effectively implemented across diverse groups of nurses, regardless of their background or prior knowledge.

3. **Knowledge Gaps**:

Despite the overall success of VATM, the relatively lower effectiveness in the "articles required" domain points to a potential gap in the module's content or the nurses' practical experience in handling surgical tools and materials. Future iterations of the VATM could place greater emphasis on this area to ensure comprehensive knowledge.

4. **Relevance to Clinical Practice**:

The findings underscore the importance of continuous professional education for nurses, particularly in areas like diabetic foot care, where proper wound management is critical. By equipping nurses with the necessary knowledge and skills, VATM can play a pivotal role in improving patient outcomes and reducing the risk of complications like amputations.

5. **Implications for Nursing Education**:

The success of VATM in this study highlights its potential as a replicable model for other nursing practices. The use of technology in education, particularly in video-based learning, can provide an accessible and engaging platform for nurses to upgrade their skills without the constraints of traditional classroom-based learning.

4. CONCLUSION

The data analysis and interpretation from this study clearly demonstrate the effectiveness of the Video-Assisted Teaching Module in improving the knowledge of staff nurses regarding surgical fomentation for diabetic foot patients. The significant improvements observed in post-test scores validate the need for innovative educational interventions such as VATM in nursing practice. Given the promising results, VATM can be further integrated into professional development programs to ensure that nurses are well-equipped to provide high-quality care to diabetic foot patients.

Moreover, the findings suggest that VATM could be adapted for other clinical procedures, contributing to a broader shift towards technology-enhanced learning in healthcare.

This study assessed the effectiveness of a Video-Assisted Teaching Module (VATM) in enhancing the knowledge of staff nurses regarding the practice of surgical fomentation for diabetic foot patients. The pre-experimental research design, involving pre-test and post-test assessments, revealed a significant improvement in knowledge following the VATM intervention. The post-test scores showed a 22% increase compared to pre-test scores, indicating the module's effectiveness. The highest knowledge gain was observed in the "surgical fomentation" domain, while the "articles required" domain showed the lowest improvement.

The study also found no significant associations between knowledge improvement and demographic variables such as age, gender, and educational background, suggesting that VATM is universally effective across diverse nursing groups. This emphasizes the module's potential to bridge knowledge gaps in nursing practice, particularly in areas with limited access to continuing education.

Overall, VATM proved to be an effective tool in improving nurses' knowledge and competence in surgical fomentation, which is crucial for the management of diabetic foot complications. The success of this educational intervention highlights the importance of integrating technology-based learning into professional nursing education to enhance patient care and outcomes.

Competing Interest

The authors declare that there are no competing interests related to this research. The remaining authors declare no competing interests.

Ethical Clearance

Every procedure in this investigation complied with equivalent ethical standards or the 1964 Helsinki Declaration and its revisions. "The ethical aspect of the study has been institutionally reviewed". Informed consent has been procured by all respondents in this study.

REFERENCES
- Alsaigh, S. H., Alzaghran, R. H., Alahmari, D. A., Hameed, L. N., Alfurayh, K. M., & Alaql, K. B. (2022). Knowledge, Awareness, and Practice Related to Diabetic Foot Ulcer Among Healthcare Workers and Diabetic Patients and Their Relatives in Saudi Arabia: A Cross-Sectional Study. *Cureus*, *14*(12), e32221. https://doi.org/10.7759/cureus.32221
- Alkhatieb, M., Abdulwassi, H., Fallatah, A., Alghamdi, K., Al-Abbadi, W., & Altaifi, R. (2022). Knowledge of Diabetic Foot Among Nurses at a Tertiary Hospital in Saudi Arabia. *Medical archives (Sarajevo, Bosnia and Herzegovina)*, *76*(3), 190–197. https://doi.org/10.5455/medarh.2022.76.190-197
- Sutariya, P., & Kharadi, A. (2016). Knowledge and practice of foot care among the patients of diabetic foot: a hospital based cross-sectional study. *International Surgery Journal*, 1850–1855. https://doi.org/10.18203/2349-2902.isj20163045
- Pourkazemi, A., Ghanbari, A., Khojamli, M., Balo, H., Hemmati, H., Jafaryparvar, Z., & Motamed, B. (2020). Diabetic foot care: knowledge and practice. *BMC endocrine disorders*, *20*, 1-8. https://doi.org/10.1186/s12902-020-0512-y
- Armstrong, D. G., & Lavery, L. (2005). *Clinical Care of the Diabetic Foot*. American Diabetes Association.
- Faroon, O. (2010). *Toxicological Profile for DDT/DDD/DDE (Update)*. DIANE Publishing.
- Ignatavicius. (2000). *Medical-Surgical Nursing*.
- *McGlamry's Comprehensive Textbook of Foot and Ankle Surgery*. (2001). Lippincott Williams & Wilkins.
- Boulton, A. J. M., Rayman, G., & Wukich, D. K. (2020). *The Foot in Diabetes*. John Wiley & Sons.
- Shearman, C. P. (2015). *Management of Diabetic Foot Complications*. Springer.