



EFFECTIVENESS OF SELF-INSTRUCTIONAL MODULE ON KNOWLEDGE REGARDING HEMODYNAMIC MONITORING AMONG FINAL YEAR NURSING STUDENTS OF SELECTED NURSING COLLEGES: A QUASI-EXPERIMENTAL

Health Science (Nursing)

**Ms. Monali
Narendrakumar
Murre**

M.Sc. Nursing, Department of Medical Surgical Nursing, Suretech College Of Nursing, Nagpur

**Mr. Sandip
Rangari**

Associate Professor, (Research Guide), Department of Medical Surgical Nursing, Suretech College of Nursing, Nagpur

ABSTRACT

Background: Hemodynamic monitoring is essential in clinical practice for assessing cardiovascular function and ensuring optimal patient care. Adequate knowledge among nursing students is crucial for accurate interpretation and management of hemodynamic parameters. **Objectives:** **Primary:** To evaluate the effectiveness of a self-instructional module on knowledge regarding hemodynamic monitoring among final year nursing students. **Secondary:** (1) To assess the existing knowledge; (2) To determine the association between post-test knowledge scores and selected demographic variables. **Hypothesis:** H_0 : No significant difference between pre-test and post-test knowledge scores. H_1 : Significant difference between pre-test and post-test knowledge scores at 0.05 level of significance. **Methodology:** A quantitative, pre-experimental one-group pre-test post-test design was adopted. A total of 100 final year nursing students were selected using non-probability convenience sampling. Data were collected using a self-structured questionnaire and analyzed using descriptive and inferential statistics (paired t-test and chi-square test). **Results:** Post-test findings showed that 33% had average knowledge, 33% good, 32% very good, and 2% excellent knowledge, with a mean score of 13.49 ± 4.07 . The results indicated a significant improvement in knowledge following the intervention. **Conclusion:** The self-instructional module was effective in improving knowledge regarding hemodynamic monitoring among final year nursing students. H_1 was accepted and H_0 was rejected. **Recommendations:** Further studies can be conducted on larger samples and different populations. Comparative studies using teaching and video-assisted methods may also be undertaken.

KEYWORDS

Hemodynamic Monitoring, Knowledge, Nursing Students, Self-Instructional Module, Effectiveness.

INTRODUCTION

Hemodynamics refers to the study of blood flow dynamics within the circulatory system and the physiological mechanisms that regulate it. It plays a crucial role in maintaining homeostasis by ensuring adequate transport of oxygen, nutrients, hormones, and metabolic waste products throughout the body. Proper regulation of blood flow is essential for maintaining cellular metabolism, body temperature, pH balance, and overall physiological stability.¹

The body continuously adapts its hemodynamic response to internal and external factors such as physical activity, temperature, and metabolic demands. In critical organs like the brain, adequate blood flow is essential for sustaining neuronal function, as it lacks energy reserves. This relationship between neuronal activity and blood flow, known as neurovascular coupling, highlights the importance of effective hemodynamic regulation.²

Hemodynamic monitoring is a vital clinical tool used to assess cardiovascular function and guide therapeutic interventions. It helps in identifying circulatory insufficiency and supports individualized patient management. Monitoring techniques may be invasive or non-invasive, each providing valuable data for optimizing fluid therapy and pharmacological interventions. However, improved patient outcomes depend not only on monitoring but also on appropriate clinical decision-making based on the data obtained.³

Background of the Study

Hemodynamic monitoring is a critical component in the management of critically ill patients, particularly in intensive care settings, where it aids in early detection of complications, evaluation of therapeutic interventions, and prevention of shock states.^[3] Evidence indicates a high incidence of hemodynamic instability among surgical patients, highlighting the importance of timely assessment and management to improve patient outcomes.⁴ Nursing students are expected to develop adequate knowledge and skills in hemodynamic monitoring to effectively manage patients across clinical settings; however, gaps in knowledge persist due to limitations in traditional teaching methods.⁵ Emerging educational strategies, such as self-instructional modules, offer flexible and interactive learning opportunities and have shown effectiveness in enhancing knowledge in various clinical domains. Nevertheless, limited research exists on their application in teaching hemodynamic monitoring, thereby emphasizing the need for the present study to evaluate their effectiveness among final year nursing students.⁶

Need of the Study

Hemodynamic monitoring is a vital component of nursing practice, particularly in critical care settings, where accurate assessment of cardiovascular function is essential for effective patient management. Despite its importance, traditional teaching methods may not adequately address the complexity of this topic, leading to knowledge gaps among nursing students.⁷ With the growing demand for competent healthcare professionals, there is a need for innovative educational approaches that enhance learning outcomes. Self-instructional modules provide flexible and interactive learning opportunities that can improve understanding and promote active learning. Therefore, the present study aims to evaluate the effectiveness of a self-instructional module in improving knowledge regarding hemodynamic monitoring among final year nursing students, thereby enhancing their clinical competence and readiness for practice.⁸

Review of Literature

Pau Codina, José Ángel Vicente Gómez, Guillem Hernández Guillamet, Laura Ricou Ríos, Andrea Carrete, Victoria Vilalta, Oriol Estrada et al (2024) a study conducted on assessing the impact of haemodynamic monitoring with CardioMEMS on heart failure patients: a cost-benefit analysis. The objective of this study was to perform a cost-benefit analysis of the CardioMEMS HF System (Abbott Laboratories, Abbott Park, IL, USA) in a heart failure (HF) clinic in Spain by evaluating the real-time remote monitoring of pulmonary artery pressures, which has been shown to reduce HF-related hospitalizations and improve the quality of life for selected HF patients. The rate of HF hospitalizations was significantly lower at 1 year compared with the year before CardioMEMS implantation (0.25 vs. 1.10 events/patient-year, hazard ratio 0.22, $P = 0.001$). At the end of the first year, the usual management outperformed the CardioMEMS HF System. By the end of the second year, the CardioMEMS system is estimated to reduce costs compared with usual management. The study concluded that remote monitoring of pulmonary artery pressure with the CardioMEMS HF System represents a midterm and long-term efficient strategy in a healthcare setting in Southern Europe.⁹

Adinda Putra Pradhana (2023) have conducted the study to find out the role of invasive hemodynamic monitoring in patients with severe mitral regurgitation undergoing herniorrhaphy operation. A 64-year-old, male, presented with Responsible Lateral Inguinal Hernia with comorbid of severe mitral and tricuspid regurgitation alongside congestive heart failure. The patient was premedicated with fentanyl

25 mcg intravenously, followed by oxygen supplementation with 3 lpm nasal cannula and insertion of the arterial line. Anaesthesia was performed using a lumbar epidural technique, with the insertion of an epidural catheter in the L1-L2 intervertebral space, Reponible Lateral Inguinal Hernia. The local anesthesia agent chosen was plain bupivacaine with a concentration of 0.5% and a volume of 8 ml. The onset of action of epidural anesthesia is achieved within 20 minutes as long as the operation reaches a total blockade as high as T8. The patient is monitored with standard monitors and an artery line during surgery. There were no complaints of shortness of breath, chest heaviness, or chest pain felt by the patient during the operation. Conclusion of the study Epidural anesthesia technique can provide stable hemodynamics in patients with severe mitral-tricuspid regurgitation and congestive heart failure and hemodynamic monitoring plays an important role postoperatively to prevent further deterioration and maintain stability.¹⁰

HYPOTHESIS

Will be tested at 0.05 level of significance.

H₀ - There will be no significant difference between effectiveness of self-instructional module on knowledge regarding hemodynamic monitoring among final year nursing students of selected nursing colleges after pretest and post test.

H₁; There will be significant difference between effectiveness of self instructional module on knowledge regarding hemodynamic monitoring among final year nursing students with students of selected nursing colleges after pretest and post test.

Objective of the Study

Primary Objective

1. To evaluate the effectiveness of self-instructional module on knowledge regarding hemodynamic monitoring among final year nursing students in selected colleges

Secondary Objective

1. To assess the existing knowledge regarding hemodynamic monitoring among final year nursing students in selected colleges.
2. To determine the association between the post test knowledge score with their selected demographic variables.

METHODOLOGY

Research Approach

A quantitative research approach was adopted to assess the effectiveness of self instructional module on knowledge regarding hemodynamic monitoring among final year nursing students.

Research Design

A quasi-experimental one-group pre-test post-test research design was used. This design was chosen to assess the effectiveness of self instructional module on knowledge regarding hemodynamic monitoring among final year nursing students.

Setting of the Study

The study was conducted in selected nursing colleges.

Target Population

The target population comprised the all final year nursing students of the selected colleges of the city.

Accessible Population

The accessible population comprises of final year nursing students of the selected colleges of the city and are available at the time of data collection and who were fulfilling the inclusive criteria.

Sample Size and Sampling Technique

A sample of 100 final year nursing students was selected using Non-probability purposive sampling technique.

Inclusion Criteria

In this study, inclusive criteria was, final year nursing students who are:

1. GNM Final year and BSc final year nursing students
2. Able to read and understand English.
3. Willing to participate in study.
4. Available at the time of data collection.

Exclusion Criteria

In this study exclusive criteria was, final year nursing students who are:

1. MSc, ANM final year nursing
2. Participated in pilot study and attended similar kind of study less than 6 months.

Tool for Data Collection

The research instrument was developed to assess the knowledge of final year nursing students regarding hemodynamic monitoring. Based on the study objectives, a self-structured questionnaire was prepared following an extensive review of literature from textbooks, journals, online sources, and previous studies. Content validity was ensured through expert consultation from medical-surgical nursing specialists, intensive care experts, and a statistician.

Section A – Demographic Variables: The investigator constructed this tool to collect the background data of the study subjects and to identify the influence of the sample characteristics with the knowledge in them. It includes total 4 demographic variables such as, age, gender, Education, Previous knowledge regarding hemodynamic monitoring.

Section B – Self Structured Knowledge Questionnaire: The questionnaire consisted of 25 questions on knowledge regarding. Total score is 25. Each question carries 1 mark and zero for the wrong answer.

Reliability

Reliability was assessed using appropriate tests from pilot data, The correlation coefficient 'r' of the tool was 0.88 and the tool was found reliable.

Pilot Study

The pilot study was conducted in hospital from from 10/02/2025 to 18/02/2025. As per laid down 10 final year nursing students were selected for pilot study from nonprobability purposive sampling technique.

Data Collection Procedure

Data collection is a systematic process of gathering relevant information to address the research objectives. The main study was conducted from 12/03/2025 to 19/03/2025 after obtaining permission from the concerned college authorities. A non-probability convenience sampling technique was used to select participants. Prior to data collection, the investigator introduced herself, explained the purpose of the study, and obtained informed consent from all participants. Baseline knowledge was assessed using a structured questionnaire (pre-test). A self-instructional module on hemodynamic monitoring was then administered to the participants. The post-test was conducted on the 7th day using the same questionnaire to evaluate the effectiveness of the intervention.

RESULT

The demographic profile showed that the majority of students (58%) were aged 23–24 years, followed by 38% aged 21–22 years and 4% aged 25–26 years; most were female (86%), and 53% had previous training in hemodynamic monitoring. Pre-test findings revealed that 46% of students had average knowledge, 51% good, and 3% very good knowledge, with a mean score of 10.18 ± 2.74 . Post-test results demonstrated improvement, with 33% having average knowledge, 33% good, 32% very good, and 2% excellent knowledge, with a mean score of 13.49 ± 4.07 . The paired t-test showed a statistically significant increase in knowledge ($t = 16.86, p < 0.05$), indicating the effectiveness of the self-instructional module. Chi-square analysis revealed a significant association between post-test knowledge and variables such as gender and previous training ($p < 0.05$), while no significant association was found with age ($p > 0.05$).

Table 1: Significance of difference between knowledge score in pre and post test regarding effectiveness of self-instructional module on knowledge among final year nursing students (Paired test)

Test	Frequency	Mean	S.D.	t value	Table value	P value
Pre Test	100	10.18	2.74	16.86	1.98	0.000
Post test	100	13.49	4.07			

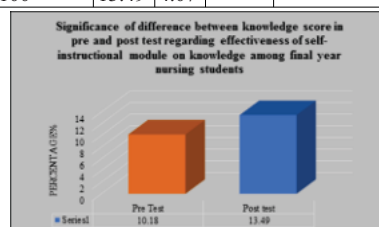


Figure 1: Significance of difference between knowledge score in pre and post test regarding effectiveness of self-instructional module on knowledge among final year nursing students.

DISCUSSION

The present study demonstrated a significant improvement in knowledge regarding hemodynamic monitoring among final year nursing students following the self-instructional module. The increase in mean post-test scores compared to pre-test scores, along with statistically significant t-test values, confirms the effectiveness of the intervention. These findings are consistent with previous studies conducted among staff nurses, which also reported significant improvements in knowledge and practice following planned teaching programmes, with statistically significant differences observed at $p < 0.05$ levels and a strong positive correlation between knowledge and practice scores. The results further indicate that structured educational interventions are effective in enhancing understanding of hemodynamic monitoring. Therefore, the findings support that the self-instructional module is an effective teaching strategy, leading to a significant increase in knowledge among final year nursing students.

CONCLUSION

After detailed analysis, this study leads to the following conclusion: The study demonstrated a significant improvement in knowledge regarding hemodynamic monitoring among final year nursing students following the self-instructional module. The mean post-test score (13.49 ± 4.07) was higher than the pre-test score (10.18 ± 2.74), with a statistically significant difference ($t = 16.86, p < 0.05$). Hence, the null hypothesis was rejected, and the intervention was found to be effective in enhancing knowledge among the participants.

REFERENCES

1. Guyton AC, Hall JE. Textbook of Medical Physiology. 14th ed. Philadelphia: Elsevier; 2021.
2. Purves D, Augustine GJ, Fitzpatrick D, et al. Neuroscience. 6th ed. New York: Oxford University Press; 2018.
3. Vincent JL, Rhodes A, Perel A, et al. Clinical review: Update on hemodynamic monitoring in critically ill patients. *Crit Care*. 2011;15(4):229.
4. Abebe MM, Arefayne NR, Temesgen MM, et al. Incidence and predictors of hemodynamic instability among adult surgical patients in post-anesthesia care unit. *BMC Anesthesiol*. 2022;22(1):1–10.
5. Burns SM, Delgado SA. Hemodynamic monitoring in critical care nursing. *AACN Adv Crit Care*. 2019;30(1):43–56.
6. Cook DA, Levinson AJ, Garside S, et al. Instructional design variations in internet-based learning for health professions education. *JAMA*. 2008;300(10):1181–96.
7. Lewis SL, Bucher L, Heitkemper MM, Harding MM. Medical-Surgical Nursing: Assessment and Management of Clinical Problems. 11th ed. St. Louis: Elsevier; 2020.
8. Bastable SB. Nurse as Educator: Principles of Teaching and Learning for Nursing Practice. 5th ed. Burlington: Jones & Bartlett Learning; 2019.
9. Codina P, Gómez JÁV, Guillamet GH, Ríos LR, Carrete A, Vilalta V, et al. Cost-benefit analysis of CardioMEMS in heart failure patients. *Eur J Heart Fail*. 2024;26(2):123–30.
10. Pradhana AP. Role of invasive hemodynamic monitoring in severe mitral regurgitation undergoing surgery: A case study. *J Clin Anesth*. 2023;85:110–5.