

Effectiveness of Self Instructional Module on Knowledge of Artificial Cardiac Pacemaker among Staff Nurses

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Running Title: *Artificial cardiac pacemaker and staff nurses*

Abstract: *Objective:* Heart diseases are a huge burden and cause of concern for everybody from doctors to policy makers. Heart disease leading to heart failure is a further cause for worry. In fact, approximately 60% of all cardiac deaths occur due to arrhythmias leading to Sudden Cardiac Arrest (SCA). Annual incidence of SCA in India is 0.55 per 1,000 populations. Today, pacemakers are used to manage symptomatic bradycardia but rising cost of technology that saves life has been out of reach for many poor patients in India leading to confinement, morbidity and death. Each year 1-2 million individuals worldwide die due to a lack of access to pacemakers. In India, about 1, 00,000 patients suffer from bradycardia every year. However, only 15,000 patients resort to pacemakers in India annually. Hence, the study was aimed to determine the effectiveness of the self instructional module on knowledge of Artificial cardiac pacemaker among staff nurses. *Materials and methods:* Pre - experimental study was performed on 60 staff nurses working in medical, surgical, and intensive care units of selected hospital of Kolhapur. The effectiveness of a Self instructional module on artificial cardiac pacemaker was evaluated through a structured knowledge questionnaire using one group pre-test post-test design. Improvement in knowledge score was determined through the quantitative evaluative survey approach. *Results:* The calculated paired' value ($t_{cal} = 17.16$) was greater than tabulated value ($t_{tab} = 2.00$). This indicates that the gain in knowledge score was statistically significant at $P < 0.05$ level. Therefore the findings revealed that the SIM on Artificial cardiac pacemaker was effective in increasing the knowledge regarding artificial cardiac pacemaker among staff nurses. In present study there was significant association between pre test knowledge score & selected socio demographic variable such as Age in years [$\chi^2_{cal} = 127.9$, $\chi^2_{tab} = 7.82$], Educational qualification [$\chi^2_{cal} = 11.93$, $\chi^2_{tab} = 5.99$] & Total clinical experience in years [$\chi^2_{cal} = 7.84$, $\chi^2_{tab} = 7.82$]. This indicates that there is significant association between pre test knowledge scores and selected socio-demographic variables at 0.05 level of significance. *Conclusion:* The self instructional module was effective in improving knowledge of artificial cardiac pacemaker in staff nurses and can be used as an effective method to train nurses in Kolhapur.

Keywords: Effectiveness, Self-instructional module, artificial cardiac pacemaker, Staff nurses

1. Introduction

Cardiovascular diseases have been on the increase in India which has resulted in several deaths occurring every day across the country. A report by the WHO, to the end of year 2005, states that all the deaths occur in India would mainly be due to heart diseases¹. Heart disease leading to heart failure is a further cause for worry. In fact, approximately 60% of all cardiac deaths occur due to arrhythmias leading to Sudden Cardiac Arrest (SCA). Annual incidence of SCA in India is 0.55 per 1,000 populations².

A cardiac pacemaker is a device that is used to regulate the heart rate. If you have been found to have a heartbeat that is too slow, a pacemaker can be implanted in the body to take over the function³. Advances in pacemaker patients have resulted in tremendous changes in the care of patients with a wide range of cardiac diseases, including AV block, sinus node dysfunction and congestive heart failure⁴. Technology has helped the health lives of thousands of people around the world. All of these health findings are used to detect the diseases and help patients to cope with health problems⁵.

Studies had shown that intervention can increase the knowledge of cardiac pacemaker among nurses^{6, 7, 8, 9}. The present study, first of its kind in Kolhapur, aimed to determine the effectiveness of self instructional module on knowledge of artificial cardiac pacemaker among staff nurses in Kolhapur.

2. Materials and Methods

A Pre - experimental study was performed during July 2021 on 60 staff nurses working in medical, surgical, and intensive care units of selected hospital, Kolhapur. Participants of both genders, present at the time of data collection and willing to participate in the study were included. Those who were not available at the time of data collection were excluded. The study was performed after the clearance of the institutional ethical committee and local authorities. The structured knowledge questionnaire (tool) on artificial cardiac pacemaker was designed after extensive literature reviews and expert discussion. Items in the tool were analyzed according to Gilbert's classification¹⁰. The self instructional module on artificial cardiac pacemaker was developed through expert consultation and literature review.

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Both, the tool and self instructional module were validated by 14 experts from medical surgical nursing, MD medicine and statistics. The reliability of the tool and self instructional module was determined using the Karl Pearson's coefficient of correlation formula. Pre-test and post-test data (intervention being self instructional module) were collected to determine the improvement in knowledge of Artificial cardiac pacemaker by using the tool. Pre- experimental knowledge evaluation was conducted by providing study participants the tool and arbitrarily grading the response as: Good knowledge (20 - 28), average knowledge (10 - 19) and poor knowledge (0 - 09) based on correct answers. The self instructional module was provided to the study participants at the end of the pre-experimental evaluation. Post-interventional knowledge score was evaluated after the 7th day of administration of the self instructional module. Responses were graded similar to the pre-experimental evaluation. The time allotted to respond for each set up was 30minutes.

A pilot study was conducted in a selected hospital of Kolhapur on 10 staff nurses. The tool was distributed to participants and the results were recorded for pre and post - intervention response.

The difference in pre-test and post- test score were compared using paired 't' test. A chi - square test was used to find an association between pretest scores and socio-demographic variables. $P < 0.05$ was considered as statistically significant.

3. Results

The tool consisted of a structured knowledge questionnaire related to socio – demographic variables and artificial cardiac pacemaker. According to Gilbert's classification difficult index on item analysis of the tool revealed the number of difficult questions was 9whereas; good and poor questions were 16, and 3 respectively. No marginal questions were present in the tool. Discrimination index indicated that the number of excellent, good, marginal, and poor questions was 6, 11, 0, and 11 respectively. Item analysis was performed on 30 items, among which the final tool contained 28 questions. The description of the questionnaire is shown in Table 1.

Table 1: Description of Questionnaire

Sr. No	Questions regarding	Total number of Questions
1.	Anatomy of heart & conduction system	07
2.	Types & indications of artificial cardiac pacemaker	10
3.	Nursing care & health education	07
4.	Complications	04

The self instructional module consisted of information about artificial cardiac pacemaker such as introduction, conduction system of heart, definition, components & functions, types, indications, nursing care, health education & complications. The pilot study proved that the tool and self instructional module was reliable and consistent, the reliability of the tool was computed as $r=0.81$.

Detailed demography of the participants is given in Table 2.

Table 2: Frequency Distribution of Socio- Demographic Variables

Socio - demographic Variable	Frequency (%)
Age (in years)	
21 –30	31 (51.67)
31 – 40	13 (21.67)
41 –50	10(16.67)
Above 50	06(10.00)
Gender	
Male	16 (26.67)
Female	44 (73.33)
Educational qualification	
GNM	48 (80.00)
Basic B. Sc. nursing	07 (11.67)
Post Basic B. Sc. nursing	05(08.33)
Area of working	
Medicine ward	16 (26.67)
Surgery ward	15 (25.00)
ICU	29 (48.33)
Clinical experience in years	
0 – 2	29 (48.33)
3 – 5	16 (26.67)
6 – 8	09 (15.00)
9 & above 9	06 (10.00)
Have you taken any in-service education regarding pacemaker	
Yes	21(35)
No	39(65)

GNM - General nursing and midwifery, B. sc. - Bachelor of Science, ICU - Intensive care unit, % -Percentage.

In the pre-test scores, 78.33% of the participants had average knowledge score (n=47) whereas 21.67% had poor knowledge scores (n=13)& none of the participants had good knowledge. In post-test, 71.67% of participants had good knowledge (n=43), 28.33% of participants had average knowledge (n=17) and no poor knowledge score was observed (Figure 1).

There is significant association between pre test knowledge scores and selected socio demographic variables at 0.05 level of significance such as Age in years [$\chi^2_{cal} = 127.9$, $\chi^2_{tab} = 7.82$], Educational qualification [$\chi^2_{cal} = 11.93$, $\chi^2_{tab} = 5.99$] & clinical experience in years [$\chi^2_{cal} = 7.84$, $\chi^2_{tab} = 7.82$].

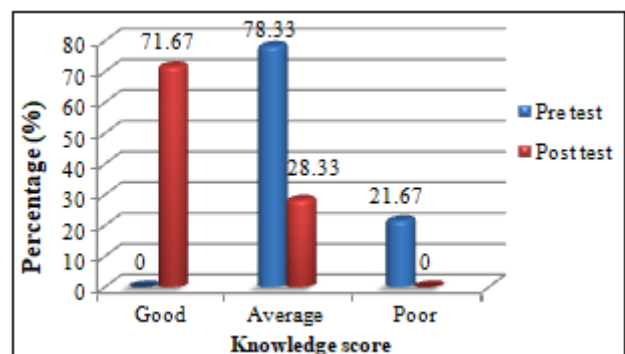


Figure 1: Distribution of pre - and post - test score

4. Discussion

Nurses play a central role in detection prevention, control and rehabilitation. They are often the case manager, working

in partnership with patients and families, based in the general/family practice, hospital and community sectors¹². Advances in pacemaker patients have resulted in tremendous changes in the care of patients with a wide range of cardiac diseases⁴. Taking care of such a rapidly growing patient population constitutes a challenge for all health care providers working in a cardiology ward, operating room or primary care practice. Nurses among them have a unique role by being the most appropriate persons to provide in-hospital and long-term health care, education and psychological support to these patients¹³.

The present study is the first of its kind in Kolhapur. It aimed to determine the effectiveness of Self instructional module on knowledge of artificial cardiac pacemaker among staff nurses in Kolhapur and to evaluate association between socio - demographical variables of the subjects and their pretest scores.

A significant improvement was observed between pre-test and post-test scores. A significant association between pretest knowledge score & socio demographic variables such as age, educational qualification & clinical experience was seen.

An expert validated self instructional module used in knowledge improvement was distributed to the participants at the beginning of the study. Information retention through the self instructional module was impressive as evident by the improvement in the post-test conducted after 7 days. These findings are in agreement with the studies of Peter Jasper Youtham et al. and Sneha Sahay Youtham et al.^{11,6} A significant associations were observed between age, educational qualification & clinical experience with pretest. However, this association was absent in the post test. This shows that the self instructional module was able to bridge this learning gap. This could be because of the ability to relate and interpret better with practical experience. Similarly, in this study self instructional module was used showed significant improved artificial cardiac pacemaker knowledge.

The limitation of the study was the small sample size. Generalization could be better if the large sample size is used, also an experimental study including control and experimental group with various other interventional modalities are the further recommendation of the study.

5. Conclusion

The self instructional module was very effective in improving knowledge of artificial cardiac pacemaker. Hence, it can be used to improve the practices & uses of cardiac pacemaker for all nurses. There is significant association between pre test knowledge scores and selected socio demographic variables at 0.05 level of significance.

6. Ethical Approval

Ethical approval for this study was obtained from Institutional Ethical Committee of D.Y. Patil Medical College, Kolhapur.

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Conflict of interest: None to declare

Authors Contribution

Study conception and design: Ms. Shweta S Jadhav & Mr. Amos Talsandekar.

Data collection: Ms. Shweta S Jadhav.

Data analysis and interpretation: Ms. Shweta S Jadhav & Mr. Amos Talsandekar.

Drafting of the article: Ms. Shweta S Jadhav.

Critical revision of the article: Ms. Shweta S Jadhav & Mr. Amos Talsandekar.

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