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EFFECTIVENESS OF PACEMAKER CARE PROTOCOL ON KNOWLEDGE AND SKILL REGARDING CARE OF CLIENT UNDERGOING PACEMAKER IMPLANTATION AMONG NURSES AT SELECTED HOSPITALS, NAGERCOIL, 2015.

DISSERTATION SUBMITTED TO

THE TAMIL NADU DR.M.G.R.MEDICAL UNIVERSITY

CHENNAI

IN PARTIAL FULFILMENT OF REQUIREMENT FOR THE DEGREE OF

MASTER OF SCIENCE IN NURSING

APRIL 2016

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LIST OF ABBREVIATIONS

AHA	-	American Heart Association
ANOVA	-	Analysis Of Variance
BJM	-	British Journal of Medicine
CABG	-	Coronary Artery Bypass Graft
CAD	-	Coronary Artery Disease
CATH Lab	-	Cardiac Catheterization laboratory
CDC	-	Centre for Disease Control and Prevention
CHB	-	Complete Heart Block
CINAHL	-	Cumulative Index to Nursing and Allied Health
CRT	-	Cardiac Resynchronization Therapy
CTICU	-	Cardio-Thoracic Intensive Care Unit
CVD	-	Cardiovascular Disease
HOD	-	Head of the Department
ICCR	-	International Centre for Collaborative Research
ICD	-	Implantable Cardioverter Defibrillator
IEC	-	Institutional Ethical Committee
ICMR	-	Indian Council of Medical Research
MEDLINE	-	Medical Literature Analysis and Retrieval System Online
MI	-	Myocardial Infarction
NCD	-	Non Communicable Disease
OPD	-	Out Patient Department
PMI	-	Pacemaker Implantation
PPMI	-	Permanent Pacemaker Implantation
PPI	-	Permanent Pacemaker Implantation
PTMCA	-	Percutaneous Transluminal Coronary Angioplasty
QOL	-	Quality Of Life
RHD	-	Rheumatic Heart Disease
SCA	-	Sudden Cardiac Arrest
SD	-	Standard Deviation
TNAI	-	Tamilnadu Nurses Association Of India
WHO	-	World Health Organization

LIST OF SYMBOLS

&	-	Ampersand
*	-	Asteris
:	-	Colon
=	-	Equals To
!	-	Exclamation Mark
.	-	Full stop
<	-	Less than
>	-	More than
±	-	Plus or minus
%	-	Percentage
;	-	Semicolon
P	-	Significance

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ABSTRACT

Effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospitals ,Nagercoil.

ABSTRACT

Aim and objective : To assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospital. **Methodology :** A quasi-experimental non equivalent control group design was chosen to conduct the study among 60 Nurses, who were selected using purposive sampling technique. Immediately after pretest assessment,intervention was given in experimental group and hospital routine was carried out in control group. After seven days post test was collected in both the groups. **Result :** The comparision of post test level of knowledge between experimental and control group, revealed that the unpaired ' t' value of 12.002, was statistically significant at p<0.001level.The comparison of the post test level of skill ,revealed an unpaired ' t' value of 9.577,which was highly statistically significant at p< 0.001level. The analysis of correlation coefficient between knowledge and skill using Karl Pearson correlation revealed ' r' value 0.375, ,showed a positive correlation at p<0.05 in experimental group. **Conclusion :**The study findings concluded that the pacemaker care protocol, developed by the investigator proved to be an effective aid in improving the knowledge and skill regarding care of client undergoing pacemaker implantation among Nurses.

Keywords *: Pacemaker care protocol ,Knowledge, Skill, Nurses,Pacemaker implantation site dressing.*

INTRODUCTION

Cardio Vascular Disease (CVD) is a diseases that involve the heart or blood vessels. Cardiovascular disease includes Coronary Artery Diseases (CAD) such asangina and myocardial infarction (commonly known as a heart attack).Other CVDs are stroke, hypertensive heart disease, rheumatic heart disease, cardiomyopathy,atrial fibrillation, congenital heart disease, endocarditis, aortic aneurysms, peripheral artery disease and venous thrombosis.Arrhythmias can affect all age groups, but atrial fibrillation is more common in older people.

Today, pacemaker therapy is synonymous for managing all arrhythmias (abnormal slow or fast heart rate) or heart rhythm-related disease. "Newer technologies in past few years have emerged as device therapy of arrhythmias Implantable Cardioverter Defibrillator (ICDs), Device therapy for heart failure Cardiac Resynchronisation Therapy, (CRT), and device therapy in combination for arrhythmias

and heart failure (combo-device). These implantable medical devices which are prescribed for controlling fast abnormal heart rhythms.

OBJECTIVE

To determine the effectiveness of pacemaker care protocol on knowledge and skill among nurses in selected hospitals.

NULL HYPOTHESIS

NH_1 - There is no significant difference in the post test level of knowledge and skill regarding pacemaker care protocol between the experimental group and control group at $p< 0.05$ level.

METHODOLOGY

A quasi experimental, non-equivalent, with control group design was chosen to conduct the study among 60 nurses. 30 nurses each in experimental group Dr.Jeyasekharan Hospital, Nagercoil,and 30 nurses in Dr.Somervell Medical College and Hospital. who satisfied the inclusion criteria ,were selected by purposive sampling technique. The demographic variables and level of knowledge was assessed using structured questionnaire and administered pacemaker care protocol.The post test level of knowledge and skill was assessed using structured questionnaire and observational checklist.

RESULTS

The comparison of the pre and post test level of knowledge scores regarding pacemaker care protocol among nurses in experimental group,the calculated paired 't' value was found to be highly statistical significant at $p <0.001$ level, which indicates that the pacemaker care protocol administered to the nurses in the experimental group had improved their level of knowledgethan the nurses in the control group..

The comparison of post test skill scores regarding pacemaker care protocol among nurses between experimental and control group,calculatedunpaired 't' value clearly proves that there was significant difference between the post test skill score among the nurses between the experimental and control group.

DISCUSSION

The study findings revealed that Pacemaker Care Protocol was effective in assessing knowledge and skill,bring about awareness about Pacemaker care protocol influencing a positive behavior and aided in developing knowledge and skill of pacemaker care protocol. The pamphlet developed by the investigator proved to be an effective aid in providing insight on pacemaker care protocol.

CONCLUSION

The present study was conducted to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospital. The study findings revealed that pacemaker care protocol was effective in improving knowledge and skill among nurses. Hence various continuous education training can be given to all nurses to implement pacemaker care protocol.

IMPLICATIONS

The Pacemaker care protocol standards can be incorporated as a hospital policy routine nursing care to reduce the levelof infection, less hospital stay and reduce the complications. The intervention is cost effective, reliable and can easily incorporated in all cardiac units and the hospital stay of the patient can be decreased. Thenurse educator must educate the nurses and significant others on the pacemaker care protocol to bring awareness in care of patient with pacemaker implantation.Nurse administrator can organize training programmeand to reach out to all nurses working in hospital.

INTRODUCTION

Non Communicable Diseases (NCDs) also known as chronic diseases, which includes cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes.NCDs result in rapid deaths as seen in certain diseases like autoimmune diseases, heartdiseases,stroke, cancers, diabetes, chronic kidney disease, osteoporosis, Alzheimer's disease, cataracts, and others. Cardiovascular diseases is one of the major incidence of non-communicable diseases and leading causes of deaths in India.

The heart is endowed with a specialized system for generating rhythmic electrical impulses and for conducting these impulses rapidly throughout the heart to cause contraction of the heart muscle. When this system functions normally, the atria contract about one-sixth of a second ahead of the ventricles. This orderly electrical activity must precede contraction to provide adequate cardiac output for perfusion of all body organs and tissues.

Heart diseases are huge burden and further cause of worry for everybody from doctors to policy makers. Heart disease leads to heart failure. In fact, approximately 60% of all cardiac deaths occur due to arrhythmias leading to Sudden Cardiac Arrest (SCA). Heart rhythm problems such as arrhythmia occur when the electrical impulses produced by the heart that coordinate heartbeat do not function properly, causing heart to beat too quickly, too slowly, or irregularly. Age increases the probability of experiencing an arrhythmia. It can occur in people who do not have heart disease. Some heart arrhythmias are harmless, though some types, such as ventricular tachycardia are serious and even life threatening. Pacemakers represent one of the earliest and most successful non pharmacological therapy for arrhythmias. Millions of pacemakers have been implanted since the very first pacemaker was implanted in 1958 by Elmquist and Senning. Drugs are no longer used except in the very acute setting before implantation of a temporary or permanent pacemaker.

1.1 BACKGROUND OF THE STUDY

Non communicable diseases (NCDs), also known as chronic diseases, are not transmitted from person to person but kills 38 million people each year. Almost three quarters ie 28 millionsof NCD deaths occurred in low and middle-income countries. Sixteen million NCD related deaths occurred before the age of 70 years. The four main types of non communicable diseases are cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. Of these 77% of deaths are due to chronic-non communicable diseases, having cardiovascular diseases (40%) followed by malignant neoplasms (25%), chronic respiratory diseases (8%), diabetes (6%), digestives diseases (6%) and 15% of deaths in the rest of non communicable diseases. From the 44% of deaths under age 70, Non communicable diseases were responsible for 65% of deaths having cardiovascular diseases World Health Organization (WHO, 2014).

Table1.1.1: The Global Prevalence Mortality rate due to NCD s (2013)

S.No.	Non-Communicable Disease	Deaths/ million
1.	Cardiovascular disease	17.3
2.	Cancer	7.6
3.	Hypertension	7.5
4.	Diabetes	1.3
5.	Tobacco use	5
6.	Overweight	2.8
7.	High cholesterol	2.6
8.	Respiratory disease	4.2

Source: WHO (2013)

Theabove table 1.1.1 depicts that Globally cardiovascular disease is the leading cause of death (17.3) million followed by cancers (7.6) million.

Cardiovascular disease may increase from 2.9 crore in 2000 to as many as 6.4 crore in 2015 and deaths resulting from CVD will also rise more than double. Prevalence rate of cardiovascular disease in rural population remains lower than that in the urban population; this will continue to increase, reaching around 13.5% of the rural population

within the age group of 60-69 years by 2015. The cardiovascular crisis in India has quadrupled in the last 40 years and WHO **(**2013) estimated that by 2020 , 60% of cardiac patients worldwide will be an Indian.

The risk factors of cardiovascular disease include lack of exercise, poor diet, and smoking. According to the study, the Indian subcontinent (including India, Pakistan, Bangladesh,Sri Lanka, and Nepal) has the highest rates of cardiovascular disease globally. The emerging field of environmental cardiology addresses exposures to chemicals and other environmental substances also have profound impact on heart health (WHO**,** 2013).

A study among Asian Indian men showed that half of all heart attacks in this population occur under the age of 50 years and 25 percent under the age of 40, according to the Indian organization (WHO, 2010).

Table 1.1.2: Prevalence rate of CVD in Tamil Nadu (2013)

S.No.	Disease	Prevalence rate of CVDs / 1000 Population
1.	Cardiovascular Disease	300
2.	Stroke	205
3.	Diabetes	154
4.	Trauma	49

Source:Tamil Nadu Survey Report 2013

The above table 1.1.2 depicts that the prevalence of cardiovascular disease is very high among all other non communicable diseases.

Complete Heart Block (CHB) is a cardiac disease associated with extremely low heart rates and if untreated, results in average longevity of only 2.5 years.In India and China alone, there were 140,000 new cases (50,000 in India) and less than 20% in each country received treatment. The only effective treatment for CHB is implantation of a cardiac pacemaker. Cardiac pacing is one of the most reliable documented treatments for various cardiac arrhythmias, especially bradyarrhythmias since 1950. The initial pacing system consisted of a single lead asynchronous pacemaker, which paced the heart at a

fixed rate. Over the years, the technological advances have revolutionized the pacemakers and currently more sophisticated multi programmable devices are available. 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 (slow heart rate) every year. However, only 15,000 patients underwent pacemaker implantation in India annually (2011). It has been estimated that approximately 25,000 pacemaker were implanted in India. Archive Healthcare (2013).

Patient undergoing pacemaker implantation per year per 10,000 000 population

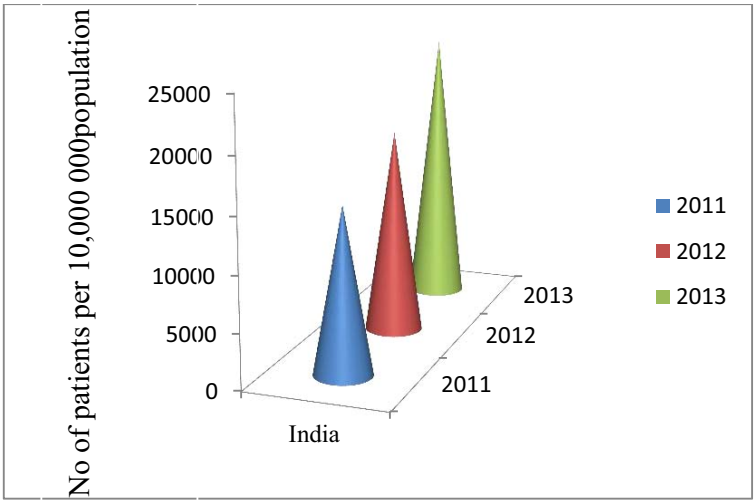


Fig.1.1.1: Number of patients undergoing pacemakers implantation in India (2011 – 2013)

Source: Archive Healthcare (2013)

The most common complication of dysrhythmia is sudden death. In 2008**,** dysrhythmias contributed to 479,000 of more than 2,40,0000 deaths in United States. When an arrhythmia is serious, need urgent treatment to restore a normal rhythm. This may include electrical shock therapy (defibrillation or cardio version), implanting a temporary pacemaker to interrupt the arrhythmia, and medications given through intravenously. Pacemakers is an artificial sino atrial node or purkinjie system.

Deo, Albert, Chen, Kirkpatrick, (2012) reported that Sudden Cardiac Death (SCD) is the cause for 45,0000 deaths around the world each year .SCD is usually caused by an unstable, fast ventricular rhythm, predominantly ventricular tachycardia and ventricular fibrillation.When either arrhythmia occurs, the heart cannot pump enough

blood throughout the body. Unless treatment is delivered within a few minutes, death is eminent. Long-term treatment options for people who survive life-threatening ventricular rhythms include medication, surgery, Implantable Cardioverter Defibrillator (lCD) or a combination of treatments. ICDs are devices that sense these life-threatening arrhythmias automatically and deliver electrical therapy or lifesaving shock directly to the myocardium .

Implantation of donated permanent pacemakers can not only save lives, but also improve quality of life of needy poor patients. Reusing pacemakers could “alleviate the burden of symptomatic bradyarrhythmia (abnormally slow heart rate) in impoverished nations around the world, American Journal of Cardiology (2011) .

Baddour et al, (2010) reported that in the last two decades, a dramatic rise in implantation of cardiovascular implantable electronic devices for management of numerous life threatening cardiac rhythm disorders as well as nonarrhythmic conditions, such as heart failure and chronotropic incompetence. One recent survey indicated that there was almost a 50% increase in the rate of cardiovascular implantable electronic devices being fitted including Permanent PaceMakers (PPMs) and ICDs between 1991 and 2003.

More and more patients receiving pacemakers, ICDs and combination devices, a need for multidisciplinary approaches to meet these population-specific needs has become obvious. The most important indication of pacing however remains complete heart block and the sick sinus syndrome which account for 95% of the indication for pacemakers implanted in India. During the last pacemaker survey in 2005, the implant rate was 91 per million. With our ageing population, we can expect that the need for pacemaker implantation in Singapore will rapidly increase. In Europe, Japan and the USA, the implant rate is almost 300-1000 per million (WHO, 2013).

There are currently more than 3 million patients worldwide with implanted pacemakers, and indications for implants are expanding. Pacemakers today are smaller (23-30 g) and fashioned in a more physiologic shape so as to be less obtrusive. They are replete with sophisticated diagnostic and programming features that

make troubleshooting of complicated arrhythmias easier. American Heart Association. (AHA, 2011).

Nurses have a unique role in providing care such as education and psychological support to the patients and their families during and after implantation at the hospitals, long-term health care settings. To accomplish this task, nursing intervention must be multi level. Moreover, nurses play an important role in patient education will increase adherence to the followup treatment. Finally, by providing psychological and emotional support, the nursing staff can address the immediate concern of the patient and help them tocope successfully with their new life situation.

1.2 SIGNIFICANCE AND NEED FOR THE STUDY

A permanent cardiac pacemaker is an implantable device used to maintain a sufficient heart rate when natural mechanisms fail.Patients with implanted cardiac devices constitute a growing segment of the contemporary healthcare practice. 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 patients. In-hospital and long-term care will ensure an uneventful procedure and a safe discharge as well as early detection of device malfunction and late complications. Education of the patient will prevent any self or environmental interactions which can adversely affect proper device function and will increase his or her adherence to the follow-up treatment.

Ayub, Nawaz,(2014) conducted a retrospective study to examine the incidence of Permanent Pacemaker Implantation(PPI) post-valvular surgery and determine predictors that can identify high risk patients 72 different predictive variables were compared between the two groups and the mean follow up duration was 30 days . Indications for PPI were complete heart block (26.3%), junctional rhythm (21.1%), sinus node dysfunction (31.6%) and atrial fibrillation with slow ventricular response (5.3%). Cardiac outcomes (peri-operative MI, death, and stroke) were not significantly different between the two groups. The study concluded that patients undergoing valvular surgery are at significant risk for requiring post-operative PPI and recommended alarger study to determine the significance for other variables.

Shenthar. J, Rai. MK, Walia .R, Ghanta .S,(2013) conducted retrospective study to assess the transvenous permanent pacemaker implantation in dextrocardia: technique, challenges and outcome. The records of patients with dextrocardia who had undergone pacemaker implantation between January 2006 and July 2013 from a single centre were reviewed. Six patients with dextrocardia (five males and one female) underwent permanent pacemaker implantation. The study concluded that the favourable outcome was noted during a mean follow-up of 3.9 years (4 months to 7 years) with one patient needing a pulse generator replacement.. The medium- and long-term survival after a successful pacemaker implantation in dextrocardia is favourable.

Jens Brock Johansen, Ole Dan Jørgensen, Mogens Møller,(2011)conducted cohort study to assess the rates and risk factors associated with infection after pacemaker implantation among 46299 patients. The study concluded that overall risk of infection after pacemaker implantation was low. Surgical site infection occurred in 192 cases after first implantation (incidence rate 4.82/1000 pacemaker implantation), and 133 cases after replacement.

Taking care of such a rapidly growing patient population constitutes achallenge 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 psychologicalsupport to these patients.

More numbers of patients are receiving pacemakers as indications for devices continue to expand worldwide. Technical follow-up of such patients is well structured. There is an increasing body of knowledge regarding pacemaker patients' experiences with recovery interventions but nurses are less seems to be known about pacemaker patient's care. In-hospital and long-term care will ensure an uneventful procedure and a safe discharge as well as early detection of device malfunction and late complications. Education of the patient will prevent any self or environmental interactions which can adversely affect proper device function and will increase his or her adherence to the follow-up treatment.

All medical professionals involved in patient care and compelled throughout their professional career, to expand their knowledge. Today, nurses more than any other time, are faced with increasing obligation to evaluate and improve their practice, while their motivation to improve their skills may spring either from internal will, or from external pressure. Continuing education is extremely important for nurses counseling patients with implanted devices in order to play successfully their role as the continuous link to the multidisciplinary team of professionals. Nurses are becoming increasingly independent in their management of the follow-up care of these patients. Guidelines for the assessment of pacemaker function, detection of malfunction, and reprogramming techniques are provided. Muhammad R. Sohail, Daniel Z. Uslan,Akbar H. Khana, Paul A. Friedman, (2014) conducted descriptive analyses study to assess the risk of permanent pacemaker infection in California, among 88 patients (retrospectively reviewed) under category of age, sex, year of implantation, and duration of follow-up. The study concluded that majority 83% of cases presented with infections.

The nurse's role in the prevention of infection after pacemaker implantation is of great importance and involves all stages concerning the procedure and involves observation for early diagnosis of the symptoms, the precise implementation of basic nursing principles and interventions such as aseptic techniques and the epidemiologic surveillance of incidents. The patient undergoing pacemaker implantation deserves to have confidence that the professional nurse is knowledgeable, caring, efficient and effective in providing necessary nursing care. Success in all the above may assist in the formation of nursing protocols regarding the prevention of infection after pacemaker implantation. Although specific protocols and guidelines have not yet been planned for nurses in Dr.Jeyasekharan hospital and Dr. Somervell Medical College and Hospital, and there are some rules that may assist in prevention of infection after pacemaker implantation.

Nurses should be well equipped with knowledge and skill to perform good care so that patient will free from complications. Therefore researcher was interested to take up the study to enhance their knowledge on care of patients with pacemaker so that they will take action to prevent complications which in turn will reduce the incidence pacemaker failure in hospitals and in community there by helping in increasing the quality of life. In the present setting, the investigator, during her teaching felt that the nurses have

inadequate knowledge about the care of patients with cardiac pacemaker. So the investigator felt that there was a need to develop a pacemaker care protocol to enhance the knowledge and skill of nurses to provide better quality care to the patient after pacemaker implantation.

Nagwa Mohamed Ahmed Mohamed, ZienabAbd El-Lateef Mohamed, (2014)conducted a quasi-experimental study to assess the impact of Nursing Teaching Protocol on reduction of complications for Patient with Permanent Artificial Pacemaker. The sample comprised 60 male and female adult patients having permanent artificial pacemaker (30 patients for each study and control groups). Data were collected by pre-post test questionnaire sheet, observational checklist and complication assessment sheet. The mean knowledge scores of both study group was significantly increased in the post protocol application. Establishment of an in-service training center and a hot line contact in additions provision of pamphlets and simple booklet are recommended.

1.3 STATEMENT OF THE PROBLEM

A Quasi experimental study to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospitals.

1.4 OBJECTIVES

1. To assess and compare the pre test and post test level of knowledge regarding pacemaker care protocol among experimental and control group.
2. To assess the post test level of skill regarding pacemaker care protocol in experimental and control group.
3. To determine the effectiveness of pacemaker care protocol on knowledge and skill among nurses in experimental and control group.
4. To correlate the post test level of knowledge with skill regarding pacemaker care protocol in experimental group and control group.
5. To associate the selected demographic variables with the mean differed knowledge score and post test skill score regarding pacemaker care protocol in the experimental group.

1.5 OPERATIONAL DEFINITIONS

1.5.1 Effectiveness

It is the outcome of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation assessed using the structured questionnaire and observational check list respectively within in the time of 1 week.

1.5.2 Pacemaker care protocol

It refers to the set of guidelines for the nurses regarding care of client undergoing pacemaker implantation devised by the investigator. It constitutes

Lecture cum group discussion on definition, uses, types of pacemaker and nurses responsibilities in care of patient with pacemaker implantation for about15-20 minutes to a group of maximum 7 nurses using power point presentation.

Demonstration on preparation of patient before pacemaker implantation, (Environment preparation, Articles preparation) and post implantation care (implantation site dressing) using mannecuine performed by the investigator for 10 minutes to a group of maximum 7 nurses in the demonstration room.

Returndemonstration on pacemaker care protocol by using the mannecuine done by the each nurses for 15 minutes in the demonstration room after 7 days.

Reinforcement of pacemaker care protocol through a pamphlet.

1.5.3 Knowledge

It refers to the level of understanding of nurses and ability to answer the question regarding the pacemaker care protocol assessed using a structured knowledge questionnaire devised by the investigator.

1.5.4 Skill

It refers to the ability of the nurses to perform the steps of pacemaker implantation site dressing as specified in the pacemaker care protocol, using mannequin assessed using observational checklist formulated by the investigator**.**

1.5.5 Nurses

Registered health care personnel with educational qualification of B.Sc(N), PB.BSc(N), Diploma in nursing with experience of more than 6 months in cardiac units working at selected hospitals.

1.6 ASSUMPTIONS

1. Nurses may have some knowledge and skill regarding pacemaker care protocol.
2. Providing information on pacemaker care protocol may enhance the nurses knowledge and skill on client undergoing pacemaker implantation**.**

1.7 NULL HYPOTHESES

NH_1- There is no significant difference in the post test level of knowledge and skill regarding pacemaker care protocol between the experimental group and control group at $p< 0.05$ level.

NH_2- There is no significant relationship between the post test level of knowledge and skill regarding the pacemaker care protocol in the experimental group and control group at $p<0.05$ level.

NH_3- There is no significant association of the selected demographic variables with the mean differed knowledge score and post test skill score on pacemaker care protocol in the experimental group at $p< 0.05$level.

1.8 DELIMITATIONS

1. The study was delimited to a period of 4 weeks.
2. The study was delimited to staff nurses with selected working only in cardiac units.

1.9 CONCEPTUAL FRAMEWORK

A conceptual framework is the abstract and logical structure of meaning that guides the development of the study which enables the researcher to link the findings of the nursing body of knowledge. It is the symbolic depiction of the reality, providing a schematic representation of relationships among the phenomena and concepts (Betty M.Johnson and Pamela.B.Webber, 2005).

The present study aimed at developing and evaluating the effectiveness of pacemaker care protocol on knowledge and skill among nurses working in selected hospitals.The investigator had adopted conceptual framework by integrating the concepts of **Stuffle Beam Model and Von Berttalannfy's General Systems Model.** It provides a comprehensive, systematic and continuous ongoing framework for programme evaluation. System Model focuses on the organizing, interacting and interaction of parts and sub parts and the interdependence of the parts on each other.

CONTEXT EVALUATION

This describes the plan for decisions and collection of data apart from providing rationale for the determination of the objectives.The present study wasto carried out to determine the effectiveness of pacemaker care protocol on knowledge and skill among nurses working in selected hospitals. Based on investigator clinical experiences, extensive review of literatures and expert opinion, it was assumed that the nurses may have some knowledge and practice regarding pacemaker care protocol.

DESIGN EVALUATION

In this study input refers to the

- Development of pacemaker care protocol
- Development of tool : structured knowledge questionnaire and check list
- Validation of the tool and teaching module.
- Establishment of reliability of tool by test retest method and intererater method.
- Framing a research design- Quasi experimental.
- Selection of samples –Non probability purposive sampling technique.

Input

It refers to an open system that exchange energy with environment and continually attempts to adapt holistically. In this study it refers to the assessment of demographic variables and pretest level of knowledge regarding pacemaker care protocol including structured questionnaire.

Process

It refers to the different operational procedures of the programme. It includes pacemaker care protocol .

Output

After processing the input, the system returns output to the environment in the form of practicing in their daily lives. In this study, the investigator assess the post test level of knowledge and skill regarding pacemaker care protocol among nurses.If there is adequate knowledge and skill, it will help in adjusting well to practice in their daily basis and it can be enchanced. Inadequate and moderate knowledge and skill leads to improper care. This can be reinforced.

Feedback

The feedback is the process by which the output of the system is redirected as a part of the input of the same system. Inadequate and moderately adequate knowledge and skill can be rectified by reassessment,which serves as an input. This is continuous process.

This integerated **Stuffle Beam Model and Von Berttalannfy's General Systems Model** provided the comprehensive, systematic guidelines throughout the study process to evaluate the effectiveness of pacemaker care protocol on knowledge and skill among nurses regarding care of client with pacemaker implantation.

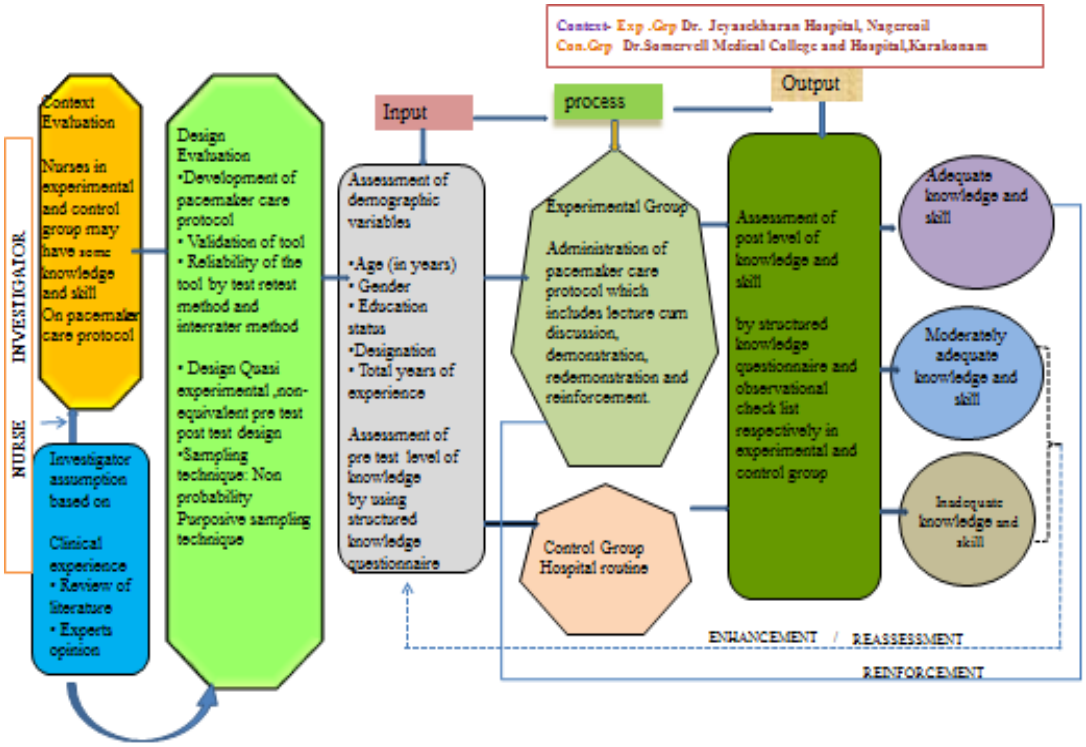


Fig 1.9 Conceptual framework based on integrated Stuffle Beam Model and Von Bertalanffy's General Systems Model

1.10 OUTLINE OF THE REPORT

Chapter 1: Dealt with the introduction, background of the study, significance and need for the study,objectives, operational definitions, assumptions, null hypothesis, delimitation and conceptual frame work.

Chapter 2: Contains the critical reviews related to the present study.

Chapter 3: Presents the methodology of the study and plan for data analysis.

Chapter 4: Focuses on data analysis and interpretation.

Chapter 5: Enumerates the discussions and findings of the study.

Chapter6: Gives the summary, conclusion, recommendation, implications and limitations of the study.

The study report ends with selected references and appendices.

REVIEW OF LITERATURE

Review of literature is a systemic search of a published work to gain information about a research topic. (Polit and Beck, 2012).

Literature review is defined as a summary of research on a topic of interest often prepared to put a research problem in context (Polit and Beck, 2008).

Literature review is a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included (Gerrish& Lacey, 2007).

Review of literature is a systematic and logical arrangement of information that is carefully selected from scientific writings. The ultimate purpose of a good review of literature is to find out the best available evidences from various updated sources and organize them scientifically within the framework of current research project.

This review of literature was done using the key words such as pacemakers, pacing, sinoatrial node. This review was searched based on standard databases such as Cochrane library, Cumulative Index to Nursing and Allied Health (CINAHAL) Google Scholar,Medical Literature Analysis and Retrieval System Online (MEDLINE), PubMed, British Journal of Medicine (BJM), American Heart Association (AHA) and other unpublished studies from dissertations. It includes cross-sectional surveys, crossover studies, cohort studies, longitudinal prospective studies systematic reviews, randomized controlled trials and quasi-experimental design that explore the level of knowledge among Nurses and effectiveness of the nursing intervention Pacemaker implantation site dressing. Collectively 78 studies were searched out from the above databases of which 45 were relevant and updated studies were utilised to support the current research topic. Among the selected 43 supportive studies, were international and 2 were Indian literatures. The reviews were taken from the year 2008 to 2015 to reflect the most current research.

2.1 ORGANISATION OF REVIEW OF LITERATURE

2.1.1 : Critical review related to indication of pacemaker implantation

2.1.2 : Critical reviews related to complications of pacemaker implantation

2.1.3 : Critical review related to infection after pacemaker implantation

2.1.4 : Critical review related to knowledge and skill among nurses on pacemaker implantation

2.1.5 : Critical review related to quality of life in patients with permanent pacemakers

SECTION 2.1.1: CRITICAL REVIEW RELATED TO INDICATION OF PACEMAKER IMPLANTATION

Do Guither, (2014**)** conducted a study to determine the incidence and predictors of postoperative permanent pacemaker implantation in patients undergoing trans-catheter aortic valve implantation for symptomatic calcific aortic stenosis and to compare this to the known risks of this complication following surgical aortic valve replacement . Using the reported search method 3071 articles were identified, of which 94 were relevant to the

procedure of trans-catheter aortic valve implantation and 14 were deemed to represent the best evidence. We conclude that the current best available evidence suggests that the mean incidence of permanent pacemaker implantation following trans-catheter aortic valve implantation is 14.2% (range 0-34%, median 9.7%).

JB Johanson, (2011) conducted a study to reveal the reasons for pacemaker implantation, the duration of the pacemaker use, the cause of death, and pacemaker function after removal from the patient. The methods used were removal of Pacemakers at necropsy, or from the bodies of patients awaiting cremation, in three hospitals over a three year period. The cause of death was taken from the results of the necropsy or from the certified cause of death. Demographic data, including the time of implant and reasons for implantation, were checked. The pacemakers were analyzed in terms of battery status, program, and output under a standard 470 ohm load. The results were 69 patients studied; average age at death was 78 and 80 years for men and women, respectively. The average duration since pacemaker implantation was 46 months. Eleven patients had necropsies, showing that three died from ischemic heart disease, six from cardiomyopathy, one from an aortic aneurysm, and one from disseminated neoplasia. The study concluded by neither primary nor secondary pacemaker dysfunction was found. The relatively short gap between pacemaker implantation and death requires further study.

SECTION 2.1.2: SCIENTIFIC REVIEWS RELATED TO COMPLICATIONS OF PACEMAKER IMPLANTATION

Series of researcherChauhan. Grace.newell.tone. (2014).conducted study to compare the frequency of early complications after single chamber versus dual chamber permanent pacemaker implantation. Early complication was defined as one occurring in the 6-week period following implantation. Wound infection occurred within 6 weeks and lead displacement also occurred in patients .The rate of wound infection was higher in patients who had a temporary pacing wire in place inspite of using prophylactic antibiotics the early complications were higher due to an increased incidence of wound infection and atrial lead displacement.

Multiple Researcher Ellenbogen Wood, M.A, and Shepard .R.K, (2009) conducted study on delayed complications after pacemaker implantation. Late complications may occur days to weeks following uncomplicated pacemaker implantation and may lead to death if they are not recognized early. Recently, several

reports have described the occurrence of perforation and pericarditis as late complications following pacemaker implantation. Late perforation of the right atrium or right ventricle is an uncommon complication after pacemaker implantation but should be suspected by the general cardiologist in a patient who has a device implanted within a week to several months prior to the development of chest pain.

Researchers Jeanne E. Poole, et.al, (2008) prospectively assessed predefined procedure-related complication rates associated with elective pacemaker or implantable cardioverter-defibrillator generator replacements over 6 months of follow-up. Pacemaker and implantable cardioverter-defibrillator generator replacements are associated with a notable complication risk, particularly those with lead additions. No peri procedural deaths occurred in either cohort, although later procedure-related deaths occurred in cohort .These data suggests support careful decision making before device replacement, managing device advisories, and when considering upgrades to more complex systems.Muhammad R. Sohail, Daniel Z. Uslan, Akbar H. Khana, Paul A. Friedman, et.al. (2008) conducted descriptive retrospective study to assess the risk of permanent pacemaker infection with samples of 88 patients,under category of age, sex, year of implantation, and duration of follow-up. The study concluded that majority (83%) of cases presented with infections

SECTION 2.1.3: CRITICAL REVIEW RELATED TO INFECTION AFTER PACEMAKER IMPLANTATION

Ayub. Y, Nawaz, et al.(2014) conducted a retrospective study to examine the incidence of permanent pacemaker implantation post-valvular surgery and determine predictors that can identify high risk patients 72 different predictive variables were compared between the two groups and the Mean follow up duration was 30 days. The study revealed that the baseline demographics including age, sex, coronary artery disease, diabetes mellitus and hypertension were similar between the two groups. Post surgery 9.6% patients underwent pacemaker implantation. Incidence of permanent pacemaker implantation for aortic,mitral and multivalvular surgery was 8.3% 17.6% and 15.4% respectively. Mean surgery to permanentpacemaker implantation duration Was 5.4 days. Presence of preoperative right bundle branch block along with patient undergoing valvular surgery significantly increased the incidence of permanent pacemaker implantation . Indications for permanent pacemaker implantation were complete heart block, junctional rhythm, sinus node dysfunction and atrial fibrillation with slow

ventricular response. The study concluded that Patients undergoing valvular surgery are at significant risk for requiring post-operative permanent pacemaker implantation and recommended alarger study to determine the significance for other variables.

Shenthar J, Rai MK, Walia R, Ghanta S,(2013) conducted retrospective study to assess the technique,challenges and cardiac outcome amongdextrocardia patient s with implanted transvenous permanent pacemaker. The patient details reviewed between January 2006 and July 2013 from a single centre. Six patients with dextrocardia (five males and one female) underwent permanent pacemaker implantation. The study concluded thatwhich the medium- and long-term survival after a successful pacemaker implantation in dextrocardia is favourable.

Jeffrey L. Williams and Robert T. Stevenson, (2012) conducted study to estimate the rate of infection of permanent endocardial pacing leads was correlated to fever within 24 hours of device implant. The results revealed that the range is from under 1 percent to greater than 10% where the device infection requires removal,the incidence and early re intervention for lead revision or hematoma evacuation and the likelihood of infection was nearly doubled by the presence of a temporary system other sources of infection identified were temporary intravenous pacing wires, indwelling lines and the duration of hospitalization prior to implantation.

Lindsey Getz, (2012) conducted retrospective study to evaluate therate of infectionafter pacemaker implantation ,though infection remains a rare complication, the concern lies in the fact that the rate of infection seems to be increasing at a faster pace than the rate of device implantation. The second, more serious type of infection in patients with cardiac devices is a systemic infection that occurs in the bloodstream and also known as lead-associated endocarditis.

Multiple Researcher Jens Brock Johansen, Ole Dan Jørgensen, Mogens Møller, Per Arnsbo, Peter Thomas Mortensen, Jens Cosedis Nielsen, (2011)studied to ascertain the infection after pacemaker implantation. The incidence of surgical site infection was compared with later infection in first implant and replacement procedures. Independent factors associated with an increased risk of pacemaker infection were a greater number of pacemaker operations (including replacements), male sex, younger age, implantation

during the earliest part of the study period, and absence of antibiotics whereas the overall risk of infection after PM implantation was low, but the greater number of operations augmented the risk of infection. This should be taken into account when considering revisions of PM systems.

Antoine Da Costa, MD, et.al, (2010) conducted a meta-analysis study on antibioticprophylaxis for permanent pacemaker implantation to evaluate the effectiveness of antibiotic prophylaxis to reduce infection rates after permanent pacemaker implantation. Reports of trials were identified through a Medline, Embase, Current Contents, and an extensive bibliography search. The study concluded that systemic antibiotic prophylaxis significantly reduces the incidence of potentially serious infective complications after permanent pacemaker implantation and support use of prophylactic antibiotics at the time of pacemaker insertion to prevent short-term pocket infection, skin erosion or septicemia**.**

Aggela-Beth Terzi, RN,(2010) conducted study to determine the risk factors which are responsible for causing infection after pacemaker implantation and to study the nursing interventions which may help reduce the risk of such a serious complication Nursing personnel is present during all stages of pacemaker implantation and is therefore an important member of the multidisciplinary team involved in the procedure. The nurse's various roles make apparent the need for a high quality of knowledge and skills, concerning all aspects of general nursing principles, along with details of this specialized cardiac procedure. The need not continues only for further studies, but for continuous education and for enhancing the development of guidelines and protocols, and help prevent incidents of infection after pacemaker implantation.

SECTION 2.1.4:CRITICAL REVIEW RELATED TO KNOWLEDGE AND SKILL AMONG NURSES ON PACEMAKER IMPLANTATION

NahlaShaaban, et al, (2014) conducted a descriptive exploratory study to assess critical care nurses' knowledge and practice regarding implantable cardiac devices at selected critical and coronary care units in Egypt among 40 nurses with a minimum 1 year of experience. The background data that included gender, age, educational level, area of work and years of experience, Questionnaire was used to assess nurses' knowledge and checklist to assess nurses' practice regarding implantable cardiac devices.

The results revealed that nurses have low knowledge and practice scores and no significant correlations existed between gender, age, years of experience, and their level of knowledge and practice.

Nagwa Mohamed Ahmed Mohamed, ZienabAbd El-Lateef Mohamed (2014) conducted a quasi-experimental study to assess the impact of nursing teaching protocol on reduction of complications among 60 patient(30 patients in study group and 30 patients in control groups) with permanent artificial pacemaker. Data were collected by pre-post test questionnaire sheet, observational checklist and complication assessment sheet. The mean knowledge scores of both study group was significantly increased in the post protocol application. The study recommends to establish an inservice training center and a hot line contact in additions provision of pamphlets and simple booklet.

Vahid Zamanzadeh., et al., (2013)conducted a prospective study to evaluate the effect of a supportive-educational intervention on self-care behaviours of heart failure patients in Iran. Eighty heart failure patients were randomly assigned to receive the supportive-educational intervention or usual care. Data were collected at baseline, one, two, and three months. The results showed that the control and intervention groups did not differ in self-care scores at baseline but with regard to self-care behaviours over the three months, among participants in the intervention group were exist a significant difference . This study provides support for the effectiveness of a supportive-educational intervention to increase self-care behaviours among Iranian patients suffering from chronic heart failure.

Bavnbek K, Ahsan SY, Sanders J, Lee SF, Chow AW , (2010) conducted astudy on wound management and restrictive arm movement following cardiac device implantation. Recent guidelines on wound management published by The National Institute for Health and Clinical Excellence in the UK recommend covering the wound postoperatively for 48 h with a low-adherent transparent dressing and letting patients shower thereafter. Studies showed that early mobilisation and allowing a full range of arm movements following device implantation is safe.

Malm D, Karlsson JE, Fridlund B, (2009) study was conducted to assess theeffectivenessof a self-care program on the health-related quality of life of pacemaker

patients.The study integrated that it is important to actively include pacemaker patients in a self-care program while still in the acute phase in the hospital training and continued education for health care professionals aids in holistic approach to nursing care which inturn make Health care professionals to support the patient in a kind and professional manner by providing clear, relevant information, planning a self-care program based on the nurse's assessment of the patient's needs to enable patients to manage their life situations.So that their efforts are based on a holistic approach to nursing care.

A cross-sectional descriptive study was performed among nurses to examine nurses' performance in giving care to patients with temporary and permanent pacemakers of Kerman University affiliated hospitals, (2009) data was collected by a researcher-made questionnaire with 36 questions on nursing care (15 items on hospital care and 21 items on discharge time nursing care) . There was no relationship between postoperative and discharge time care scores with cardiac re-education scores. Considering nurses' lack of information on patient education and the critical situation of these patients, establishing nursing re-education courses and adding courses with functional content to nursing curriculum are suggested.

SECTION 2.1.5: CRITICAL REVIEW RELATED TO QUALITY OF LIFE IN PATIENTS WITH PERMANENT PACEMAKERS

Chen HM, (2010) conducted a study at Chang Gung Institute of Nursingon Change in Quality Of Life (QOL) in patients with permanent cardiac pacemakers before pacemaker implantation and the QOL after pacemaker implantation. The QOL improvement reached a peak at the end of the fourth month and the scores decreased at the end of the sixth month and the fourth month. They had significant improvement in general well-being, sleeping, appetite, physical activity, and physical symptoms but not in cognitive function, social participation, work capability and sexual function. Subjects with spouses as their main caregivers had significantly better improvement in QOL after pacemaker implantation.

Rassin, et al, (2010) conducted a study to identify the information of patients following pacemaker implantation about classification of questions asked by pacemaker patients as a basis for intervention. Study was conducted in AsafHarofe Medical Centre, Zrifinn, Bear Yaakov, Israel. A convenience sample of participants was taken from the

entire population of patients who attended the cardiology clinic between January-June 2007; 274 individual meetings were held with 123 pacemaker patients in three periods, reflecting different stages of recovery. Eight categories representing common issues and content were raised. Patients were invoked to ask any question they may have regarding pacemaker implantation,The study concluded that, the common factor for most of the questions was the loss of confidence in the various aspects of life and the largest relative question proportion was in the motion and effort (27%) (e.g. may I swim? how many kg may I lift?) and environmental influences (26%) (e.g may I use a cellular phone? continuous pattern and characterizing the different points of measurement where, related to daily routine activities and as time passed and patients were exposed to non-daily activities and conditions.

Van Eck, et al,(2009) conducted a prospective, observational, prognostic cohort study to quantify the incidence of complications and the quality of life 1 year after pacemaker implantation, and to determine the follow-up measurements to improve the efficiency of follow-up and to demonstrate which follow-up measurements are redundant. About 40 pacemaker centers in the Netherlands participated with 2,500 patients aged >or=18 receiving a pacemaker for the first time were taken as samples. After implantation, follow-up visits carried out conforming with routine care. Primary outcome is the incidence of PM and Secondary outcome parameters are quality of life. This study suggested that more efficient routine follow-up schedule for patients with a PM is necessary.In addition to reduce time and energy while preserving the safety of pacing therapy and to improve prognosis of the patient and ultimately provide evidence-based guidelines for PM follow-up.

Aqueel , et al, (2009**)** conducted a descriptive cross sectional survey was carried out on consecutive patients at the pacemaker clinic at a public hospital in Karachi, Pakistan. A 47-question tool was developed and tested. Patients' perceptions of safety of performing various routine activities, along with socio-demographic data were recorded. The final results sample included 93 adult patients (45% males). 41% were illiterate. 77.4% recalled receiving counseling at implantation, predominantly from the implanting physician and house staff. A considerable proportion of patients considered many routine activities unsafe including driving automobiles (28%), passing through metal detectors (31%), bending over (37%), and sleeping on the side of the pacemaker (30%). Also

considered unsafe were operation of household appliances- TV/VCR (television/video cassette recorders) (53%), irons (55%)) and electrical wall switches (56%).. This study concluded that pacemaker patients perceive many routine activities as unsafe, potentially leading to disabling life style modifications. Further studies are required to determine the reasons for these misperceptions.

Jimenez, et al.,(2008)prospectively examined 398 patients withthe pacemaker implantation.Health values were estimated with the time tradeoff method before implantation and at 3, 9, and 18 months after implantation. 234 patients (59%) were male. The overall improvement in health values at 3 months after pacemaker implantation was significant.(P =. 0001). Stofmeel, et al,(2008) conducted a study to assess the sensitivity to change in health. A cohort of 51 patients was assessed at baseline and at 4-6 weeks after pacemaker implantation. The authors compared the sensitivity to change over time based on to the scores obtained using various techniques (t-test value, effect size, standard error of measurement). The score was modestly correlated with other measurements of health-related quality of life and it was not influenced by demographic characteristics such as age and sex, diagnoses, pacing mode, employment status, or history of angina. Patients with a lower functional class at enrollment (III or IV on the Specific Activity Scale) demonstrated an absolute improvement of 23% in their health values, whereas patients in class I or II improved only by 12%, (P =. 03).

Panja M, et.al, (2008) conducted a study in Department of Cardiology, Institute of Post-graduate Medical Education & Research at Calcutta to determine the reused pacemaker from thedead patient with that of newly implanted one. Reuse of these pacemakers after thorough cleansing and proper sterilization was utilized .The infection rate in cases of reuse from dead patients was comparable to that in cases of new implantation. However, pacemakers reused in the same patient showed a high rate of infection. With the aid of newer generations of antimicrobials, infection when matched with efficacy and economy (of reuse) does not seem to be a major factor against pacemaker reuse.

SUMMARY

After an extensive literature search the researcher found that majority of the nurses lack in knowledge to examine nurses' performance in giving care to patients with temporary and permanent pacemakers and have inadequate level of skill regarding care of patient with pacemaker implantation. The reviews supported that the pacemaker care protocol will enhance their knowledge of nurses and promotethe quality of life among patient undergoing pacemaker implantation. Hence the reviewssupported that the pacemaker care protocol is the effective method for imparting knowledge and skill among nurses.

RESEARCH METHODOLOGY

The methodology is the significant part of any research study which will enable the researcher to project a blue print of the research (Polit and Hunger, 2012).

This chapter deals with the methodology adopted for the study to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at Dr.Jeyasekharan hospital and Dr.Somervell Medical College and hospital.

This phase of the study includes selecting the research design, variables, research settings, population, sample, criteria for sample selection, sample size, sampling

technique, development and description of tool, content validity, pilot study, reliability of the tool, data collection procedure and plan for data analysis.

3.1 RESEARCH APPROACH

The research approach used in the study was Quantitative research approach.

3.2RESEARCH DESIGN

Theresearch design used in this study was quasi experimental non equivalentpre test and post test with control group design. In this study the experimental group received the pacemaker care protocol and control group received the hospital routine.

The investigator conducted this study in different settings to prevent contamination and adopted control group in order to show the effectiveness. This made the investigator to undertake quasi experimental design for this study. Based on Polit and Hungler (2011) the schematic representation of the quasi-experimental study (pre test and post test) shown below.

SCHEMATIC REPRESENTATION OF THE QUASI-EXPERIMENTALSTUDY

Group	**Pre test Day 1 (O_1)**	**Intervention Day 2 and Day 3 (×)**	**Post test Day 7** (O_2)
Experimental group	Assess thelevel of knowledge using structure knowledge questionnaire .	Pacemaker care protocol for the Nurses **Lecture cum group discussion** on definition, uses, types, pacing methods of pacemaker and nurses responsibilities before pacemaker implantation,immediately after receiving patient from the Cardiac Catheterization Laboratory	Assess the level of knowledge and skill among nurse with structured knowledge

		(CATH lab), post pacemaker implantation care for about 25-30 minutes to a group of maximum 7 nurses using power point presentation. **Demonstration** on Preparation of patient before pacemaker implantation,(Environment preparation, Articles preparation), post implantation care (implantation site dressing)using mannecuine performed by the investigator for 10 minutes to a group of maximum 7 nurses in the procedure. **Return demonstration** on Pacemaker care protocol using the mannecuine done by the each nurses for 10 minutes in the demonstration room after 7 days. **Reinforcement** of pacemaker care protocol through a pamphlet	questionnaire and observational checklist respectively.
Control group		Hospital Routine	

3.3 VARIABLE

3.3.1Independent variable

The independent variable is pacemaker care protocol.

3.3.2Dependent Variables

The dependent variables were knowledge and skill regarding pacemaker care protocol.

3.3.3 Extraneous Variables

It consisted of age, gender, educational status, designation and total years of experience.

3.4 SETTING

The researcher selected 2 settings for the study. Experimental group as Dr.Jeyasekharan Hospital, Nagercoil and control group as Dr.Somervell Medical College and Hospital, Karakonam.

Dr.Jeyasekharan Hospital, Nagercoil, 350-bedded hospitalwith about 85 beds in the CTICU, Cath lab, female and male cardiac ward .The following procedure performed on daily basis like (Coronary artery bypass graft) CABG, (Percutaneous Transluminal Coronary Angioplasty) PTMCA, Pacemaker implantation and all other cardiac procedures. The Pacemaker implantation procedure was done approximately 6-8 cases per month and nearly 40-45 nurses are working only in cardiac wards such as CTICU, Cath lab, female and male cardiac ward, Cardiac post operative ward and Cardiac OPD, and the duty shifts for the nurses were 7amto 1pm in the first shift and in the second shift is 1pm to 7pm. In night 7pm -7am in morning.

Dr.Somervell Medical College and Hospital,Karakonam, a 500 bedded hospital with approximately 65 beds in CTICU,Cath lab and female and male cardiac wards.The following procedure are performed on daily basis like (Coronary artery bypass graft) CABG, PTMCA, pacemaker implantation and all other cardiac procedures. The pacemaker implantation procedure was done approximately 3-4 cases per month and nearly 45-55 nurses are working only in cardiac wards such as CTICU, Cath lab, female and male cardiac ward, Cardiac post operative ward and Cardiac OPD, and the duty shifts for the nurses were 7am to 1pm in the first shift and 1pm to 7 pm in the second shift and 7pm to 7am in the night shifts.

3.5 POPULATION

3.5.1 Target population

The study population consisted of all registered nurses qualified with diploma in general nursing and midwifery, B.Sc. Nursing and post basic B.Sc Nursing working in cardiac ward such as Cardio Thoracic Intensive Care Unit (CTICU), Cath lab, female and male cardiac ward.

3.5.2Accessible population

Nurses who are working in cardiac ward such as CTICU, Cath lab, female and male cardiac ward of Dr.Jeyasekharan Hospital, Nagercoil and Dr.Somervell Medical College and Hospital, Karakonam.

3.6 SAMPLE

Nurses working in cardiac ward who fulfilled inclusive criteria.

3.7 SAMPLE SIZE

The sample size for this study comprised of 60 nurses, in which 30 nurses in experimental group and 30 nurses were in control group.

3.8 CRITERIA FOR SAMPLE SELECTION

3.8.1 Inclusion criteria

Nurses

- with education qualification of diploma in nursing, B.Sc Nursing or Post Basic B.ScNursing.
- who are working in cardiac wards such as CTICU, Cath lab, female and male cardiac wards .
- who are willing to participate in study.

3.8.2 Exclusion criteria

Nurses

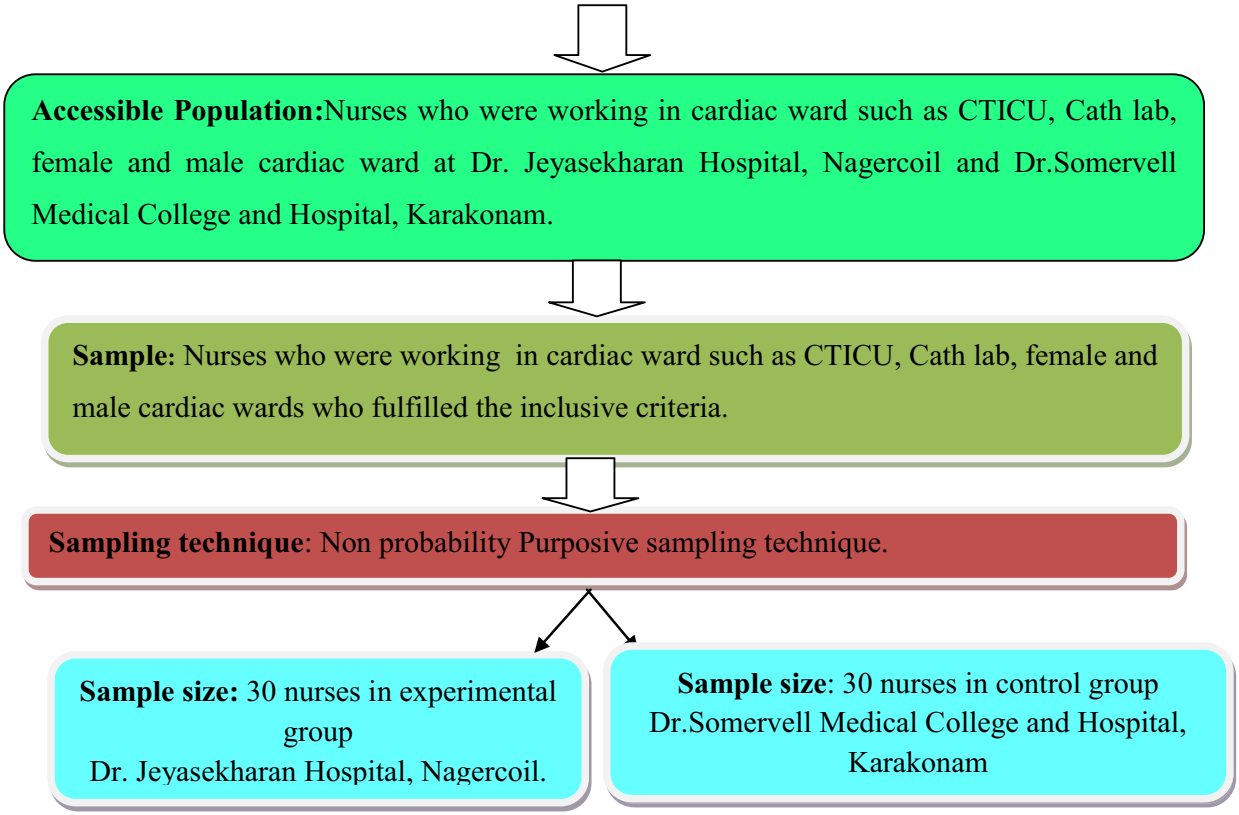
- who are already attended training programme on pacemaker care protocol .
- who had less than 6 month of experience in care of client undergoing pacemaker implantation.

3.9 SAMPLING TECHNIQUE

The researcher adopted purposive sampling technique for the study. The researcher selected nurses who were working only in cardiac wards such as CTICU, Cath lab, female and male cardiac ward and selected nurses from all shifts duty.

SCHEMATIC REPRESENTATION FOR SAMPLING

Target Population: All registered nurses qualified with Diploma in general Nursing and Midwifery, B.Sc Nursing and Post Basic B.Sc Nursing working in cardiac ward such as CTICU, Cath lab, female and male cardiac ward.



3.10 DEVELOPMENT AND DESCRIPTION OF THE TOOL

After an extensive review of literature and discussion with the experts and with the investigator‘s professional experience,the data collection and intervention tool was developed. The tool constructed in this study has two parts:

3.10.1: DATA COLLECTION TOOL

3.10.2: INTERVENTION TOOL

3.10.1DATA COLLECTION TOOL

- **Section A:** Assessment of demographic variables.
- **Section B:** Structure Knowledge questionnaire
- **Section C:** Observational checklist

Section A:Assessment of demographic variables.

Personal data sheet used to collect the demographic characteristics of nurses which include age (in years), gender, education status, designation and total years of experience**.**

Section B: Structured Knowledge questionnaire

This part consisted of structured knowledge questionnaire toassess the level of knowledge regarding Pacemaker care protocol among nurses. It consisted of 30 questions Each question ended with multiple choices. Nurses were asked to select the best answer from the four options given.

CONTENT	NO.OF QUESTIONS
General information	5
Uses of Pacemaker	5
Types of pacemaker	5
Pacemaker protocol care	10
Nurses responsibility	3
Home care management	2
Total	**30**

Scoring key: Each correct answer was given‘1’mark and wrong and unattended questions was given‘0’mark each .The raw score was converted to percentage to interpret the level of knowledge. The overall score was 30, maximum score is 30 and minimum score is 0.

SCORE	PERCENTAGE	INTERPRETATION
>19	> 75 %	Adequate level of knowledge
13-18	51-75 %	Moderate level of knowledge
< 12	<50%	Inadequate level of knowledge

Section C: Observation checklist to assess the level of skill regarding Pacemaker implantation site dressing among nurses.

The part consisted of dichotomous statement with yes / no as answer options regarding pacemaker care protocol.

CONTENT	NO.OF QUESTIONS

Before procedure of pacemaker implantation	6
Care immediately after receiving patient from the CATH lab	7
After care of pacemaker implantation	7
Total	**20**

S**coring key:** Each yes was awarded a score of '1' and each no was awarded '0'. The overall score is 20,maximum score is 20 and minimum score is 0.The raw data was computed to interpret the level of skill.

Interpretation of observational checklist to assess the level of skill of pacemaker implantation site dressing among nurses.

SCORE	LEVEL OF SKILL
≤ 50%	Inadequate level of skill
51- 75%	Moderate level of skill
> 75 %	Adequate level of skill

3.10.2 Interventional Tool:

The interventional tool is pacemaker care protocol devised by the investigator which includes pacemaker care protocol, knowledge on definition,uses, types, methods of pacing pacemaker, nurses responsibility before, during, after pacemaker implantation.

Information transfer in the form of

- **Lecture cum group discussion** on definition, uses, types, pacing methods of pacemaker and nurses responsibilities before pacemaker implantation, immediately after receiving patient from the Cath lab, post pacemaker implantation care for about 25-30 minutes to a group of maximum 7 nurses using power point presentation.

- **Demonstration** on pacemaker care protocol includes (Environment preparation, Articles preparation), post implantation care (implantation site dressing) using mannecuine performed by the investigator for 10 minutes to a group of maximum 7 nurses in the procedure.
- **Return demonstration** on pacemaker implantation care protocol, post implantation care (implantation site dressing) using the mannecuine done by the each nurse for 10 minutes in the demonstration room after 7 days.
- **Reinforcement** of pacemaker care protocol through a pamphlet.

3.11 CONTENT VALIDITY

The content validityof the data collection tool and intervention tool was ascertained with the experts opinion in the following field of expertise

- Medical cardiologist - 1
- Interventional Cardiologist - 1
- Medical Surgical Nursing Experts - 4

The following modifications were made in the data collection and intervention tool as per the experts suggestions. All the experts had their consensus and then the tool was finalized. Experts suggested to addsome of the variable and modification done in the multiple choice questions given by the experts were incorporated.

3.12 ETHICAL CONSIDERATION

Ethics is a system of moral values that is concerned with the degree to which the research procedures adhere to the professional, legal and social obligations of the study participants**.** (Polit and Hungler, 2012).

The ethical principle followed in the study were:

1. BENEFICIENCE

The investigator followed the fundamental ethical principles of beneficience adhering to:

a) Freedom from harm and discomfort

The study was beneficial for the nurses as it enhanced their knowledge regarding pacemaker care protocol and improved their skill while taking care of clients undergoing pacemaker implantation.

b) Protection from exploitation

The investigator explained the procedure and nature of the study to the nurses and ensured that none of the samples were exploited or denied.

2. RESPECT FOR HUMAN DIGINITY

The investigator followed the second ethical principle of respect for human dignity. It includes the right to self determination and the right to self disclosure.

a)The right to self – determination

The investigator gave full freedom to the nurses to decide voluntarily whether to participate in the study or to withdraw from the study and the right to ask questions. All the nurses were participated throughout the study and there was no attrition.

b) The right to full disclosure

The researcher had fully described the nature of the study, the persons right to refuse participation and the researchers responsibilities based on which both oral and written informed consent obtained from the nurses.

3. JUSTICE

The researcher adhered to the third ethical principles of justice. The selection of the study participants was completely based on research requirements. A full privacy was maintained throughout the data collection.

a)Right to fair treatment

The researcher selected the study participants based on the research requirements. The investigator followed the rules and regulations of Institutional Ethical Committee (IEC).

b) Right to privacy

The researcher maintained the participants privacy throughout the study without revealing the score of the participants and data was collected individually to all nurses.

4.CONFIDENTIALITY

The researcher maintained confidentiality of the data provided by the participants using identification number to the each participants.

3.13 RELIABILITY OF THE TOOL

The reliability of the tool was established by test retest method for knowledge questionnaire with 'r' value of 0.85 ,and inter rater method for an observational checklist with 'r' value of 0.86. It was found that the tool was reliable and practicable to implement in the main study.

3.14 PILOT STUDY

Pilot study is the trial run for the main study. Pilot study was conducted at Fortis Malar Hospital Adayar, Chennai and Kamakshi Hospital, Pallikarnai, Chennai.

The pilot study was conducted for a period of one week from 18th May to 24th May 2015. After obtaining ethical committee clearance from International Centre for Collaborative Research (ICCR), a formal written permission was sought from the principal of Omayal Achi College of Nursing and the Nursing superintendent of Fortis Malar Hospital Adayar and Kamakshi Hospital Pallikarnai, Chennai.

The investigator selected 6 nurses from Fortis Malar Hospital Adayar, Chennai and 6 nurses from Kamakshi Hospital Pallikarnai, Chennaiwho fulfilled the inclusive criteria using non-probability purposive sampling technique, nurses who were working in cardiac wards such as CathLab, CTICU, female and male cardiac ward. A brief explanation was given regarding purpose of the study to the participants and written consent was obtained.

Nurses in the experimental group (Fortis Malar Hospital Adayar, Chennai) were met by the investigator individually in the ward and demographic details were obtained from the nurses through the structured demographic profile. Then the investigator assessed the pre test level of knowledge using structured knowledge questionnaire.

It took 30 minutes to answer the questions. In morning shift the investigator selected 2 nurses from Cath Lab,2 nurses from CTICU, 2 nurses from female and male cardiac ward were gathered in an auditorium and administered the intervention knowledge regardingthe pacemaker care protocol, through lecture cum discussion for 15 minutes and demonstration of pacemaker implantation site dressing by using mannecuine for 10 minutes and the pamphlets was given to the nurses.

Nurses in the control group (Kamakshi Hospital Pallikarnai, Chennai) were met by the investigator individually in the ward and demographic details were obtained from the nurses through the structured demographic profile. Then the investigator assessed the pre test level of knowledge using structured knowledge questionnaire. It took 30 minutes to answer the questions. In evening shift the investigator selected 3 nurses from Cath Lab, 2 nurses from CTICU, 1 nurse from female and male cardiac ward and no intervention was given, the control group followed hospital routine.

On the seventh day the investigator conducted the post-test using the same structured knowledge questionnaire to assess the knowledge on pacemaker care Protocol and the post –test skill was assessed using a structured observational checklist.

For the control group the investigator administered pacemaker care protocol at the end of the post test.

The analysis of the pilot study revealed that:

The unpaired ‘t’value was to determine the effectiveness of pacemaker care protocol on knowledge was 15.50 and 2.326, which showed a statistical significance to improve the level of knowledge in experimental group at $p < 0.001$ level.

The result of the pilot study revealed that the assessment and intervention tool was reliable, feasible and practicable to conduct the main study.

3.15 PROCEDURE FOR DATA COLLECTION

The main study was conducted after obtaining formal permission from the Principal, Omayal Achi College of Nursing. Ethical Committee Clearance obtained from

the International Centre for Collaborative Research and written permission obtained from Medical Director, of Dr.Jeyasekharan Hospital, Nagercoil and Dr.Somervell Medical college and Hospital,Karakonam.

The study was conducted for a period of 4 weeks for experimental group in Dr.Jeyasekharan Hospital, Nagercoil and for control group in Dr.Somervell Medical college and Hospital, Karakonam. A total of 60 nurses (30 nurses each in the experimental group and control group) who met the inclusion criteria was selected by purposive sampling technique, from Cardiac Ward,CATH Lab, CTICU.

On first day the investigator collected data from experimental group at Dr.Jeyasekharan Hospital. The investigator met the Nurses in CATH Lab, CTICU, Cardiac Ward, introduced about self and briefly explained regarding the purpose of the research study. After obtaining a written consent form and pledge of confidentiality the demographic variables and assessed the pre test level of knowledge regarding pacemaker care protocol. Approximately it took 30 minutes to complete structured knowledge questionnaire for a sample. The nurses were assigned with an identification number to maintain their confidentiality.

After the completion of the pre test, the investigator gathered the nurses in the multipurpose hall, to a maximum of 7 nurses in each shift, seated comfortably in a well ventilated room and administered knowledge on pacemaker care protocol through lecture cum discussion and explained about the definition, uses, types, methods of pacing pacemaker, nurses responsibility before, during and after pacemaker implantation. Demonstrationon Pacemaker implantation site dressing performed by the investigator for 10 minutes to a group of maximum 7 in each shift nurses using the mannecuine in the demonstration room,after which a pamphlet containing the information transferred was given to the nurses for the reinforcement. It took approximately 20 minutes to administer the intervention.

On the seventh day after pre- test, the investigator conducted the post-test using the same structured knowledge questionnaire to assess the knowledge on pacemaker care Protocol and the post –test skill was assessed using a structured observational checklist.

The same procedure for data collection was repeated for the control group at Dr.Somervell Medical college and Hospital, Karakonam. The investigator met the nurses in CATH Lab, CTICU, Cardiac Ward, introduced about self and briefly explained regarding the purpose of the research study .After obtaining a written consent form and pledge of confidentiality. The demographic variables and pre test knowledge questionnaire collected individually from the nurses. Approximately it took 30 minutes to complete structured knowledge questionnaire for a sample. The nurses were assigned with an identification number to maintain their confidentiality.

After the completion of the pre test the hospital routine was carried out for the nurses in the control group. On the seventh day after pre- test, the investigator conducted the post-test using the same structured knowledge questionnaire to assess the knowledge on pacemaker care protocol and the posttest skill was assessed using a structured observational checklist. The investigator administered pacemaker care protocol after the post test.

All ethical principles were adhered throughout the course of the study.

3.16 PLAN FOR DATA ANALYSIS

Data was analyzed by using both descriptive and inferential statistics.

Descriptive Statistics

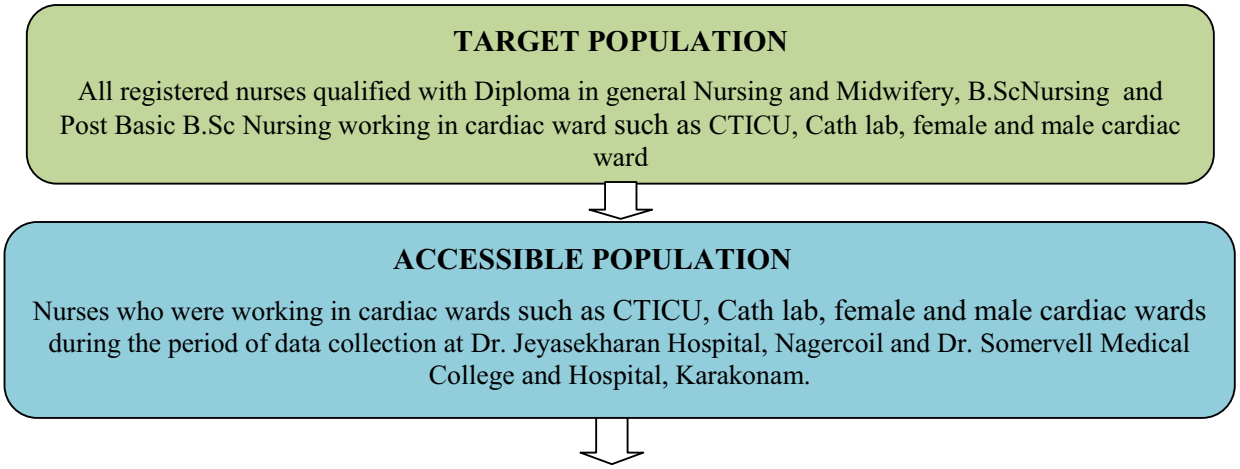
1. Frequency and Percentage distribution was used to analyze the demographic data of the nurses.
2. Mean and Standard deviation was utilized to assess the level of knowledge and skill.

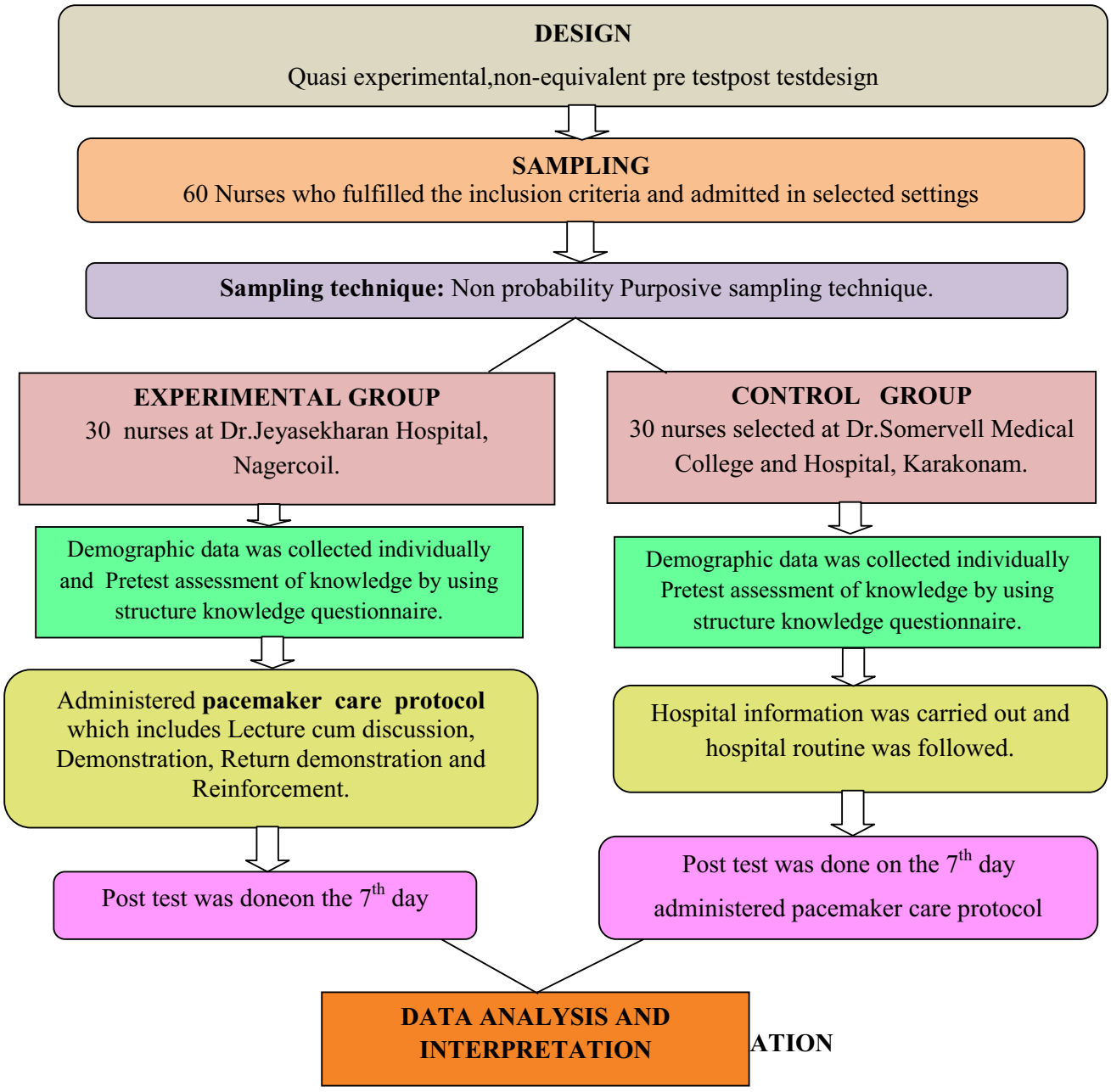
Inferential Statistics

1. Unpaired ‘t’ test was used to assess the effectiveness of pacemaker care protocol for care of client undergoing pacemaker implantation between the experimental and control group.
2. Correlation coefficient was utilized to find the relationship betweenthe mean differed level of knowledge and skill among Nurses in the experimental group andcontrol group.

3. Analysis of Variance (ANOVA) was used to associate the selected demographic variables with the mean differed level of knowledge and skill of the nurses.

Fig.3.1: SCHEMATIC REPRESENTATION OF RESEARCH METHODOLOGY





The analysis is the process of organizing and synthesizing the data in such a way that the research question can be answered and hypothesis tested (Polit and Hungler, 2011).

This chapter deals with the analysis and interpretation of data collected from 60 nurses to assess the effectiveness of pacemaker care protocol on knowledge and skill among nurses.

The data collected for the study was grouped and analyzed as per the objectives set for the study. The findings based on the descriptive and inferential statistical analysis are presented under the following sections.

ORGANIZATION OF DATA

SECTION 4.1: Description of the demographic variables of nurses in experimental and control group.

SECTION 4.2: Assessment and comparison of pre test and post test level of knowledge regarding pacemaker care protocol in experimental and control group.

SECTION 4.3: Assessment of the post test level of skill regarding pacemaker care protocol in experimental and control group.

SECTION 4.4: Effectiveness of pacemaker care protocol on knowledge and skill among nurses in experimental and control group.

SECTION 4.5: Correlation of the post test level of knowledge with skill regarding pacemaker care protocol in experimental group and control group.

SECTION 4.6: Association of selected demographic variables with mean differed knowledge score and post test level of skill score regarding pacemaker care protocol in the experimental group.

SECTION 4.1: DESCRIPTION OF DEMOGRAPHIC VARIABLES OF NURSES IN EXPERIMENTAL AND CONTROL GROUP.

Table 4.1.1: Frequency and percentage distribution of demographic variable such as age,gender, educational status in experimental and control group.

N = 60

S.No.	Demographic Variables	Experimental Group n=30		Control Group n=30	
		No.	%	No.	%
1.	Age in years				

	21-25	10	33.33	10	33.33
	26-30	4	13.33	6	20.00
	31-35	**13**	**43.34**	**11**	**36.67**
	>36	3	10.00	3	10.00
2.	**Gender**				
	Male	0	0	0	0
	Female	**30**	**100**	**30**	**100**
3.	**Educational status**				
	G.N.M	10	33.33	10	33.33
	B.Sc Nursing	**18**	**60.00**	**13**	**43.34**
	P.B.B.Sc Nursing	2	6.67	7	23.33

In the experimental group, 13(43.34 %) were in the age group of 31 – 35 years, 30(100%) were females, 18 (60%) had completed B.Sc Nursing .

In the control group, 11(36.67%) were in the age group of 31 – 35 years, 30(100%) were females, 13 (43.34%) had completed B.Sc Nursing .

Table 4.1.2: Frequency and percentage distribution of demographic variables such as total years of experience and designation of nursesin experimental and control group.

N=60

S.No.	**Demographic Variables**	**Experimental Group n=30**		**Control Group n=30**	
		No.	**%**	**No.**	**%**
1.	**Total years of experience**				

	6 months – 1	0	0.00	4	13.33
	>1 -3	**11**	**36.67**	**19**	**63.33**
	>3 -5	8	26.66	3	10.00
	> 5	**11**	**36.67**	4	13.34
2.	**Designation of nurses**				
	Staff nurse	**12**	**40.00**	**12**	**40.00**
	Senior nurse	10	33.33	**12**	**40.00**
	Ward in charge	8	26.67	6	20.00

In the experimental group, 11(36.66%) of them had >1 – 3 of experience and >5 experience, 12(40%) were staff nurses.

In the control group, 19(63.33%) had >1 – 3 of experience and 12(40%) were staff nurses and senior nurses.

SECTION 4.2: ASSESSMENT AND COMPARISION OF PRE TEST AND POST TEST LEVEL OF KNOWLEDGE REGARDING PACEMAKER CARE PROTOCOL AMONGNURSES IN EXPERIMENTAL AND CONTROL GROUP.

Table 4.2.1: Frequency and percentage distribution of pre and post test level of knowledge regarding pacemaker care protocol among nurses in experimental and control group.

N=60

Level of Knowledge		Inadequate (≤ 50%)		Moderately Adequate (51-75 %)		Adequate (> 75 %)	
		No.	%	No.	%	No.	%
Experimental Group n= 30	**Pre-test**	20	66.67	10	33.33	0	0.00
	Post-test	0	0.00	7	23.33	23	76.67
Control Group n= 30	**Pre-test**	22	73.33	8	26.67	0	0
	Post-test	19	63.33	9	30.0	2	6.67

In the experimental group, 20(66.67%) had inadequate knowledge on pacemaker care protocol in the pre test, whereas in the post test 23(76.67%) had adequate knowledge regarding pacemaker care protocol among nurses.

Inthe control group, most of them had inadequate level of knowledge on pacemaker care protocol in the pre test and post test.

Table 4.2.2: Comparison of pre test and post test level of knowledge scores regarding pacemaker care protocol among nurses in experimental group and control group.

N = 60

Group	Pre test		Post test		Mean Difference	Paired 't' value
	Mean	S.D	Mean	S.D		

Experimental Group n = 30	14.80	3.29	24.63	2.89	9.83	t = 16.630 p = 0.000,S ***
Control Group n = 30	13.30	3.84	14.43	3.64	1.13	t = 0.252 p = 0.5N.S

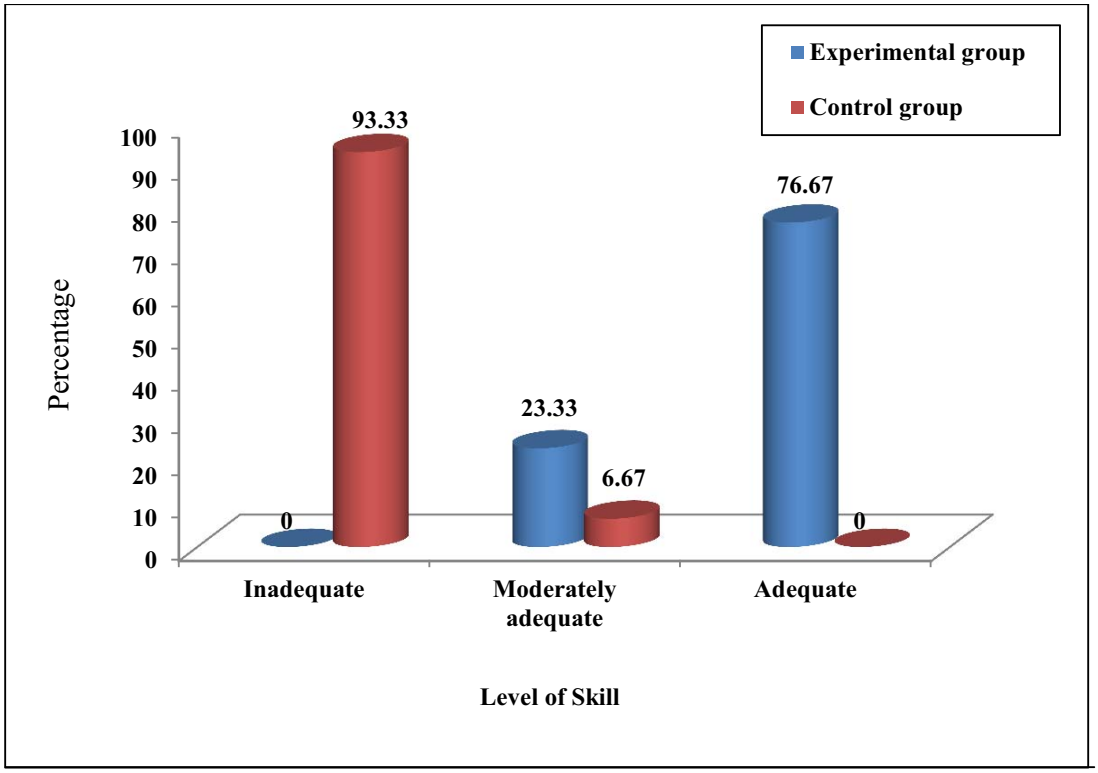
*** p<0.001, S-Significant

In the experimental group, the calculated paired 't' value was 16.630 found to be highly statistical significant at p <0.001 level, which indicates that the pacemaker care protocol administered to the nurses had significantly improved their level of knowledge. It indicates developing protocol for any procedure is effective to improve the knowledge and skill and enable to provide better patient care.

SECTION 4.3: ASSESSMENT OF THE POST TEST LEVEL OF SKILL REGARDING PACEMAKER CARE PROTOCOL AMONG NURSES IN EXPERIMENTAL AND CONTROL GROUP.

Fig.4.3.1: Frequency and percentage distribution of post test level of skill regarding pacemaker care protocol among nurses in experimental group and control group.

N=60



In the post test level of skill, experimental group, 23(76.67%) had adequate level of skill whereas in the control group, 28(93.33%) had inadequate level of skill. It shows that pacemaker care protocol demonstration and redemonstration had significant improvement in the level of skill in experimental group than control group.

SECTION 4.4: EFFECTIVENESS OF PACEMAKER CARE PROTOCOL ON KNOWLEDGE AND SKILL AMONG NURSES IN EXPERIMENTAL AND CONTROL GROUP.

Table 4.4.1: Comparison of pre test level of knowledge scores regarding pacemaker care protocol among nurses between experimental and control group.

N= 60

Group (Level of knowledge)	Mean	S.D	Mean difference	Unpaired t value
Experimental Group n= 30	14.80	3.29	1.13	t = 0.183 p = 0.24,N.S
Control Group n= 30	13.30	3.84		

*** p<0.001, S-Significant

The calculated unpaired 't'value indicates that there is nostatistically significant difference between the pre test level of knowledge score among the nurses between experimental and control group. This shows that the experimental and control group had low level of knowledge regarding pacemaker care protocol, therefore the investigator administered pacemaker care protocol after pretest assessment.

Table 4.4.2: Comparison of post test level of knowledge scores regarding pacemaker care protocol among nurses between experimental and control group.

N= 60

Group (level of knowledge)	Mean	S.D	Mean difference	Unpaired 't' value

Experimental Group n= 30	24.63	2.89	10.2	t = 12.002 p = 0.000,S***
Control Group n= 30	14.43	3.64		

*** p<0.001, S-Significant

The calculated unpaired‘t’value indicates that there was highly statistically significant difference between the post test knowledge score among the nurses between experimental and control group at <0.001 .The pacemaker care protocol administered to the nurses in the experimental group had significantly improved their level of knowledge than the nurses in the control group.

Table 4.4.3: Comparison of post testlevel of skill regarding pacemaker care protocol among nurses between experimental and control group.

N= 60

Group (Skill scores)	**Mean**	**S.D**	**Mean difference**	**Unpaired ‘t’ test**

Experimental Group n= 30	16.46	1.65	4.43	t = 9.577 p = 0.000,S***
Control Group n= 30	12.03	1.92		

*** p<0.001, S-Significant

The calculated unpaired 't'valuewas 9.577 clearly proves that there was a significant difference in the post test skill score among the nurses between the experimental and the control group. This shows that the pacemaker care protocol i.e., demonstration and return demonstration of patient preparation and surgical site dressing procedure after pacemaker implantation was effective to improve the level of skill among nurses.

SECTION 4.5: CORRELATEION BETWEEN THE POST TEST LEVEL OF KNOWLEDGE AND SKILL SCORE REGARDING PACEMAKER CARE PROTOCOL IN EXPERIMENTAL GROUP AND CONTROL GROUP.

Table 4.5.1: Correlation of post test level of knowledge with skill regarding pacemaker care protocol among nurses in the experimental group and control group.

N=60

Group	Knowledge		Skill		'r' value
Experimental Group n= 30	**Mean**	**S.D**	**Mean**	**S.D**	r = 0.375 p = 0.041,S *
	24.63	2.89	16.46	1.65	
Control Group n= 30	14.43	3.64	12.03	1.92	r = 0.027 p = 0.886,N.S

* p<0.05, S-Significant, N.S-Not Significant

In experimental group 'r' value 0.375 clearly indicated that the post testlevel of knowledge regarding pacemaker care protocol among nurses significantly correlated with the level of skill at p< 0.05 level. It shows where the post test level of knowledge increases, their level of skill also increased.

In control group 'r' value shows no statistically significant correlation at p<0.05 level .which indicated that post test knowledge regarding pacemaker care protocol among nurses and their skill level was not found to be adequate.

SECTION 4.6: ASSOCIATION OF SELECTED DEMOGRAPHIC VARIABLES WITH MEAN DIFFERED KNOWLEDGE SCORE AND POST TEST LEVEL OF SKILL SCORE REGARDING PACEMAKER CARE PROTOCOL AMONG NURSES IN EXPERIMENTAL GROUP.

Table 4.6.1: Association of selected demographic variables with mean differed knowledge score regarding pacemaker care protocol among nurses in experimental group. n = 30

Demographic Variables	Pretest	Post Test	Mean Imp.	ANOVA

	Mean	S.D	Mean	S.D	Mean	S.D	
Age							
21 – 25	14.60	4.35	23.30	2.54	8.70	3.62	F = 1.148
26 – 30	13.75	1.89	25.50	2.08	11.75	1.70	p = 0.348
31 – 35	15.76	2.68	26.15	2.64	10.38	3.37	N.S
> 36	12.66	2.88	21.33	1.52	9.67	1.52	
Educational Status							F = 0.275
G.N.M	15.20	3.42	25.00	1.76	9.80	3.19	p = 0.762
B.Sc (NURSING)	14.61	3.48	24.27	3.42	9.67	3.44	N.S
P.B.B.Sc NURSING	14.50	0.70	26.00	2.82	11.50	2.12	
Total years of experience							
6 months - 1	-	-	-	-	-	-	F = 0.805
> 1 - 3	16.27	3.66	25.63	2.11	9.36	3.95	p = 0.458
> 3- 5	13.87	3.33	23.00	2.97	9.12	2.74	N.S
> 5	14.00	2.64	24.81	3.21	10.81	2.78	
Designation							F = 1.331
Staff nurse	15.00	2.92	24.50	3.03	9.50	3.39	p = 0.281
Senior nurse	14.50	4.30	23.50	2.71	9.00	3.36	N.S
Ward Incharge	14.87	2.74	26.25	2.43	11.37	2.61	

N.S – Not Significant

The data revealed that none of the demographic variables such as age, gender, educational status, total years of experience, and designation was statistically associated with mean differed knowledge score regarding pacemaker care protocol among nurses in the experimental group.

Table 4.6.2: Association of selected demographic variables with post test level of skill score regarding pacemaker care protocol among nurses in experimental group.

n = 30

Demographic Variables	Post Test		ANOVA
	Mean	S.D	

Age			
21 – 25	16.60	1.77	F = 2.122
26 – 30	17.00	1.41	p = 0.122
31 – 35	16.69	1.25	N.S
> 36	14.33	2.30	
Educational Status			F = 0.728
G.N.M	16.90	0.99	p = 0.492
B.Sc (NURSING)	16.33	1.97	N.S
P.B.B.Sc NURSING	15.50	0.70	
Total years of experience			
6 months - 1 yr	-	-	F = 3.016
> 1 - 3	17.36	1.80	p = 0.066
> 3 – 5	15.75	1.90	N.S
> 5	16.09	0.83	
Designation			F = 0.338
Staff nurse	16.25	1.65	p = 0.716
Senior nurse	16.40	2.17	N.S
Ward Incharge	16.87	0.83	

N.S – Not Significant

The data revealed that none of the demographic variables such as age, gender, educational status, total years of experience, and designation was statistically associated with mean differed post test level of skill score regarding pacemaker care protocol among nurses in the experimental group.

DISCUSSION

This chapter discusses in detail about the finding of the analysis in relation to the objectives of the study. The following were the objectives of the study and further discussion will exemplify how these objectives were satisfied by the study.

5.1 The findings of the demographic variables of the staff nurses

The demographic variables of the nurses in experimental group considered in the study was age in years, gender, educational status, total years of experience and designation .Most of the nurses were females come under the age group of 31 – 35 years had an educational qualification of B.Sc. Nursing holding a designation of staff nurses with the experience of >5years.

The demographic variables of the nurses in control group considered in the study were age in years, gender, educational status, total years of experience and designation. Most of the nurses were females come under the age group of 31 – 35 years had an educational qualification of B.Sc. Nursing holding a designation of staff nurses and senior nurses with the experience of > 1yr – 3 years and >5years .

NahlaShaaban,et.al,(2014) conducted a descriptive exploratory study to assess critical care nurses' knowledge and practice regarding implantable cardiac devices at selected critical and coronary care units in Egypt among 40 nurses with a minimum 1 year of experience. The background data that included gender, age, educational level, area of work and years of experience, questionnaire was used to assess nurses' knowledge and checklist to assess nurses' practice regarding implantable cardiac devices. The results revealed that nurses have low knowledge and practice scores and no significant correlations existed between gender, age, years of experience, and their level of knowledge and practice.

5.2 The first objective of the study was to assess and compare the pre test and post test level of knowledge regarding pacemaker care protocol in experimental and control group.

The table 4.2.1 depicts the frequency and percentage distribution of pretest andpost testlevel of knowledge regarding pacemaker care protocol among nurses in the experimental group and control group .

In pretest most of the nurses had inadequate level of knowledgeon pacemaker care protocol in experimental groupand control group.whereas after administration of pacemaker care protocol in post test76.7% of nurses had adequate knowledge in experimental group and only 2% had adequate knowledge in control group .

The findings related to comparison of pre test and post test level of knowledge in the experimental group showed that, the pre test mean knowledge score was 14.80 with S.D 3.29 and the post test mean knowledge score was 24.63 with S.D 2.89.The calculated paired t value of 16.630 with p value is 0.000 showed high statistical significant at $p<0.001$ level.

The comparison of the pre test and post test level of knowledge in the control group revealed that, the pre test mean knowledge score was 13.30 with S.D 3.84 and the post test knowledge score was 14.43 with S.D 3.64.The calculated unpaired 't' value of 0.252 with p value is 0.5 showed no statistical significant at $p<0.001$ level.

It indicates that developing protocol with lecture cum discussion for any procedure is effective to improve the knowledge and enable to provide quality patient care.

Nagwa Mohamed Ahmed Mohamed, ZienabAbd El-Lateef Mohamed (2014) conducted a quasi-experimental study to assess the impact of nursing teaching protocol on reduction of complications among 60 patient (30 patients in study group and 30 patients in control groups) with permanent artificial pacemaker. Data were collected by pre-post test questionnaire sheet, observational checklist and complication assessment sheet. The mean knowledge scores of both study group was significantly increased in the post protocol application. The study recommended to establish an inservice training center and a hot line contact in additions toprovision of pamphlets and simple booklet .

5.3Thesecond objective of the study was to assess the post test level of skill regarding pacemaker care protocol in the experimental and control group.

Fig.4.3.1 shows the frequency and percentage distribution of post test level of skill regarding pacemaker care protocol among nurses in the experimental and control group**.** In the post test level of skill experimental group, 23(76.67%) had adequate level of skill whereas in the control group, 28(93.33%) had inadequate level of skill. It shows that pacemaker care protocol demonstration and redemonstration had significant improvement in the level of skill in experimental group than control group.

Ayub.Y, Nawaz, et al.(2014) conducted a retrospective study to examine the incidence of permanent pacemaker implantation post-valvular surgery and determine predictors that can identify high risk patients 72 different predictive variables were compared between the two groups and the Mean follow up duration was 30 days. The study revealed that the baseline demographics including age, sex, coronary artery disease, diabetes mellitus and hypertension were similar between the two groups. Presence of preoperative right bundle branch block along with patient undergoing valvular surgery significantly increased the incidence of permanent pacemaker implantation The study concluded that Patients undergoing valvular surgery are at significant risk for requiring post-operative permanent pacemaker implantation and recommended a larger study to determine the significance for other variables.

5.4The third objective of the study was to assess the effectiveness of pacemaker care protocol on knowledge and skill among nurses in experimental and control group.

Table 4.4.1 depicts that the comparison of pre test level of knowledge scores regarding pacemaker care protocol among nurses between experimental and control group**.** The calculated unpaired 't' value 0.183 indicates that there is no statistically significant difference between the pre test level of knowledge score among the nurses between experimental and control group. This shows that the experimental and control group had low level of knowledge regarding pacemaker care protocol.

Table 4.4.2 depicts that the comparison of post test level of knowledge scores regarding pacemaker care protocol among nurses between experimental and control group**.** The calculated unpaired 't' value 12.002 indicates that there was highly

statistically significant difference between the post test knowledge score among the nurses between experimental and control group at <0.001. The pacemaker care protocol administered to the nurses in the experimental group had significantly improved their level of knowledge than the nurses in the control group.

Table 4.4.3 shows the comparison of post test level of skill regarding pacemaker care protocol among nurses between experimental and control group. The calculated unpaired 't'value was 9.577 clearly proves that there was a significant difference in the post test skill score among the nurses between the experimental and the control group. This shows that the pacemaker care protocol i.e., demonstration and redemonstration of patient preparation and pacemaker implantation site dressing procedure after pacemaker implantation was effective to improve the level of skill among nurses.

Theinvestigator had adopted conceptual framework by integrating the concepts of **StuffleBeam Model and Von Berttalannfy's General Systems Model.** It provides a comprehensive, systematic and continuously ongoing framework for programme evaluation. System Model focuses on the organizing, interacting and interaction of parts and sub parts and the interdependence of the parts on each other. The input by the investigator is assessment of demographic data,using structured questionnaire. The throughput is the education on pacemaker care protocol and the output is validated as positive and negative outcome. The positive output of acquiring adequate knowledge and adequate skill was enhanced and negative output such as of inadequate knowledge and inadequate skill were reinforced by the investigator.

Hence, the null hypothesis NH_1 stated earlier that **"There is no significant difference in the post test level of knowledge and skill regarding pacemaker care protocol between the experimental group and control group at $p < 0.05$ level." was rejected for experimental group and accepted for control group.**

5.5 The fourth objective was to correlate between the post test level of knowledge regarding pacemaker care protocol with post test level of skill regarding pacemaker care protocol in the experimental group and control group.

Table 4.5.1 depict correlation of post test level of knowledge with skill score regarding pacemaker care protocol among nurses in the experimental group and control group.

In experimental group 'r' value 0.375 clearly indicated that the post test level of knowledge regarding pacemaker care protocol among nurses significantly correlated with the level of skill at $p< 0.05$ level. It shows that when the post test level of knowledge increases, their level of skill also increased.

In control group 'r'value shows no statistically significant correlation at $p<0.05$ level which indicated that post test knowledge regarding pacemaker care protocol among nurses and their skill level was not found to be correlated.

VahidZamanzadeh,et al,(2013)conducted prospective study to evaluate the effect of a supportive educational intervention on self-care behaviours of heart failure patients in Iran. Eighty heart failure patients were randomly assigned to receive the supportive-educational intervention or usual care. Data were collected at baseline, one, two, and three months. The results showed that the control and intervention groups did not differ in self-care scores at baseline. There were significant differences in self-care behaviours over the three months, among participants in the intervention group. This study provides evidence that effectiveness of a supportive-educational intervention to increase self-care behaviours among Iranian patients suffering from chronic heart failure.

Hence, the null hypothesis **NH2**stated earlier "**There is no significant relationship between the post testlevel of knowledge and skill regarding the pacemaker care protocol in the experimental group and control group at $p < 0.05$ level '' was rejected for experimental group and accepted for control group.**

5.6 The fifth objective was to associate the selected demographic variables with mean differed level of knowledge, and post test skill score regarding pacemaker care protocol among experimental group.

The data revealed that none of the demographic variables such as age, gender, educational status, total years of experience, and designation was statistically associated

with mean differed knowledge score and post test level of skill score regarding pacemaker care protocol among nurses in the experimental group.

Katrine Bavnbek, et.al, (2010) conducted meta analysissearch on Wound Management and Restrictive Arm Movement Following Cardiac Device Implantation. The study found that certain aspects of established practice are based on tradition rather than evidence. Recent guidelines on wound management published by The National Institute for Health and Clinical Excellence in the United Kingdom recommend covering the wound postoperatively for 48 hours with a low-adherent transparent dressing and make patient to shower thereafter. The study concluded that nurses can play a key role in identifying and addressing research questions that lead to improved patient outcome to achieve adequate research skills.

Thus the **NH_3**stated before that "**There is no significant association of the selected demographic variables with the mean differed knowledge score and post test skill score on pacemaker care protocol in the experimental group at $p<0.05$ level'' was accepted for the experimental group.**

SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

6.1 SUMMARY

Complete Heart Block (CHB) is a cardiac disease. There were 140,000 new cases (50,000 in India) and less than 20% in each country received treatment. Sudden cardiac death (SCD) is the cause for 450 000 deaths around the world each year .The only effective treatment for CHB is implantation of a cardiac pacemaker. Pacemakers represent one of the earliest and most successful non pharmacological therapy for arrhythmias. 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 (slow heart rate) every year. However, only 15,000 patients underwent pacemaker implantation in India annually. It has been estimated that approximately 25,000 pacemaker were implanted in India. Archive Healthcare (2013).

Nurses have a unique role in providing care such as education and psychological support to the patients and their families during and after pacemaker implantation. Nurses should be well equipped with knowledge and skill to perform good care so that patient will free from complications plantation at the hospitals, long-term health care settings.

The objectives of the study were

1. To assess and compare the pre test and post test level of knowledge regarding pacemaker care protocol among nurses in the experimental and control group.
2. To assess the post test level of skill regarding pacemaker care protocol in the experimental and control group.
3. To determine the effectiveness of pacemaker care protocol on knowledge and skill among nurses in experimental and control group.
4. To correlate the post test level of knowledge with skill regarding pacemaker care protocol in the experimental group and control group.
5. To associate the selected demographic variables with the mean differed knowledge score and post test skill score regarding pacemaker care protocol in the experimental group.

The study was based on the assumptions that,

1. Nurses may have some knowledge and skill regarding pacemaker care protocol.
2. Providing information on pacemaker care protocol may enhance the nurse knowledge and skill on client undergoing pacemaker implantation.

The null hypotheses formulated were,

NH_1- There is no significant difference in the post test level of knowledge and skill regarding pacemaker care protocol between the experimental group and control group at $p< 0.05$ level.

NH_2- There is no significant relationship between the post test knowledge score and skill score regarding the pacemaker care protocol in the experimental group and control group at $p<0.05$ level.

NH_3- There is no significant association of the selected demographic variables with the mean differed knowledge score and post test skill score on pacemaker care protocol in the experimental group at $p< 0.05$ level.

Thestudy was rooted on the review of literature, professional experiences and experts guidance from the field of Medical- Surgical Nursing. It also provide a platform to integrate theories into a conceptual framework aiding to design the methodology and in developing the tool for data collection.

In order to provide the relation of various aspects of study,the investigator had adopted and integrated a framework based on **Stuffle Beam Model and Von Berttalannfy's General Systems Model.**

The researcher adopted a quasi experimental, non equivalent pre test and post test study design to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospitals, Nagercoil. Purposive sampling technique was used to select 60 samples.

The tool constructed with two parts. Data collection tool**,** which consisted of 3 sections. Section A consisted ofstructured questionnaire to assess the demographic data which includes age, gender, educational status, total years of experience, and designation. Section B consisted of structured knowledge questionnaire to assess the level of knowledge among nurses regarding pacemaker care protocol consisted of 30 questions. Section C consisted of observational checklist to assess the level of skill regarding

pacemaker care protocol. It is a dichotomous questions statements with yes /no as answer options.

The interventional tool prepared by the investigator was pacemaker care protocol including lecture cum group discussion ondefinition, uses, types, methods of pacing pacemaker, nurses responsibility before, during and after pacemaker implantation with the aid of a power point presentation, demonstration on preparation of patient before pacemaker implantation and post pacemakercare using mannecuineperformed by the investigator for 10 minutes to a group of maximum 7 in each shift nurses in the demonstration room. Redemonstration done by the nurses for 10 minutes using the mannecuineinand reinforcement was given on pacemaker care protocol through pamphlet which contains information on steps before procedure, during procedure, after pacemaker implantation.

The content validity of the data collection tool was ascertained from 2 medical experts and 4 Medical-Surgical Nursing experts. The reliability of the tool was established test retest method for knowledge questionnaire and inter rater method for observational checklist. The feasibility and practicability of the study was analysed by conducting a pilot study at Fortis Malar Hospital,Chennai and Kamakshi Hospital Pallikarnai, Chennai, was found that the tool was practicable to implement in the main study.

The data collection for the main study was conducted at Dr.Jeyasekharan Hospital, Nagercoil and Dr.Somervell Medical College and Hospital Karakonam. Purposive sampling technique used and the sample size was 60 nurses who fulfilled the sample selection criteria. Ethical aspects maintained throughout the study.

The data collected was analyzed and interpreted based on the objectives and null hypothesis using descriptive and inferential statistics. The findings revealed that there was a significant improvement in the level of knowledge and skill after being provided intervention on pacemaker care protocol.

The major findings of the study revealed that,

In experimental group the pre test most of the nurses had inadequate level of knowledge on pacemaker care protocol,whereas in the post test revealed an improvement with 23(76.67%) had adequate level of knowledge.

In the control group the pre test majority of the nurses had inadequate level of knowledge on pacemaker care protocol,whereas in the post test most of the nurses had inadequate level of knowledge on pacemaker care protocol.

In the post test level of skill experimental group, 23(76.67%) had adequate level of skill whereas in the control group, 28 (93.33%) had inadequate level of skill.

When comparing the level of knowledge and skill between the experimental and control group, after administration of pacemaker care protocol includes lecture cum discussion, demonstration, redemonstration had significantly improved the level of knowledge and skill in experimental group than the control group nurses.

When correlating the mean knowledge score of 24.63 and S.D 2.89 with post test level of skill mean score 16.46 with S.D 1.65 'r' value of 0.375 showed positive correlation in experimental group. When knowledge increased their level of skill also increased. whereasno significantly correlation found in control group .This can be strengthen by inservice education and training on pacemaker care protocol.

The demographic variables such as age, gender, educational status, total years of experience and designation showed no statistically significant association with mean differed knowledge score and post testskill score among nurses regarding pacemaker care protocol.

CONCLUSION

The current study assessed the effectiveness of pacemaker care protocol on knowledge and skill among nursesat selected hospitals, Nagercoil. The study revealed that there was a significant difference in post test level of knowledge and skill regarding pacemaker care protocol after the administration of education and demonstration on pacemaker care protocol between experimental and control group . The study results concluded that pacemaker care protocol was effective in improving knowledge and skill

among nurses. Hence various continuous education training can be given to all nurses to implement pacemaker care protocol.

6.3 IMPLICATIONS

The investigator has drawn the following implications from the study in the field of nursing practice, nursing education, nursing administration and nursing research.

6.3.1 NursingPractice

Nurse investigator have a vital role in educating the nurses on pacemaker care protocol.

- Encourage the nurses in practicing pacemaker care protocol standards.
- Demonstration on preparation of patient before, during and after pacemaker implantation and redemonstration of pacemaker care protocolcan be made as routine to improve the skill of the nurses.

6.3.2 Nursing Education

- Thenurse educator must educate the nurses and significant others on the pacemaker care protocol to bring awareness in care of patient with pacemaker implantation.
- Other AV aids can be made to educate the nurses, using the pamphlet as a sample.

6.3.3 Nursing Administration

- Nurse administrator can organize training programme for nurses on pacemaker care protocol, care of patient undergoing pacemaker implantation.
- Nurse administrator can plan for awareness programme and reach out to all nurses working in hospital.
- Nurse administrator can suggest the nurses to practice pacemaker care protocol in the hospital policy.

6.3.4 Nursing Research

- Dissemination of findings of the study through conferences, seminars and by publishing in journals and websites.

- The generalization of the study results can be made further replication of the study in various settings and larger population.
- Encourage the nurses to implement the research findings in daily care of practices.
- Encourage the nurses to perform the standard pacemaker care protocol as devised by the investigator.

6.4 RECOMMENDATIONS

1. The nurse investigator encourages the use of pamphlet on pacemaker care protocol by the nurses in the hospitals.
2. The generalization of the study results can be made further replication of the study in various settings and larger population.
3. Inservice education on pacemaker care protocol could be conducted to all departmental nurses.
4. Nurse investigator plan for awareness programme and reach out to all nurses working in hospital.

6.5 LIMITATIONS

1. The investigator found difficulty in getting setting permission.
2. The investigator found difficulty in getting related reviews.
3. The investigator found difficulty in getting statistical information on pacemaker implantations.

6.6 PLAN FOR RESEARCH DISSEMINATION

1. The research findings will be disseminated through podium presentations in National conference and international conference.
2. The research findings will be published in various peer reviewed nursing journals like The Nightingale Times, TNAI etc., newspaper articles within time duration of 6 months.So that the nurses who read them can take initiative steps to implement such interventions in their hospital setup.

6.7 PLAN FOR RESEARCH UTILIZATION

1. The pamphlet on pacemaker care protocol will be issued to the nurses of various hospitals.
2. Pacemaker care protocol will be framed and utilized in various affiliated institution.
3. Pacemaker care protocol will be implemented in the routine nursing care at Dr.Jeyasekharan Hospital, Nagercoil**.**

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Recognized by the Indian Nursing Council & TN Nurses and Midwives Council)

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Tel : 26591617, 26591618
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Website : omayaln.com

30.12.2014.

The Nursing Superintendent,
Dr.Jayasekharan Memorial Hospital,
Nagarcoil.,
Kanyakumari District.

Sir/Madam,

Sub: Request for permission to conduct
Research Study.

Ms. Beny N.R, is a bonafide M.Sc(Nursing) I year student studying at our College and she is conducting "A QUASI EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF PACEMAKER CARE PROTOCOL ON KNOWLEDGE AND SKILL REGARDING CARE OF CLIENT UNDERGOING PACEMAKER IMPLANTATION AMONG NURSES AT SELECTED SETTINGS ".

This is for her research project to be submitted to the Tamilnadu Dr.M.G.R. Medical University in partial fulfillment of the University requirement for the award of M.Sc(Nursing) Degree.

Further details of the proposed project will be furnished by the student personally. She will not hinder your routine in any way and she will abide by the rules and regulations of the Hospital. The information collected from your Hospital will be kept confidential.

I kindly request you to grant her permission to conduct the study at your Esteemed Hospital.

Thanking you,

Yours Sincerely,
OMAYAL ACHI COLLEGE OF NURSING
Principal

Ok
Bsah
11/6/15

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02.05.2015.

The Medical Director,
Dr.Somervell Memorial CSI Medical
College & Hospital,
Karakonam (PO),
Thiruvananthapuram,
Kerala-695 504.

Sir,

Sub: Request for permission to conduct
Research study.

Ms. Beny.N.R, is a bonafide M.Sc(Nursing) I year student studying at our College and she is conducting " A QUASI EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF PACEMAKER CARE PROTOCAL ON KNOWLEDGE AND SKILL REGARDING CARE OF CLIENT UNDERGOING PACEMAKER IMPLANTATION AMONG NURSES IN SELECTED SETTINGS".

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Further details of the proposed project will be furnished by the student personally. She will not hinder your routine in any way and she will abide by the rules and regulations of the Hospital. The information collected from your Hospital will be kept confidential.

I kindly request you to grant her permission to conduct the study at your Esteemed Hospital.

Thanking you,

Yours faithfully,
OMAYAL ACHI COLLEGE OF NURSING
Principal

To M.S

APPENDIX – C

REQUISITION LETTER FOR CONTENT VALIDITY

From

Mrs.Beny N.R

M.sc Nursing I year,

OmayalAchi College of Nursing,

Puzhal, Chennai.

To

Respected Madam,

Subject:**Requisition from expert opinion for content validity**

I am Mrs.Beny N.R doing my M.sc Nursing I year specializing in Medical surgical Nursing at OmayalAchi College of Nursing. As a part of my research project to be submitted to the Tamil Nadu Dr. M.G.R. Medical University and in partial fulfillment of the University requirement for the award of M.sc Nursing degree, I am conducting **"A Quasi experimental study to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses in selected hospital, Nagercoil."** under the guideship of Dr.S.Kanchana, Research Director, ICCR and with the guidance of Mrs.Sumathi for the year 2015. I have enclosed my data collection and intervention tool for your expert guidance and validation.Kindlydo the needful.

Thanking you,

Yours faithfully,

Mrs.Beny N.R

Enclosures:

1. Research proposal
2. Data collection tool
3. Intervention tool
4. Content validity form
5. Certificate for content validity

LIST OF EXPERTS FOR CONTENT VALIDITY

MEDICAL EXPERTS

1. **Dr. R.Sivakumar M.D., D.NB., FNB**
   Consultant Interventional Cardiologist,
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   ShenoyNagar ,Chennai – 30.

2. **Dr. Chandrakumar ImmanuelM.D.,D.M.**
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4. **Mrs. Uma Raghu**,
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5. **Dr.Kayalvizhi,**
   Professor,
   PIMS College of Nursing,
   Pondicherry.

6. **Dr. SharmilaJansi Rani**
   Professor,
   Christian College of Nursing,
   Neyyoor, KanyakumariDistrict.

CERTIFICATE FOR CONTENT VALIDITY

This is to certify that the data collection and intervention tool developed by **Mrs. Beny N.R, M.Sc**(Nursing) I year student of OmayalAchi College of Nursing for her study **"A quasi experimental study to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospitals, Nagercoil"** 2015 is validated by the undersigned and she can proceed with this tool to conduct the main study.

Signature with date :

Seal :

Dr. R. SIVAKUMAR
DNB, FNB(Interventional Cardiology)
Consultant Interventional Cardiologist
Reg. No.68984
BILLROTH HOSPITALS LTD.

CERTIFICATE FOR CONTENT VALIDITY

This is to certify that the data collection and intervention tool developed by **Mrs. Beny N.R, M.Sc**(Nursing) I year student of OmayalAchi College of Nursing for her study **"A Quasi experimental study to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospitals, Nagercoil"** 2015is validated by the undersigned and she can proceed with this tool to conduct the main study.

Signature with date:

Seal:

DR. CHANDRAKUMAR IMMANUEL,
M.D., D.M.,
REGN. No. 54110.

DR. JEYASEKHARAN MEDICAL TRUST
JEYASEKHARAN HOSPITAL & NURSING HOME
K. P. ROAD
NAGERCOIL-3

CERTIFICATE FOR CONTENT VALIDITY

This is to certify that the data collection and intervention tool developed by **Mrs. Beny N.R, M.Sc**(Nursing) I year student of OmayalAchi College of Nursing for her study **"A Quasi experimental study to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospitals, Nagercoil"** 2015is validated by the undersigned and she can proceed with this tool to conduct the main study.

18/05/2015

Signature with date:

(Mrs. M. REENA)

THE PRINCIPAL
Dr. Kamakshi Institute of Medical Sciences and Research,
No.1, Radial Road, Pallikaranai,
Chennai-600 100.

Seal:

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C UMA RAdhu)
Professor in medical Surgical N

Signature with date: 6/06/15

Seal:

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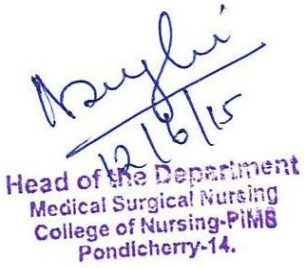
Signature with date:



Seal:

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Signature with date: 14/6/2015

Seal:

Dr. S.S. SHARMILA JANSI RANI
M.Sc.,Ph.D(N).,MA.,M.Phil.(PA)
Professor,
Christian College of Nursing,
Sreyyaar.

APPENDIX – D

CERTIFICATE OF ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work**''A quasi experimental study to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurses at selected hospitals, Nagercoil,''**done by Mrs. Beny N.RM.Sc (N) II year student of OmayalAchi College of Nursing, Chennai, is edited for English language appropriateness by _____ .

Seal : **Signature with date :**

APPENDIX – F

INFORMED CONSENT REQUISITION FORM

Good morning,

I Mrs. Beny N.R, M.Sc Nursing student from OmayalAchi College of Nursing, Puzhal, Chennai, conducting**''A quasi experimental study to assess the effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantationamong nurses at selected hospitals, Nagercoil,''**as a partial fulfillment of the requirement for the degree of M.Sc Nursing under the Tamil Nadu Dr. M.G.R. Medical University .

I assure that information provided by you will be kept confidential. Hence I request you to kindly cooperate with me and participate in this study by giving your frank and honest responses to the question being asked.

Thank You

Signature of the investigator

Mrs. Beny N.R

INFORMED WRITTEN CONSENT FORM

I Understand that I am being asked to participate in a research study conducted by **Mrs.BenyN.R**M.Sc. Nursing student of OmayalAchi College of Nursing.This Research study will assess the "**effectiveness of pacemaker care protocol on knowledge and skill regarding care of client undergoing pacemaker implantation among nurse at selected hospital"**.If I agree to participate in the study,I will be interviewed. I Understand that there is no risk associated with the study.

I realize that the knowledge gained from this study may help either me or other people in the future. I realize that my participation in this study is entirely voluntary,and I may withdraw from the study at any time I wish.If I decide to discontinue my participation in this study,I will continue to be treated in the usual and customary fashion.

I understand that all study data will be kept confidential. However,this information may be used in Nursing publication or presentation. If I need to, I can contact **Mrs,BenyN.R,** M.Sc (N) II year student of OmayalAchi College of Nursing,Ambattur Main Road,Puzhal,Chennai – 66, at any time during the study.

The study has been explained to me. I have read and understood this consent form,all of my questions have been answered, and I agree to participate. I understand I will be given a copy of this signed consent form.

_____

Signature of the Participant Date: _____

_____

Signature of the investigator Date : _____

APPENDIX – G

SECTION A: DEMOGRAPHIC VARIABLES

1. Age in years

a) 21-25
b) 26-30
c) 31-35
d) >36

2.Gender

a) Male
b) Female

3. Educational status

a) G.N.M
b) B.Sc Nursing
c) P.B.B.Sc Nursing

4. Total years of experience

a) 6 months – 1
b) >1 -3
c) >3 -5
d) > 5

5. Designation

a) Staff nurse
b) Senior nurse
c) Ward in charge

SECTION B: STRUCTURED KNOWLEDGE QUESTIONNAIRE

1. The Pacemaker is a device used to
    a) increase blood flow to heart
    b) decrease the heart rate
    c) decrease cardiac output
    d) stimulating the heart muscle

2. A simple electrical circuit in pacemaker consist of a
    a) pulse generator and pacing lead
    b) battery and lead
    c) battery and circuitry
    d) battery and pacing lead

3. The pacemaker that which connects the heart by one or more
    a) threads
    b) coils
    c) Wires
    d) batteries

4.The parts of the Pacemaker includes
    a) activity sensor, battery, electrodes.
    b) sensor, threads, coils.
    c) battery, electrodes, wires.
    d) circuitry, battery, wires.

5. The device which is connected to the heart by one or more wires is called
    a) coils
    b) leads
    c) threads
    d) electrodes

6.The most common indications for temporary pacemaker is

a) bradydysrhythmia
b) supraventricular tachyarrhythmias
c) type 2 second degree AV block
d) intermittent third degree AV block

7.ThePacemaker uses batteries to send signals to the heart to pump it by right way

a) impulses
b) electrical
c) conductivity
d) stimulus

8.The Pacemaker is used to treat

a) ventricular septal defect
b) sinus tachycardia
c) atrial septal defect
d) heart block

9. When lead wires become displaced the pacemaker fails to

a) generate
b) stimulate
c) capture
d) conduct

10. Cardiac resynchronization therapy is also called as

a) temporary pacemaker
b) biventricular pacemaker
c) permanent pacemaker
d) single chamber pacemaker

11.Percussive pacing, also known as

a) transthoracic mechanical pacing
b) external pacing
c) temporary pacing
d) permanent pacemaker placement

12.The most common pacing route of Pacemaker is

a) epicardial pacing
b) transcutaneous pacing
c) transthoracic pacing
d) transvenous pacing

13. In epicardial pacing Pacemaker the electrodes are placed in contact with the

a) outer wall of the ventricles
b) inner wall of the ventricles
c) outer wall of the atrium
d) inner wall of the atrium

14. External cardiac pacing is also known as

a) epicardial pacing
b) transcutaneous pacing
c) transthoracic pacing
d) transvenous pacing

15. Transvenous pacing is often used as a bridge to

a) transthoracic pacemaker pacing
b) temporary placement pacemaker
c) epicardial pacing pacemaker
d) permanent pacing pacemaker

16.The type of medication the client will receive before pacemaker implantation surgery is

a) anticoagulant
b) sedatives
c) analgesics
d) antidiuretics

17. Prior to the surgery the nurse should instruct the client to stay Nil by mouth at least

a) 2hrs
b) 3hrs

c) 4hrs
d) 5hrs

18. The most preferred effective skin disinfectant for cardio thoracicsurgery is
    a) microshield
    b) betadine
    c) spirit
    d) chlorhexidine

19. Antiseptic skin preparation should include
    a) surgical site and wound site
    b) wound site and drain site
    c) surgical incision site and drain site
    d) suture site and wound site

20. A special type of x-ray that will be displayed on a TV monitor which is used to assist in testing the location of the leads.
    a) fluoroscopy
    b) ultrasonography
    c) echocardiogram
    d) electrocardiogram

21. The wound may be closed with
    a) stitches or staples
    b) stitches or suture
    c) staples
    d) staples and stitches

22. The Pacemaker site dressing should be cleansed daily with a
    a) betadine
    b) normal saline
    c) hydrogen peroxide
    d) mild antibacterial soap

23. After surgery the initial bandage should be removed after

a) 24hours
b) 48hours
c) 72hours
d) 90hours

24. After pacemaker implantation the following activities like jerky movement of your arms, stretching etcshouldbeavoided for

a) 4weeks
b) 6weeks
c) 12weeks
d) 6months

25. The first follow-up visit will be within

a) 2 weeks
b) 8 weeks
c) 9 weeks
d) 12 weeks

26. Before (surgery) pacemaker implantation the nurse has to prepare the skin

a) to prevent infection
b) to prevent skin damage
c) to prevent contamination
d) to prevent aseptic

27. The nurse has to prepare patient and family by

a) physiologically
b) psychologically
c) biologically
d) environmentally

28. The nurse has to administer medication as per order

a) prior to the day of surgery
b) before shifting to OT

c) during intra operative period
d) 12Hours before surgery

29. In home care management the Nurse has to instruct about
a) careful in range of motion exercise
b) adequate walking
c) care of surgical wound
d) care of diet intake.

30. The client has to avoid activities like
a) walking
b) raising hand
c) climbing steps
d) strenuous activities

SECTION – C:OBSERVATIONAL CHECK LIST

S.NO.	CHECKLIST	YES	NO
	Pre-preparation for procedure		
1.	Explain the procedure to the client to win their confidence and co-operation.		
2.	Obtain informed consent.		
3.	Check the presence of any allergic history to any medications, iodine, latex, tape, or anesthetic agents.		
4.	Check the present medication history such as anticoagulant (blood-thinning) medications, aspirin, or other medications.		
5.	Prepare the skin by removing the hair preferably with a surgical clipper to reduce the chance of infection.		
6.	Perform disinfection of the surgical site using Chlorhexidine to remove the presence of bacteria.		
7.	Ensure that all the reports of diagnostic investigations are attached to the client's medical record before shifting.		
	Preparation for pacemaker insertion site dressing		
8.	Explain the procedure and the need for surgical dressing to the client to win adequate co-operation.		
9.	Perform surgical hand hygiene to reduce the chances of cross infection.		
10.	Remove the outer dressing after 48 hours and cleansed with a mild antibacterial solution.		
11.	Apply antibacterial ointment over the wound for the first two weeks.		
12.	Keep the wound covered with 4 x 4 gauze secured with light paper tape to minimize any normal drainage.		
13.	Monitor pacemaker functions with cardiac monitoring to ensure the cardiac activity.		
14.	Discard waste and replace all the articles respectively		

S.NO.	CHECKLIST	YES	NO
	Post procedure care		
15.	Obtain a chest X-ray as order to ensure the position of the pacemaker.		
16.	Minimize movement of the affected arm and shoulder during the initial postoperative period by the restricting movement to prevent the dislodgement of the implanted pacemaker.		
17.	Assist the client in performing gentle ROM exercises at least three times daily, beginning 24 hours after pacemaker implantation.		
18.	Provide a pacemaker identification card including the manufacturer's name, model number, mode of operation, rate parameters, and expected battery life.		
19.	Document the date of pacemaker insertion the model and type and setting.		
20.	Encourage the client for regular and periodic follow up sessions to ensure the functioning of the pacemaker.		

SCORING KEY

SECTION A :STRUCTURED KNOWLEDGE QUESTIONNAIRE

This section consisted of 30 questions and each question ended with multiple choices to assess the level of knowledge regarding Pacemaker care protocol among Nurses .It consisted of 30 questions. Each question ended with multiple choices. Nurses were asked to select the best answer from the four options given.

Scoring Key:

Each correct answer was given‘1’mark and wrong and unattended questions was given‘0’mark each .The raw score was converted to percentage to interpret the level of Knowledge. The overall score was 30, maximum score is 30 and minimum score is 0.

Interpretation of level of Knowledge

Score	Percentage	Level of knowledge
>19	> 75 %	Adequate level of knowledge
13-18	51-75 %	Moderate level of knowledge
< 12	<50%	Inadequate level of knowledge

SECTION B: OBSERVATION CHECKLIST

This section consisted of observation checklist to assess the skill regarding pacemaker implantation surgical site dressing among Nurses.

This section consisted of dichotomous statement with yes / no as answer options regarding pacemaker care protocol.

SCORING KEY:

Each yes was awarded a score of‘1’and each no was awarded‘0’.The overall score is 20,maximum score is 20 and minimum score is 0.The raw data was computed to interpret the level of skill.

Interpretation of observational checklist to assess the level of skill of pacemaker implantation site dressing.

Score	Level of Skill
≤ 50%	Inadequate level of skill
51- 75%	Moderate level of skill
> 75 %	Adequate level of skill

APPENDIX – H

CODING FOR DEMOGRAPHIC VARIABLES

SECTION A: DEMOGRAPHIC VARIABLES	Code
1. Age in years	
a) 21-25	1
b) 26-30	2
c) 31-35	3
d) >36	4
2. Gender	
a) Male	1
b) Female	2
3. Educational status	
a) G.N.M	1
b) B.Sc Nursing	2
c) P.B.B.Sc Nursing	3
4. Total years of experience	
a) 6 months – 1	1
b) >1 -3	2
c) >3 -5	3
d) > 5	4
5. Designation	
a) Staff nurse	1
b) Senior nurse	2
c) Ward in charge	3

APPENDIX – I

BLUE PRINT

S.No.	Content	Item	Total Item	Percentage
1.	**Demographic Variables**	1 - 5	5	**100%**
2.	**Structured Knowledge questionnaire**			
	General information	1 - 5	5	
	Uses of Pacemaker	6- 10	5	
	Types of pacemaker	10 - 15	5	
	Pacemaker protocol care	16 - 25	10	
	Nurses responsibility	26 - 28	3	
	Home care management	29 - 30	2	
	Total		**30**	**100 %**
3.	**Check list to assess the skill among Nurses**			
	Before procedure of pacemaker implantation	1 - 6	6	
	Care immediately after receiving patient from the CATH lab	7- 13	7	
	After care of pacemaker implantation	14 - 20	7	
	Total		**20**	**100 %**

APPENDIX – J

INTERVENTIONAL PROTOCOL

- Lecture cum group discussion regarding Pacemaker care protocol
- Demonstration on preparation of patient before pacemaker implantation, (Environment preparation, Articles preparation),post implantation care..
- Return demonstration onpreparation of patient before pacemaker implantation, post implantation care.

APPENDIX – K

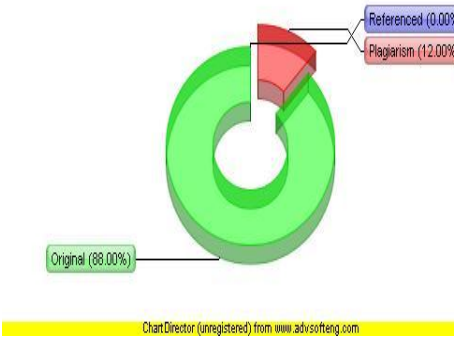
PLAGIARISM REPORT

Plagiarism Detector - Originality Report:

Analyzed document:

"BENY FRONT SHEETS.docx"

Relation chart:



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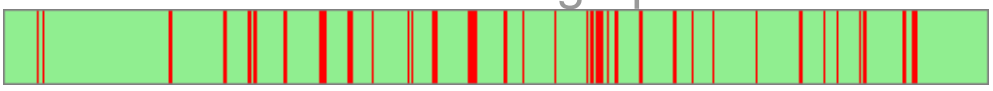
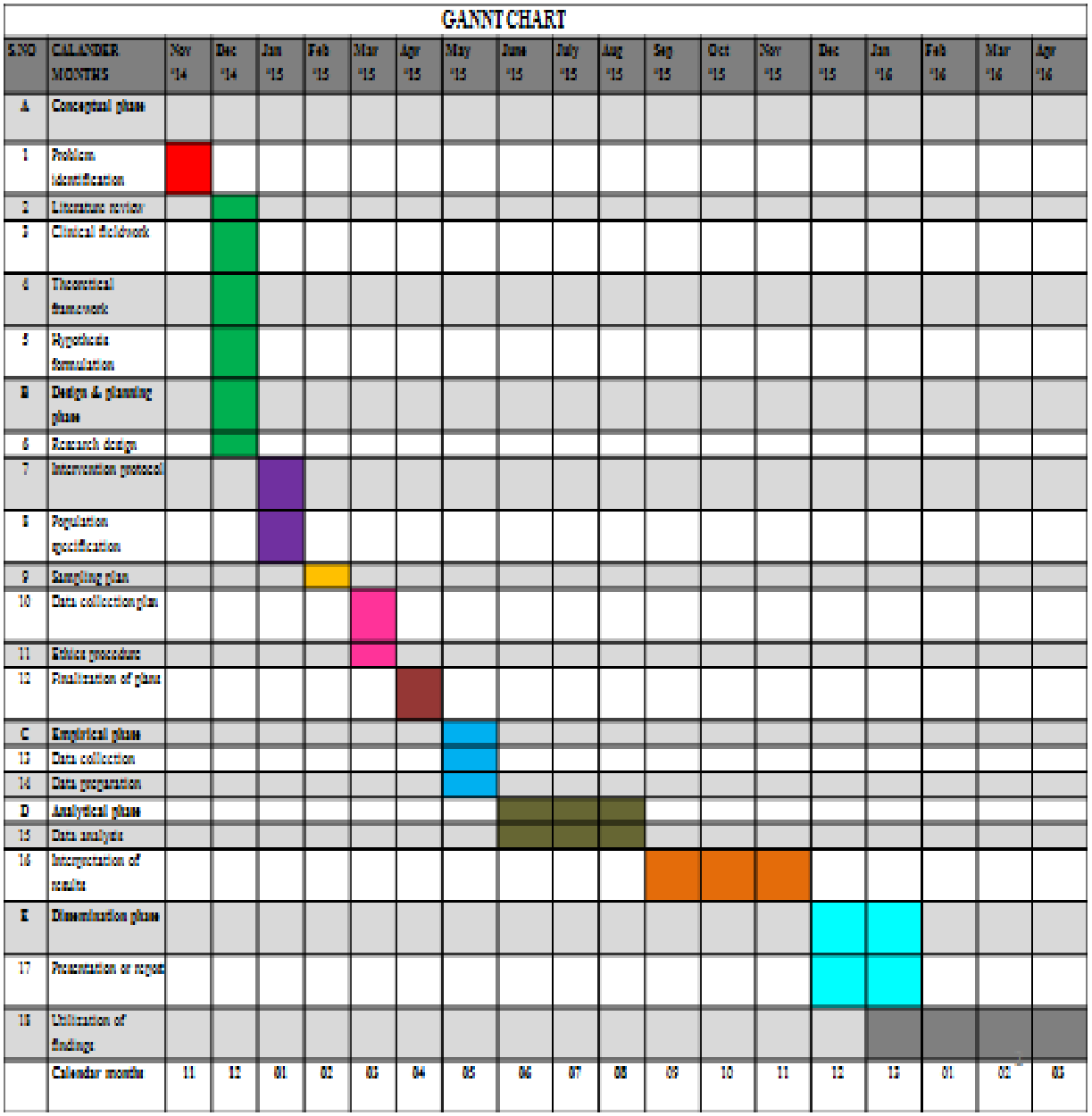


Top sources of plagiarism:

APPENDIX – L

DISSERTATION EXECUTION PLAN GANTT CHART



APPENDIX – M

PHOTOGRAPHS

LESSON PLAN ON STAFF TEACHING MODULE

Topic	**:**	Pacemaker care protocol
Group	**:**	Nurses
Place	**:**	Dr. Jeyasekharan Hospital, Nagercoil.
Duration	**:**	45 – 50 minutes
Teaching method	**:**	Lecture cum discussion
Instructor	**:**	Investigator
Type of teaching	**:**	Group (Nurses)
Number of Members	**:**	30 Members (maximum 7 nurses in a group)
Instructional Aids	**:**	Power point presentation
Seating arrangement	**:**	Theatre method
General objectives	**:**	At the end of the session the nurses will gain adequate knowledge regarding Pacemaker care protocol.
Specific objectives	**:**	At the end of the session the staff will be able to:

- state the meaning of pacemaker.
- list out the indications of pacemaker.
- enlist the uses of pacemaker..
- classify the types of pacemaker.
- explain the methods of pacing.
- Specify the complication of the pacemakers.
- elaborate the problems with the pacemaker.

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
1.	Introduces the topic.	2 mts	**INTRODUCTION** : A pacemaker is a small unit that helps the heart beat more regularly. It is made with a small electric stimulation that helps to control the heartbeat. It's hooked up to heart with tiny wires and helpsthe pacemaker to keep the heart beat normally. This helps the body to get the blood, oxygen and food that it needs. Some people need a pacemaker for a short time (like after a heart attack) and may use as a kind that's outside the skin.	Teacher introduces the topic.	Listening	
2.	state the meaning of pacemaker.	2 mts	**MEANING:** A pacemaker is a small device that is placed in the chest or abdomen to help to control the abnormal heart rhythms. This device uses electrical pulses to prompt the heart to beat at a normal rate. An implanted pacemaker consists of two parts: • **The pulse generator.** This small metal container houses a battery and the electrical circuitry that regulates the rate of electrical pulses, sent to the heart. • **Leads (electrodes).** One to three flexible, insulated wires are each placed in a chamber, or chambers, of the	Teacher defines pacemaker.	Listening	What is the meaning of pacemaker?

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			heart and deliver the electrical pulses to adjust the heart rate.			
3.	list out the indication for pacemaker implantation.	4 mts	**INDICATIONS :** **Temporary pacemaker** ➢ Unstable bradydysrhythmias ➢ Unstable tachydysrhythmias ➢ AV conduction block ➢ Slow sinus ➢ Permanent pacer malfunction ➢ Sick sinus syndrome **Permanent pacemaker** ➢ Chronic bifascicular and ➢ trifascicular block ➢ Sinus node dysfunction ➢ Hypersensitive carotid sinus	Teacher lists out the indications for pacemaker.	Listening	What are the indications for pacemaker implantation?

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
4.	enlist the uses of pacemaker.	4mts	**USES:** ➢ The most common reason for a pacemaker is the heartbeat that slows to a low heart rate or bradycardia. ➢ The pacemaker resets the heart rate to an appropriate pace, that ensuring adequate blood and oxygen are delivered to the brain and other parts of the body. **WHEN ARE PACEMAKERS USED** ➢ **Bradycardia**– a condition in which the heart beats too slowly, causing symptoms such as ♣ fatigue ♣ dizziness or Fainting(condition such as sick sinus syndrome or heart block). ➢ **Atrial fibrillation** – a common heart rhythm disorder in which the upper chambers of the heart beat rapidly and chaotically. ➢ **Heart failure** – a condition in which the heartbeat is not sufficient to supply a normal volume of blood and oxygen to the brain and other parts of the body.	Teacher discusses the uses of pacemaker.	Listens and actively participating in discussion	List out the uses of pacemaker.

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			• A special pacemaker can be carefully programmed to increase the force of muscle contractions in the heart. . This is called "biventricular pacing" or "resynchronization" therapy. ➢ **Syncope**- faint when the heart rhythm becomes very slow. Pacemaker may prevent the heart rate from slowing to the Point of fainting. **What is cardiac resynchronization therapy?** Cardiac Resynchronization Therapy (CRT) is used to treat the delay in heart ventricle contractions that occur in some people with advanced heart failure. **Benefits of CRT(cardiac resynchronization therapy)** ❖ improves survival ❖ improves quality of life ❖ improves heart function ❖ improves the ability to exercise ❖ It helps to decrease the hospitalizations in select patients			

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			with severe or moderately severe heart failure. ❖ CRT and ICD therapy ➢ Some patients with heart failure may benefit from a combination of CRT and an implantable cardiac defibrillator (ICD). ➢ These devices combine biventricular pacing with anti-tachycardia pacing and internal defibrillators to deliver treatment as needed.			
5.	classify the types of pacemaker.	5 mts	**TYPES OF PACEMAKER** **Temporary pacemaker : (External)** Temporary Pacemakers can be usedtemporarily either supportively or prophylactically, until the heart rate become normal or conduction disturbance resolves. **Permanent pacemaker: (Internal)** This pacemaker is implanted in a small pocket under skin and is meant to be left there for(the rest of the life.) permanently. **Single-chamber pacemaker:** In this type, only one pacing lead is placed into a	Teacher explains the types of pacemaker.	Listening	What are the types of pacemaker?

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			chamber of the heart, either the atrium or the ventricle. **Dual-chamber pacemaker:(biventricular)** In this pacemaker wires are placed in two chambers of the heart. One lead paces the atrium and the other one paces the ventricle. This type is more closely resembles the natural pacing of the heart by assisting the heart in coordinating the function between the atria and ventricles. **Triple chamber pacemaker** : In triple chamber pacemaker one lead is in the right atrium and one to stimulate both the right and left ventricles. These pacemakers are useful for the patients who have weakened heart muscle. **Demand Heart pacemaker :** This pacemaker has an inbuilt sensing device which senses when the heart beat is too slow it automatically turns			

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			the signal on. Once the heart beat is above a certain level ,it automatically turns the signal off.			
6.	explain the methods of pacing .	10mts	**METHODS OF PACING** ➢ Transcutaneous pacing ➢ Transthoracic pacing ➢ Epicardial pacing ➢ Transvenous pacing **Transcutaneous pacing**: - Transcutaneous pacing (TCP),is also called as external pacing. - It is recommended for the initial stabilization of hemodynamically significant bradycardia of all types. - This procedure is performed by placing two pacing pads on the patient's chest, either in the anterior/lateral position or the anterior/posterior position. - The rescuer selects the pacing rate, and gradually increases the pacing current, until electrical capture	Teacher explains the methods of pacing.	Listening	Explain the methods of pacing

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			(characterized by a wide QRS complex with a tall, broad T wave on the ECG) is achieved, with a corresponding pulse. - External pacing should not be relied upon for an extended period of time. - It is an emergency procedure that acts as a bridge until **Transthoracic mechanical pacing:** - It is also known as (Percussive pacing) - It is the use of the closed fist, usually on the left lower edge of the sternum over the right ventricle in the vena cava, striking from a distance of 20 – 30 cm to induce a ventricular beat. - This is an old procedure used only as a life saving means until an electrical pacemaker is brought to the patient. **Epicardial pacing: (Temporary)** - The epicardial pacemaker leads were placed after the patient collapsed during aortic valve surgery.			

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			In the first half of the tracing, pacemaker stimuli at 60 beats per minute result in a wide QRS complex with a right bundle branch block pattern. - Temporary epicardial pacing is used during open heart surgery when an immediate atrio-ventricular block occurs. - The electrodes are placed in contact with the outer wall of the ventricle (epicardium) to maintain satisfactory cardiac output until a temporary transvenous electrode has been inserted. **Transvenous pacing (Temporary)** - Transvenous pacing, when used for temporary pacing, is an alternative to transcutaneous pacing. - The pacemaker wire is placed into a vein, under sterile conditions, and then passed into either the right atrium or right ventricle. - The pacing wire is then connected to an external pacemaker outside the body. - Transvenous pacing is often used as a bridge to			

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			permanent pacemaker placement. - It can be kept in place until a permanent pacemaker is implanted or until there is no longer a need for a pacemaker and then it is removed.			
7.	Specify the complication of the pacemakers.	5 mts	**COMPLICATIONS:** ❖ **Blood clots** – develops in one of the veins in the arm on the side of the body where the pacemaker was fitted. ❖ **Pacemaker infections-** - high temperature - pain - swelling - redness at the site of the pacemaker. ❖ If an infection is not treated - it could spread into the lungs (pneumonia) - the lining of the heart (endocarditis) - blood (sepsis) ❖ **Air leak**-pneumothorax	Teacher explains the complications of pacemaker.	Listens	What are the complications of pacemaker.
8.	elaborate the problems with	5 mts	**PROBLEMS WITH THE PACEMAKER** ✓ the lead gets pulled out position	Teacher discusses the	Listens and asks doubts.	What are the problems occurs

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
	the pacemaker.		✓ the battery of the pulse generator fails ✓ the circuits that control the pacemaker become damaged by exposure to strong magnetic field. ✓ pacemaker has not been properly programmed ✓ Dizziness ✓ Hiccups ✓ Fainting or near fainting	problems with the pacemaker.		after pacemaker implantation.
9.	To conclude the topic	1 mt	**CONCLUSION:** Many abnormal heart rhythms can be treated with a pacemaker. A pacemaker generates electric pulses that regulate heartbeats. Pacemakers are very light and can adapt to body needs from moment to moment، beating faster during exercise and slowing down at rest. The procedure to insert a pacemaker is fairly simple and safe. Complications are rare. After the procedure the patient can go back to regular activities after a short period of healing time.			

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
10.	Bibliography	1mt	**Book References :** Bare G.Brenda., C.Smeltzer., (2011).Brunner & Suddarth. Textbook of Medical Surgical Nursing. India. Lippincott Williams Wilkins. Joyce M black, Hokansonjawks et.al., (2009). Medical surgical Nursing- Clinical Management for Positive outcome. India. Elsevier publication. Lewis, Colier, Heitkemper., et al., Medical Surgical Nursing Assessment & management of clinical problem India. Mosby publishers. Lippincott Williams Wilkins., (2011). Manual of Nursing. Philadelphia. Lippincott Williams Wilkins.			

LESSON PLAN ON STAFF TEACHING MODULE

Topic	:	Pacemaker care protocol
Group	:	Nurses
Place	:	Dr. Jeyasekharan Hospital
Duration	:	15-20 minutes
Teaching method	:	Lecture cum discussion
Instructor	:	Investigator
Type of teaching	:	Group (Nurses)
Number of Members	:	30 Members (maximum 7 nurses in a group)
Instructional Aids	:	Power point presentation and pamphlet.
Seating arrangement	:	Theatre method
General objectives	:	At the end of the session the staff will gain adequate Skill regarding Pacemaker implantation site dressing.
Specific objectives	:	At the end of the session the staff will be able to: - explain the pacemaker care protocol procedures

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1.	explain the pacemaker care protocol procedures.	15 mts	**PACEMAKER CARE PROTOCOL** **PATIENT PREPARATION** ♣ **E**xplain the procedure to the client. ♣ Obtain informed consent from the client or the relatives. ♣ Advice the client to get anesthetics opinion. ♣ Skin preparation should be done to prevent infection. ♣ Check for all present medication what the client is taking. ♣ Remove all the jewels and objects. ♣ Inform to the operation theatre. ♣ Administer pre medication as per order before shifting to OT. ♣ Psychological preparation of the patient and family ♣ Collect all the blood and other reports ♣ Shift to OT with all the reports and pre medications **ENVIRONMENTAL PREPERATION** ➢ Maintain sterile environment. ➢ Selection of the appropriate place(CATH LAB OR OT).	Teacher explains the procedure	Listening	List down the steps in pacemaker care procedure.

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<tr><td></td><td></td><td></td><td>
ARTICLES PREPERATION (Surgical dressing)

STERILE TRAY CONTAINING
<table>
<tr><th>S.No.</th><th>Articles</th><th>Nos</th><th>Purposes</th></tr>
<tr><td>1.</td><td>Stainless steel tray</td><td>1</td><td>To take all necessary articles.</td></tr>
<tr><td>2.</td><td>Bowl</td><td>1</td><td>To keep the gauze .</td></tr>
<tr><td>3.</td><td>Artery forceps</td><td>1</td><td>To clean the wound by holding the gauze piece.</td></tr>
<tr><td>4.</td><td>Drape towel</td><td>1</td><td>To cover the stainless steel tray .</td></tr>
<tr><td>5.</td><td>Thumb forceps</td><td>1</td><td>To hold the gauze .</td></tr>
</table>

CLEAN TRAY
<table>
<tr><th>S.No.</th><th>Articles</th><th>Nos</th><th>Rationale</th></tr>
<tr><td>1.</td><td>Clean tray</td><td>1</td><td>To keep the clean articles.</td></tr>
<tr><td>2.</td><td>Sterile gloves</td><td>1</td><td>To prevent infection.</td></tr>
<tr><td>3.</td><td>k-basin</td><td>1</td><td>To collect wastes.</td></tr>
<tr><td>4.</td><td>Antibacterial solution(as per hospital Policy)</td><td>1</td><td>To clean the wound.</td></tr>
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<tr><td></td><td></td><td></td><td>
PROCEDURE
BEFORE PACEMAKER IMPLANTATION
<table>
<tr><th>S.No.</th><th>Steps</th><th>Rationale</th></tr>
<tr><td>1.</td><td>Explain about the procedure to the client.</td><td>To win confidence and co-operation from the client</td></tr>
<tr><td>2.</td><td>Obtain informed consent from the clients after explaining the benefits and risks of the procedure.</td><td>To make confident to do the procedure and to give permission to do the procedure.</td></tr>
<tr><td>3.</td><td>Check history of allergies to medications, iodine, latex tape, or anesthetic agents (local and general).</td><td>To make the client to prevent from allergies.</td></tr>
<tr><td>4.</td><td>Check for present history of all medications, and herbal or other supplements.</td><td>To prevent from over dosage of drugs and prevents complications.</td></tr>
<tr><td>5.</td><td>Check for history of medications such as</td><td>It may be necessary to stop some of these</td></tr>
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				anticoagulant (blood-thinning) medications, aspirin, or other medications (affects blood clotting.)	medications prior to the procedure, to prevent from further complications.			
			6.	Skin preparation should be done by removing the hair preferably with a surgical clipper. (Chest area).	To reduce the chance of infection.			
			7.	Educate and assist clients in taking shower wash or bath atleast12 hours prior to surgery.	Preoperative showers reduces the skin's (microbial colony counts) infections.			
			8.	Chlorhexidine is a more effective skin disinfectant and repeated applications.	This agent is indicated for cardiac thoracic surgeries where there is a high incidence of postoperative wound infections.(to decrease infections).			
			9.	Antiseptic skin preparation should include surgical	To reduce the chance of infections.			

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				incision and drain sites. (anterior posterior site of chest or anterior lateral site of the chest and collar bone).				
			10.	Remove all jewels or other objects.	That may interfere with the procedure.			
			11.	Remove the clothing and should wear surgical drapes or gown.	To prevent from cross infection.			
			12.	Make the client to empty the bladder prior to the procedure.	That may interfere with the procedure.			
			13.	Intravenous (IV) line should be started prior to the procedure.	To administer medication and to administer IV fluids.			

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<tr><td></td><td></td><td></td><td>DURING PACEMAKER IMPLANTATION
<table>
<tr><th>S.No.</th><th>Steps</th><th>Rationale</th></tr>
<tr><td>1.</td><td>Monitor the records of the electrical activity of the heart by connecting electrocardiogram and also monitor the heart rate during the procedure using small adhesive electrodes.</td><td>To monitor the vital signs during procedure and to know the function of the vital organs.</td></tr>
<tr><td>2.</td><td>Large electrode pads will be placed on the front and back of the chest.</td><td>To know the electrical activity of the heart.</td></tr>
<tr><td>3.</td><td>A local anesthetic will be injected into the skin at the insertion site.</td><td>It helps the physician to make a small incision at the insertion site.</td></tr>
<tr><td>4.</td><td>Sterile towels and a sheet will be placed around the area.</td><td>To prevent from contamination and reduce the chance of infection.</td></tr>
<tr><td>5.</td><td>A sheath, or introducer, is inserted into a blood vessel, usually under the collarbone. The sheath is a</td><td>The catheter does not move out of the place and to prevent damage</td></tr>
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				plastic tube through which the pacer lead wire will be inserted into the blood vessel and advanced into the heart.	to the insertion site.			
			6.	Obtain Fluoroscopy, (a special type of X-ray that will be displayed on a TV monitor) during procedure ,after the lead wire is inserted inside the heart.	To check for proper location of the pacemaker and the pacemaker how it works.			
			7.	The generator will be placed on the non dominant side. If the client is right-handed, the device will be placed in the upper left chest. If the client is left-handed, the device will be placed in the upper right chest.	To detect or to identify the affected side.			
			8.	The skin incision will be closed with sutures, adhesive strips. sterile bandage or dressing will be applied.	To prevent from infection and to cover the wound site.			

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<table>
<tr><th>S.No.</th><th>Steps</th><th>Rationale</th></tr>
<tr><td>1.</td><td>The pacemaker implantation site dressing should be performed after 48 hours from the day of surgery.</td><td>To prevent from infection and to dry the wound site.</td></tr>
<tr><td>2.</td><td>Explain the procedure and the need for surgical dressing to the client.</td><td>To win adequate co-operation</td></tr>
<tr><td>3.</td><td>Perform surgical hand hygiene.</td><td>To reduce the chances of cross infection.</td></tr>
<tr><td>4.</td><td>The outer soiled dressing should be removed and surgical site should cleaned with mild antibacterial solution (center to periphery).</td><td>To reduce the chance of infection</td></tr>
<tr><td>5.</td><td>It is not essential to cover the incision after the first 48 hours, but</td><td>To minimize the drainage from staining the cloth</td></tr>
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				preferable to keep it covered with a 4 x 4 gauze with some light paper tape.	and to protect the wound from irritation.			
			6.	Instruct the client not to rub or scratch the area.	Itching is a normal part of the healing process.			
			7.	Monitor pacemaker functions with cardiac monitoring and obtain a chest X-ray as order	To ensure the position of the pacemaker.			
			8.	Minimize movement of the affected arm and shoulder during the initial post operative period.	To prevent from dislodgement of the implanted pacemaker.			
			9.	Assist the client in performing gentle ROM exercises at least three times daily, beginning 24 hours after pacemaker implantation.	**T**o improves in physical activity and improves circulation.			
			10.	Provide a pacemaker identification card including the manufacturer's name,	To make identification of the client.			

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	model number, mode of operation, rate parameters, and expected battery life. Document the date of pacemaker insertion the model and type and setting. Record and report the procedure.	To maintain the record.
11.	Encourage the client for regular check up and periodic follow up.	To ensure the functioning of the pacemaker

EDUCATION TO THE CLIENT AFTER PACEMAKER IMPLANTATION

1.Care of surgical wound

- If incision become red, hot, more painful, swollen, starts drain from the surgical site consult the doctor .

2.Activities should be avoided

- Avoid strenuous activity
- Avoid sudden jerky movements with the arms, or stretching or reaching over the head.
- should avoid working within a few feet of large

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			electrical transformers, electric arc welding and working on automobile ignition systems. - Avoid submerging the wound in a bathtub, swimming pool for at least three to four weeks, until the incision has completely closed. **3.Periodic follow-up check up** - physical examination - electrocardiogram (detailed evaluation of pacemaker function) - During follow-up checkup the doctor will explain when the replacement is necessary. **4.Pacemaker precautions** - **A**lways carry an ID card or wear medical identification bracelet that states the client is having pacemaker. - Turn off large motors, such as cars or boats, when working close to them as they may create a magnetic field. - Abstain from diathermy - Avoid large magnetic fields such as power generation			

S.NO	SPECIFIC OBJECTIVES	TIME	CONTENT	TEACHER'S ACTIVITY	LEARNER'S ACTIVITY	EVALUATION
			sites and industrial sites such as automobiles.			
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