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# Nurses' Performance Regarding Patient With Permanent Pacemaker In Intensive Care Unit

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## Abstract

***Background:*** *The pacemaker is a device that placed under the skin of the chest or abdominal to help control abnormal heart rhythms. This device sends electrical impulses to the heart muscle to maintain a suitable heart rate and rhythm.* ***Aim of the study:*** *This study aims to: Assess the Nurses' Performance Regarding Patient with Permanent Pacemaker In Intensive Care Unit through the following: Assess nurses' level of knowledge regarding Patient with Permanent Pacemaker. Assess nurses' practice regarding Patient with Permanent Pacemaker.* ***Design:*** *A descriptive design was used to conduct this study.* ***Study subject:*** *All available nurses working in intensive care unit at Makkah Hospital.* ***Setting:*** *This study was conducted at the intensive care unit at Makkah Hospital* ***Data collection tool:*** *Self-administered questionnaire tool. It was developed by the researcher based on related literature, it was written in simple Arabic language* ***1-*** *assess demographic characteristics* ***2-*** *assess nurses' information regarding Permanent Pacemaker and Observational check list It will be developed by the researcher based on the related literature It will be used to assess Nurses' practice for Patient with Permanent Pacemaker.* ***Result:*** *it was found thatabout eighty percent of studied nurses had unsatisfactory level of knowledge regarding pacemaker and about seventy seven percent of studied nurses had unsatisfactory level of practice regarding patient with permanent pacemaker.* ***Conclusion:*** *most of the studied nurses at cardiac care unit had unsatisfactory level of performance (knowle[1]dge & practice) regarding management of patients with permanent pacemaker in cardiac care unit.* ***Recommendations:*** *the study recommended Orientation and periodic training program for nurses in critical areas. Further studies is recommended toevaluate the reflection of training program regarding patient with permanent pacemaker in cardiac care units on nurses' performance on the patients' outcome. Developing a simplified and comprehensive booklet including guidelines about nursing care of patients with permanent pacemaker in cardiac care units. The study should be replicated on large sample and different hospitals setting in order to generalize the results.*

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***Key words:*** *Nurses, performance, Pacemaker, ICU.*

**Introduction:**

Cardiac rhythm disorder one of the major cardiovascular problems. Cardiacrhythm disorder is curable by temporary or permanent pacemakers, slow or irregular beats are replaced by regular Impulses. Heartrhythm disorder leads to bradycardia. Bradycardia can result in defect in tissue perfusion and congestive heart failure and dyspnea. patients with rhythm disorder in theform of bradycardia need to have a temporary or permanent cardiac pacemakers in order to increase cardiac output. **(Micheal,2016).**

A pacemaker can relieve some arrhythmia symptoms, such as fatigue. A pacemaker also can help a person who has abnormal heart rhythms resume a moreactive lifestyle. Cardiac permanent pacemaker is most commonly indicated for condition that results in failure of the heart to initiate or conduct an intrinsic adequate electrical impulse to maintain perfusion. Pacemakers are necessary whendysrhythmias or conduction defects compromise the electrical system andhemodynamic response of the heart. The pacemaker system, which consists of a pulse generator and one to three leads with electrodes, performs two main functions: diagnosis and treatment **(Swerdlow et al.,2015).**

Critical care nurses play an important rolein caring for patients with pacemaker. Nursing management for patients after permanent pacemaker implantation includes monitoring for complications related to insertion and pacemaker malfunctions .Postoperative complications include cardiac perforation and tamponade, Pneumothorax,hematoma, lead displacement, and infection magnetic fields or an AF signal. **(Urden, Stacy, 2010).**

To evaluate pacemaker functions, the nurse must know at least the pacemaker's programmed mode of pacing and lower rate setting. with permanent pacemakers, setting are adjusted noninvasively through a specialized programmer that uses pulsed If the pacemaker problem is suspected, ECG strips are obtained, and the physician is notified so that the pacemaker setting can be reprogrammed as needed. If the patientexperience symptoms of decreased cardiacoutput, he or she may require support with temporary pacemaker until the problem is corrected. **(Urden, Stacy,2010).**

An important aspect of implantationof pacemaker includes an assessment of patient. A through assessment helps the nurseto determine the patient's physiology response to pacing therapy. Assessment should include pulse rate, underlying cardiac rhythm, blood pressure, activity tolerance, and evidence of dizziness, syncope, dyspnea, palpitation, or edema. The nurse should be attentive to result of chest radiographs, bloodtests and other laboratory tests. The critical nurse should examine the incision site forswelling, redness, drainage, hematoma andtenderness **(Morton and Fontaine, 2018).**

Psychological assessment is anotheressential component of comprehensive careof the patient with a cardiac pacemaker. Patient's psychological response to the need for cardiac pacing may differ. Some may be relieved to have a devices that support the functioning of their heart, whereas others may be anxious about the technology andexpress fears of dying. If a permanentpacemaker is implanted, patients and familiesshould be encouraged to join support groups where they can share their fears and concernswith others who are depended on pacing technology **(Perry and potter, 2014).**

The nurse should assess patient's level of knowledge about procedure, clarifying and expanding on existing knowledge as needed. Clarifying knowledge providing information

reduces anxiety and fear and allows the patient to develop a realistic outlook regarding pacer therapy, instruct the patient that he may have nothing by mouth before the procedure, facilitate intravenous line insertion and place ECG monitor electrode away from potential incision sites to help preserve sin integrity **(Katheln and Linda, 2014)**.

Immediate nursing care afterimplantation include connecting patient with cardiac monitor or ECG machine to assess pacemaker function and giving intravenous fluid or medication. Data about patient's pacemaker should be clearly identify in patient's chart, with type and model of pacemaker, its location, setting, rate, and mod of pacing. Only electrically safe equipment is used on or near the patient with a pacemaker **(Lewis,et al, 2014).**

A planned and systematic approach toteaching the patient and family about cardiac pacing is a vital part of nursing care.Teaching a patient about pacemakers beginby eliciting the patient about pacemakers begins at the time of the decision forpacemaker insertion is made. The nurse can begin by eliciting the patient's previous knowledge of pacemakers and clarifying any miss concepts. Nothing is assumed about the patient's understanding. If appropriate, the difference between heart block and heart attack is clarified. The patient may confuse cardiac monitoring with pacing and become anxious when the monitoring electrodes are removed **(Linda, Kathleen and Mary, 2014).**

The patient and his family should be told why the pacemaker is necessary. Theanatomy of heart is discussed in general terms when explaining the need for pacing and how the pacemaker takes place of or complements spontaneous rhythm. The insertion procedure and the immediate post insertion care that can be expected areexplained. The depth of teaching that is appropriate and the teaching tools used may depend on the patient's age, intellect, attention, vision, and interest in learning. Initial teaching should be confined to the positive aspects of life with a pacemaker. Knowledge of the function and care of the pacemaker are of no interest until the patient is able to accept it as part of life **(Linda,Kathleen and Mary, 2014).**

Aim of the study:

This study aims to:- Assess the Nurses' Performance Regarding Patient with Permanent Pacemaker In Intensive Care Unitthrough the following:

1- Assess nurses' level of knowledgeregarding Patient with Permanent Pacemaker.
2- Assess nurses' practice regarding Patient with Permanent Pacemaker.

**Research Question:**

- What are the nurses' level of knowledge regarding Patient with Permanent Pacemaker?
- What are the nurses' level of practice regarding Patient with Permanent Pacemaker?

**Subject and methods:**

**Technical design**

The technical design includes research design, setting, subject and tools for data collection used in the study.

**Research Design:**

A descriptive design was used toconduct this study.

**Setting:**

This study was conducted at the intensivecare unit at Makkah Hospital.

**Subject:**

All available nurses working in intensive care unit at Makkah Hospital. The studied sample of nurses was females, with different ages, educational levels and different years of experience.

**Tools of data collection:-**

1- **Self-administered questionnaire :**It was developed by the researcher based on related literature, it was written in simple Arabic language. It will be divided into two parts:

**Part I: Demographic data characteristics: It was used to assess demographic characteristics of studied nurses such as ( age, level of education, years of experience and old training programs regarding pacemaker. )**

**Part II: This part** was developed by theresearcher after reviewing the recent and relevant literature (**Smeltezer et al., 2010,Swerdlow, Wang, Zips. 2015).** The aim wasto assess nurses' knowledge regarding pacemaker and the nursing role in giving discharge instruction.

The tool consists of 46 questions inthe form of (multiple choice questions) each question has one score, the questions are categorized as regard anatomy & physiology of the heart , investigation & information about pacemaker (definition , indications ,complications and signs and symptoms of pacemaker malfunction) & health teachingafter discharge.

- **scoring system:-**

The correct response was given a score of zero. A total score for the questionnaire was 46. Score less than 75% (less than 36.8 grades) was considered as un satisfactory and score equal or more than 75% (more than 36.8 grades) was considered as satisfactory.

**1- Observational check list :**

This tool was developed by the researcher based on the related literature**. (Linda, Kathelen and Mary, 2014**).

1. It was used to assess Nurses' practice for Patient with Permanent Pacemaker it include:
1. Continuous vital signs monitoring ( blood pressure, pulse, respiration)
2. Caring closed wound
3. Electrocardiogram
4. Permanent pacemaker

- **scoring system:-**

The step done completely was given ascore of 1 grade, while the incorrectly done step or not done was given a score zero. A total score for the checklist was 112 grades distributed as follows:-

i. Continuous vital signs monitoring (blood pressure, pulse, respiration)
- Respiration (14 grades)
- Pulse (22 grads)
- Blood pressure (26 grads)

ii. Caring closed wound (18 grads)
iii. Electrocardiogram (16 grades)
iv. Permanent pacemaker (16 grads)

Score less than 80% was considered unsatisfactory and score equal or more than 80% considered satisfactory.

**Content validity was tested. Reliability was tested statistically by cronbach's Alpha test (0.85 for assess practice tools &0.91for assess knowledge tools).**

**Pilot study:**
Before performing the actual study, a pilot study will carried out for 4 of nurses caring for Patient with Permanent Pacemaker in intensive care unit in Makkah Hospital to test clarity, applicability of tools and time consuming to fill in the tools after analyzing the results of the pilot study needed modifications will be done .

**A- Field work:**
- The researcher explains the purpose of the study was obtained.

  Interview with nurses before starting data collection and explanation for nurses' about the purpose of the study was done to assure their participation in the study. Nurses was informed about the privacy of their information, nature of the study, their right to withdraw and the confidentiality of the subject data.
- structured questionnaire was used to assess nurses knowledge for Patient with Permanent Pacemaker Data was collected at the morning and afternoon shifts on 2 days ⁄ week, then nurses' practice was assessed indirectly and recorded by using nurses' observational checklist which theresearcher was observe the nurses' while providing care for Patient with Permanent Pacemaker.

**Administrative design: An official permission was obtained**

**Ethical considerations:**
The ethical research considerationsinclude the following:

- The research approval was obtained.The researcher was clarify the objectivesand aim of the study to nurses included in the study before starting.
- Researcher was assuring maintaininganonymity and confidentiality of subjects' data of the nurses included in the study.
- Subjects was informed that they are allowed to choose to participate or not inthe study and they have the right to withdraw from the study at any time.

**Statistical design**:
Data were analyzed using Statistical Program for Social Science (SPSS) version 24.0. Qualitative data were expressed asfrequency and percentage. Sample size = 40

**The following tests were done:**

- Chi-square ($X^2$) test of significance was used in order to compare proportions between two qualitative parameters.
- Probability (P-value)
  - P-value <0.05 was considered significant.
  - P-value <0.001 was considered as highly significant.

  P-value >0.05 was considered not significant.

**Results:**

Table **(1):** shows the percentage distribution of demographic characteristics among nurses included in the study, the study was found that 67.50% of them were within the age group 18-25 years. While 75 % of the nurses were female, regarding the educational level 65% study nurses were had technical nursing education, regarding the experience years 47% of the nurses their years of experience from 5-10 years, also 20% attending training courses.

| Demographic item | | No | % |
|---|---|---|---|
| Age | 18-25 | 27 | 67.50% |
| | 25 + | 13 | 32.50% |
| Gender | Male | 5 | 10.00% |
| | Female | 35 | 90.00% |
| qualification | Diploma | 5 | 12.50% |
| | Technical institute | 26 | 65.00% |
| | Bachelors | 9 | 22.50% |
| Years of experience | < 5 years | 13 | 32.50% |
| | 5 -10 years | 19 | 47.50% |
| | + 10 years | 8 | 20.00% |
| Previous training | Yes | 8 | 20.00% |
| | No | 32 | 80.00% |

**Table (2):** shows that 87.5% of the studied nurses had satisfactory knowledge about Number of heart chambers. while 77.5% of studied nurses were unsatisfactory knowledge about the part responsible for pacemaker regulation.

| **Satisfactory** | | | **Unsatisfactory** | |
|---|---|---|---|---|
| | **No** | **%** | **No** | **%** |
| Number of heart chambers | 35 | 87.5% | 5 | 12.5% |
| Name of the two lower chambers inside the heart | 15 | 37.5% | 25 | 62.5% |
| There is between the atria and the ventricle | 21 | 52.5% | 19 | 47.5% |
| The number of veins that carry blood from the lungs to the left atrium | 27 | 67.5% | 13 | 32.5% |
| The room receives heart oxidized blood from the lungs | 17 | 42.5% | 23 | 57.5% |
| Heart function | 27 | 67.5% | 13 | 32.5% |
| The blood vessel that carries blood away from the heart to all parts of the body | 18 | 45.0% | 22 | 55.0% |

| | | | | |
|---|---|---|---|---|
| The part responsible for pacemaker regulation | 9 | 22.5% | 31 | 77.5% |
| Normal range of heart beat | 25 | 62.5% | 15 | 37.5% |
| Factors that may affect the rhythm of the heart | 21 | 52.5% | 19 | 47.5% |
| Causes of arrhythmia | 23 | 57.5% | 17 | 42.5% |
| Signs of arrhythmia | 23 | 57.5% | 17 | 42.5% |
| Risk of arrhythmia | 22 | 55.0% | 18 | 45.0% |

**Table (3):** shows that 100% of the studied nurses had satisfactory knowledge about the types of pacemaker. While 62.5% unsatisfactory knowledge about investigation that patient should not be exposed to if have apermanent pacemaker.

| **Satisfactory** | | | **Unsatisfactory** | |
|---|---|---|---|---|
| | **No** | **%** | **No** | **%** |
| Meaning of pacemaker | 16 | 40.0% | 24 | 60.0% |
| Uses of pacemaker | 18 | 45.0% | 22 | 55.0% |
| Function of pacemaker | 16 | 40.0% | 24 | 60.0% |
| Types of pacemaker | 40 | 100% | 0 | 0% |
| place of pacemaker insertion | 24 | 60.0% | 16 | 40.0% |
| Investigation patient should not be exposed. | 29 | 72.5% | 11 | 27.5% |
| Signs of permanent pacemaker failure. | 20 | 50.0% | 20 | 50.0% |
| Documentation reviewed for a permanent pacemaker | 18 | 45.0% | 22 | 55.0% |
| rate of the pacemaker program | 23 | 57.5% | 17 | 42.5% |
| Signs of complication of pacemaker | 27 | 67.5% | 13 | 32.5% |
| Warning signs after activities | 15 | 37.5% | 25 | 62.5% |
| Signs of insertion site inflammation | 35 | 87.5% | 5 | 12.5% |

**Table (4):** shows that 72.5% of the studied nurses had satisfactory knowledge about exercise that must be avoided. While 82.5 % of the studied nurses had unsatisfactory knowledge about the follow-updates for the device that the patient should attend when leaving.

| **Satisfactory** | | | **Unsatisfactory** | |
|---|---|---|---|---|
| | **No** | **%** | **No** | **%** |
| precautions take to care of the insertion site | 26 | 65.0% | 14 | 35.0% |
| - duration of the permanent pacemaker battery | 20 | 50.0% | 20 | 50.0% |
| signs that should be reported to the doctor when they suddenly appear | 17 | 42.5% | 23 | 57.5% |
| -follow-up dates of pacemaker examination after discharge | 7 | 17.5% | 33 | 82.5% |
| When activities avoided | 21 | 52.5% | 19 | 47.5% |
| Signs where activities must be stoped | 12 | 30.0% | 28 | 70.0% |
| -precautions when using a mobile device | 14 | 35.0% | 26 | 65.0% |
| instructions to follow after installing the pacemaker | 26 | 65.0% | 14 | 35.0% |

| | | | | |
|---|---|---|---|---|
| Importance of medication after insertion of pacemaker. | 20 | 50.0% | 20 | 50.0% |
| Doctors who should be informed of the presence of a permanent pacemaker . | 24 | 60.0% | 16 | 40.0% |
| precautions that the patient must be follow it. | 18 | 45.0% | 22 | 55.0% |
| exercise that must be avoided | 29 | 72.5% | 11 | 27.5% |
| Activities that avoided | 18 | 45.0% | 22 | 55.0% |
| Importance of pacemaker id. | 24 | 60.0% | 16 | 40.0% |

**Table (5):** shows that 100% of the studied nurses check physician order for ECG and press print and observe the tracing quality. While about 77.5% of studied nurses didn't clean the sites for electrode.

| performance checklist for Electrocardiogram | Done correct | | Done Uncorrected | |
|---|---|---|---|---|
| | No | % | No | % |
| Check physician order for ECG | 40 | 100.0% | 0 | 0.0% |
| Wash hand | 15 | 37.5% | 25 | 62.5% |
| Identify patient and explain to the patient the need to lie relaxand breath normally | 15 | 37.5% | 25 | 62.5% |
| Explain that the test is painless | 13 | 32.5% | 27 | 67.5% |
| Position the patient in supine position with his arm at his side, raise head of bed | 15 | 37.5% | 25 | 62.5% |
| Expose only the necessary parts of the patient's chest ,arms and legs | 30 | 75.0% | 10 | 25.0% |
| cleanse the sites for electrode placement, if there is excessive hair clip it and wash site with soap and water then dry it | 9 | 22.5% | 31 | 77.5% |
| place limb leads on fleshy area | 25 | 62.5% | 15 | 37.5% |
| The red or RA lead wire goes to the right arm | 37 | 92.5% | 3 | 7.5% |
| The yellow or LA wire lead goes to left arm | 39 | 97.5% | 1 | 2.5% |
| The black or RL lead wire goes to right leg | 39 | 97.5% | 1 | 2.5% |
| The green or ll lead wire goes to left leg | 39 | 97.5% | 1 | 2.5% |
| V1(red)4$^{th}$intercostals right sternal border | 35 | 87.5% | 5 | 12.5% |
| V2 (yellow)4$^{th}$intercostals left sternal border | 37 | 92.5% | 3 | 7.5% |
| V3(green)midway between V2&V4 | 37 | 92.5% | 3 | 7.5% |
| V4(brown)5$^{th}$intercostalsmidclavicular | 35 | 87.5% | 5 | 12.5% |
| V5(black)lateral V4 anterior axillry | 35 | 87.5% | 5 | 12.5% |
| V6(violet)lateral V4 mid axillary | 35 | 87.5% | 5 | 12.5% |
| 11-begin the recording , ask the patient don't talk and breath normally when recording ecg | 19 | 47.5% | 21 | 52.5% |
| press print and observe the tracing quality | 40 | 100.0% | 0 | 0.0% |
| writes patient's name , date and time and keep it in patient fill | 24 | 60.0% | 16 | 40.0% |

| | | | | |
|---|---|---|---|---|
| disconnect the equipment , remove the electrodes andremove the gel with moist cotton | 23 | 57.5% | 17 | 42.5% |
| Hand washing | 16 | 40.0% | 24 | 60.0% |
| document the procedure | 37 | 92.5% | 3 | 7.5% |

**Table (6):** shows that there is a statistically significant difference between nurses' total knowledge and their ages. While there is no statistically significance differences between nurses' level of knowledge scores in relation to educational qualification, years of experience placement, if there is excessive hair clip it and wash site with soap and water then dry it.

| Demographic item | | Knowledge | | | | X2 test | | |
|---|---|---|---|---|---|---|---|---|
| | | Unsatisfactory | | Satisfactory | | X2 | P | Sig |
| | | No | % | No | % | | | |
| Age | 18-25 | 19 | 47.5% | 8 | 20.0% | | | |
| | 25-40 | 13 | 32.5% | 0 | 0.0% | 4.82 | 0.0282 | S |
| | More than 40 | 0 | 0.0% | 0 | 0.0% | | | |
| Gender | Male | 8 | 20.0% | 2 | 5.0% | 0.00 | 1.0000 | NS |
| | Female | 24 | 60.0% | 6 | 15.0% | | | |
| Education | Secondary nursing education | 5 | 12.5% | 0 | 0.0% | | | |
| | Technical nursing education | 19 | 47.5% | 7 | 17.5% | 2.47 | 0.2904 | NS |
| | Baculare of nursing | 8 | 20.0% | 1 | 2.5% | | | |
| Years | Less than 5 years | 9 | 22.5% | 4 | 10.0% | | | |
| | 5-<10 years | 16 | 40.0% | 3 | 7.5% | 1.43 | 0.4882 | NS |
| | 10-<15 | 7 | 17.5% | 1 | 2.5% | | | |
| Previous | Yeas | 8 | 20.0% | 0 | 0.0% | 2.50 | 0.1138 | NS |
| | No | 24 | 60.0% | 8 | 20.0% | | | |

**Discussion:**

Regarding to demographiccharacteristics, the present study showed that,about more than two thirds of studied nurses' ages range from 18-25 years and about three quarter of them were females and less than quarter of them were males. This finding could be interpreted in the light of the fact that majority of nurses in Saudi Arabia and Arab countries are females and their number are still greater than males in nursing fields till ten years ago. This finding was in agreement with (**khalil, 2012),**who stated in his study with title (Effect of self learning module on nurses performance regarding electrocardiography) that, majority of the studied sample were female aged less than 30 years old.

Concerning qualification more of half of study nurses were graduated from nursing institute, this explain lack of knowledge and practice regarding patient with permanent pacemaker. This may be related to that highly qualified nurses perform administrative work. This study finding was supported by (**Elauty, 2013**), who found that most of the nurses were diploma.

Concerning years of experiences, the present study showed that, about half of nurses had from 5-10 years of experiences in CCU. That may be due to majority of studiednurses were aged range from 18-25 years old.This could be explained in the light of nature that safety and maintenance of the procedures and treatments initiated are crucially dependent on experienced nursing care, with constant bedside observation to ensure monitoring and immediate detection

of any problems so that they can be rapidly assessed and treated. This study result isagreed by **(Al Oyce, Leshabari andBrysiewicz, 2014),** who conducted a study about "assessment of knowledge and skills oftriage among nurses working in emergency centers in dare salaam, Tanzania" and found that, majority of nurses had 1-10 years' experience.

As regarding to training courses. The result of this study revealed that, most of studied nurses' didn't get training courses about caring for patient with permanent pacemaker after surgery. From the researcher point lack of training program may be due to lack of their awareness about the importance of priority of nursing intervention and expected complication. Increase wok over load could lead to lack of time for nurses to participate on any training courses. According to **(Praxis,2012**) mentioned that, critical care nurses working in cardiac intensive care unit must be receive continuous training courses program to improve their level of knowledge and practice in such critical field.

Concerning the nurses knowledgeregarding anatomy and physiology of heart, signs and symptoms of heart diseases thisstudy result showed that about more than halfof studied nurses have unsatisfactory level of knowledge, this might be revealed to lack of internal educational services programs andtraining courses, low level of qualification of studied nurses because of a majority of them have technical institute and absent of protocol to deal with patients. This result agreed with (**Omran, 2010**) who conducted a study titled "Nurses performance in management and prevention of complicationsfor patient under going cardiac catheterization" and found their knowledge level about anatomy, function and diseases of heart was unsatisfactory.

Regarding to knowledge of nurses about arrhythmia this study showed that about half of studied nurses have satisfied information about arrhythmia, and more than quarter didn't have information about arrhythmia this study supported by This finding supported by **(Fath-Allah.2017)** who conducted a study about "Performance Of nurses caring for patients with open heart surgery during first 24 hours" who found that two third of nurses under the study had unsatisfactory knowledge. This could be due to lack of knowledge about anatomy and physiology of the heart, lack of training about ECGinterpretation.

Regarding to nurses' knowledgeregarding post insertion complication this study finding revealed that the majority of them had got unsatisfactory level ofknowledge regarding signs and symptoms of potential complication as wound infection, hematoma. This study agree with **(Ahmed, 2018**) who conducted study titled "nurses performance regarding patients safety after cardiac catheterization" and find that majority of studied nurses have unsatisfactory level of knowledge about signsand symptoms of potential complication as wound infection, bleeding and how to manage it.

Regarding to knowledge of nurses about permanent pacemaker, This study show that majority of studied nurses' had unsatisfactorylevel of knowledge, that may be due to lackof experiences and training courses. The studied nurses reported also they didn't havea protocol to know how deal with patientwith permanent pacemaker. This result supported by **(Rezaei, Ranjbar and Abbas Zadeh,2010)** titled (cardiac word's nursing staff performance in caring of temporary and permanent pacemaker) who found that, majority of nurses' had unsatisfactory knowledge and practice for patient with permanent and temporally pacemaker and preventing probable complication inintensive care unit.

Regarding to Nurses information about health information that patient should know at discharge, about incision site care, activity,warning signs and symptoms and follow up care,

the present study showed that about more than half of them had unsatisfactoryknowledge about information that should patient learned at discharge , that may be due to most of studied nurse young and not have experiences and enough information that can told to patient and their family. Mostof studied nurses not communicate with patient and their families that may be due to they didn't have time to communicate with them related to work overload and lack of time.

Regarding to ECG making procedure; this study showed that more than three quarter of studied nurses had satisfactory level of practice and this is agreed with **(Hussien, Khalil & Youssef, 2014**), conducted a study to assess nurses' practice regarding implantation of cardiac devices in different CCU and found the majority of the study nurses perform ECG correctly and emphasized that majority of the nurses had a satisfactory level of practice regarding setting up the machine to record a 12 lead electrodes, connecting the limb lead wires to the electrodes and exposing the chest.

The relation between nurses'demographic characteristic and their level of knowledge. Regarding age the present study revealed that there was statistical significant relation. This mean that the young nurses didn't have satisfactory level of knowledge this finding disagreed with **(Ahmed, 2018)** who conduct study about (nurses' performance regarding patient safety after cardiac catheterization) mention that there was no significant relation betweenknowledge and age of studied nurses that may be due to the older nurses had got administrative duties bedsides the direct patients care, that is reflected the strong relation between age and knowledge improvement.

Regarding the relation between nurses' knowledge and their attendance oftraining courses, gender and years experiences, the present study revealed that there was no statistical significant relation. This finding is agreed with (**Abd-El Moaty, 2009)** who studied "nurses performance incaring for patients with cardiac arrest" and found that there was no relation between nurse's knowledge and attendance of trainingcourses.

Conclusion:

Based on the study finding, most of the studied nurses at cardiac care unit had unsatisfactory level of performance (knowledge & practice) regarding management of patients with permanent pacemaker in intensive care unit.

**Recommendations:**

Based on the finding of the present study, the following Recommendations aresuggested.

**Education:**

- On-going and regular in service educational programs regarding permanent pacemaker.
- Nursing educators and clinical facilitators must incorporate strategies regarding permanent pacemaker into theCCU and use learning opportunities to raise awareness of nursing staff about the topic.
- Developing a simplified and comprehensive booklet including guidelines about nursing care of patients with permanent pacemaker in CCU.
- Learning resources such as articles, journals and electronic resources such as computers and internet should be madeaccessible in the units for nursing staff members. Continuing professional development programs should include skills updates.

**Practice:**

- In-service training and educational program prior to the work in the critical care unit.
- Nurse supervisors should also verify that permanent pacemaker checklists appropriately followed by all nursing staff to prevent any complication.
- Increase number of nurses in CCUunits based on international nurse patient ratio to improve quality of care

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