

## Assessment of Nurses' knowledge And Practices Regarding Temporary Pacemaker patient`s care

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### Abstract

A temporary pacemaker is an electronic device which provides electrical stimuli to the heart, when the sinoatrial node fails to conduct regularly to the ventricles. **Aim of the study:** This study aimed to assess nurse`s knowledge and practices regarding temporary pacemaker patient`s care. **Research design:** A descriptive research design was utilized in the study. **Sitting:** This study was conducted in Coronary Care Unit at Assuit University Hospital. **Subject and Method:** The study was carried out on a convenience 40 nurses who are working in coronary care unit. **Tools: Tool 1:** Nurses` knowledge assessment tool regarding temporary pacing. **Tool 2:** Observational checklist regarding care for patient with temporary pacemaker. **Results:** The results showed that (77.5%) of nurses had unsatisfactory level of knowledge regarding care for patient with temporary pacemaker and (92.5%) of nurses had unsatisfactory level of practices regarding care for patient with temporary pacemaker. **Conclusion:** Nurses showed inadequacy of their knowledge and practices regarding temporary pacemaker patient's care. **Recommendation:** The study recommends that there is a need for an education program regarding care for patients with temporary pacemaker.

**Keywords:** Assessment, Nurse`s knowledge & practices, Temporary Pacemaker & Patient`s Care.

### Introduction

The conducting system of the heart consists of cardiac muscle cells and conducting fibers that are specialized for producing impulses and conducting them rapidly through the heart. They initiate the normal cardiac cycle and regulate the contractions of cardiac chambers. Both atria contract together, and the ventricles, but atrial contraction occurs first. (Laske, et al., 2015)

The conducting system provides the heart it`s automatic rhythmic beat necessary for the heart to pump efficiently and the systemic and pulmonary circulations to operate in synchrony. Irregularities in the normal cardiac-conduction-system can cause cardiac arrhythmias and bradycardia. (Payne, et al., 2015).

Cardiac rhythm disorder is one of the major cardiovascular problems. Cardiac rhythm slowing is curable by temporary or permanent pacemakers, slow or irregular beats are replaced by regular impulses.. Bradycardia can also result in reduced tissue perfusion and congestive heart failure and dyspnea. When an arrhythmia is serious, may need urgent treatment to restore a normal rhythm. (Nicolette, et al., 2012)

Temporary Cardiac Pacing (TPM) is the temporary delivery of electrical impulses, delivered by electrodes contacting the heart muscles, to regulate and automate the beating of the heart. The primary

purpose of temporary cardiac pacing is to maintain an adequate heart rate, either because the heart`s native (intrinsic) pacemaker is not fast enough, or there is a block in the heart`s electrical conduction system. Temporary cardiac pacing is used to maintain a normal heart rate in patients whose own heart rate is not pumping enough blood through the body. (Kotsakou, et al., 2015).

Pacemakers are used as single-chamber and dual-chamber in the rhythm changes accompanied by cardiac slowing. If the heart rate is less than 60 beats (30-40 beats) per minute and the heart does not fulfill the requirements of tissue oxygen, to compensate for tissue hypoxia and abnormal heart rhythm, a pacemaker will be placed inside the atrial or atrioventricular sinus node and the continuation of life will be possible for patients with this device. (Defaye, et al., 2015). Temporary cardiac pacing is generally indicated for the acute management of serious and often symptomatic bradyarrhythmias, that are refractory to medical therapy. Several approaches to temporary pacing are available, including transvenous, transcutaneous, epicardial, and transesophageal. (Mulpuru, et al., 2017)

Compared to the other modalities, the transvenous approach is the most stable and readily available option, with the unique ability for selective atrial or ventricular pacing.

Conversely, this approach is associated with a variety of complications, and its safe and effective use requires considerable knowledge and technical skill.

(Alsheikh-Ali, et al., 2017)

Patients with implanted cardiac devices constitute a growing segment of the contemporary healthcare practice. There are about 3 million people worldwide with pacemaker and each year 600,000 pacemakers are implanted. Taking care of such a rapidly growing patient population constitutes a challenge for all health care providers working in a cardiology ward, coronary care unit or cath lab. (Parker, et al., 2015)

Caring for patients with temporary pacemaker requires knowledge about the device and its complications and the related factors and also the patient's hemodynamic condition, nurses' information and knowledge can be crucial and constructive in patients' training and hence the reduction of complications during the life with device. Providing nursing care and proper nursing processes for these patients can prevent complications and defects in the device performance. (Sandoe, et al., 2014)

### Significance of the study

The incidence of hospital admission for patients with complete heart block (CHB) in coronary care unit at Orman heart hospital, through (2018) were 200 cases 150 of them underwent for temporary pacemaker insertion. (Statistical Records of Orman Heart Hospital, 2018)

Those patients need for special care to prevent any complication that may occur for them. Therefore this study will be conducted to assess nurses' knowledge and practices regarding pre and post insertion care for patients with temporary pacemaker to provide patients safety. (Dougherty, 2014)

### Aim of the study

**The aim of this study was** to assess nurse's knowledge and practices regarding temporary pacemaker patient's care.

#### Research questions:-

1- What is the level of nurse's knowledge and practice about temporary pacemaker patient's care?

### Materials & Methods

#### Research design:

A descriptive research design was utilized in this study.

#### Setting

The study was conducted in coronary care unit at Assiut university hospital

#### Sampling

A convenient sample of all available nurses (40)

working in coronary care unit.

#### Study tools

Two tools were used in this study

#### Tool 1: (Nurses' knowledge assessment tool regarding temporary pacing):

This tool consisted of structured multiple choice and true or false questionnaire tool. This tool was developed by researcher after reviewing literatures to assess the knowledge level of critical care nurses regarding care for patient with temporary pacemaker. It translated into Arabic language. It consists of:

- Demographic characteristics of the study sample (age, marital status, educational level, years of experiences and previous training program) and (10) Multiple choice question and (9) True and False question covering:
- Nurses' knowledge assessment related to conduction system and physiology of the heart structure included (9) questions and calculated (9) degrees.
- Nurses' knowledge assessment related to care for patients with temporary pacemaker included (10) questions and calculated (10) degrees. (Reade, 2017)

#### Scoring system for nurse's knowledge

All items had four alternative answers. A score value of (1) was awarded to each correct answer and zero (0) was allotted for wrong answer.

**The total scores** of nurse's knowledge was calculated and classified as follows:

-Less than 60% was regarded as unsatisfactory level of knowledge.

-Equal or above 60% was regarded as satisfactory level of knowledge. (Ali and Youssef, 2015)

#### Tool 2: (Observational checklist tool regarding care of patient with temporary pacemaker)

This tool was developed by researcher after reviewing literatures for assessing nurse's practice regarding temporary pacemaker patient's care. This tool consisted of observational checklist sheet. This tool covered all steps (47) of all procedures of nursing care for patient with temporary pacemaker it includes:

- Role of nurse before insertion of temporary pacemaker for the patient which include (6) steps and calculated (12) degree.
- Initiating temporary pacing / pre procedure care for the patient which include (6) steps and calculated (12) degree.
- Role of nurse during insertion of temporary pacemaker for the patient which includes (3) steps and calculated (6) degree.
- Assisting with initiation of temporary transvenous pacing which include (15) step and calculated (30) degree.

- Role of nurse after insertion of temporary pacemaker for the patient which include (8) step and calculated (16) degree.
- Role of nurse regarding patient monitoring and care / post procedure which include (9) steps and calculated (18) degree. (Reade, 2017)

**Scoring system for nurse`s practice.** Each item was observed, categorized and scored as follow:-

- 1) Two for each step that was done correct (correctly, in time and with the required frequency).
- 2) One for each step done incorrect (incorrectly, not in time and without the required frequency).
- 3) Zero for step that note done.

**The total score** of nurse`s practice was calculated and classified as follows:

-Less than 60% was regarded as unsatisfactory level of nurse`s practice.

-Equal or above 60% was regarded as satisfactory level of nurse`s practice. (Ali and Youssef, 2015)

#### **Validity of the tool**

The tool were revised by a jury of three (3) experts two(2)from critical care nursing staff and one (1) cardiology staff who reviewed the instrument for clarity, relevance, comprehensiveness, understanding and applicability. Recommended modifications were fulfilled.

#### **Reliability of the tool**

Reliability of the tool was assessed using alpha test to test the internal consistency knowledge = 0.788

#### **Methodology**

##### **Preparatory phase and administrative design**

An official approval was obtained from the Dean of Faculty of Nursing, Assiut University to the head of

#### **Result**

**Table (1): Frequency distribution for nurse`s socio-demographic characteristics of the studied nurses (n=40).**

socio-demographic characteristics	No. (40)	%
<b>Age:</b>		
<23 years	19	47.5
23-27 years	18	45.0
28-32 years	3	7.5
<b>Marital status:</b>		
Single	28	70.0
Married	12	30.0
<b>Educational level:</b>		
Nursing secondary school	11	27.5
Nursing institute	22	55.0
College of nursing	7	17.5
<b>Years of experience:</b>		
< 1 year	15	37.5
1-3 years	14	35.0
4-6 years	6	15.0
7 years and more	5	12.5

Data described as (n & %) chi-squar.

the Orman heart Hospital at Assiut University, to carry out this study and explained the purpose of the study, and asking for permission to conduct it.

#### **Pilot Study**

After developing the necessary tool of the study. A pilot study carried out on number of four (4) nurses to test the clarity and applicability of the developed tool, and to estimate the time required to fill the questionnaire. Nurses included in the pilot study were excluded from the study sample which include all available nurses (40) working in coronary care unit.

#### **Ethical consideration**

Research proposal was approved from Ethical committee in the Faculty of Nursing at Assiut University. There is no risk for study subject during application of the research. The study will follow common ethical principles in clinical research. Confidentiality and anonymity will be assured. Study subject have the right to refuse to participate and or withdraw from the study without rational at any time. Study subject privacy will be considered during collection of data and agree to participant in this study (oral agreement).

#### **Statistical analysis:**

Date entry and data analysis were done using SPSS version 19 (Statistical Package for Social Science).

#### **Field of work**

The researchers started to collect data from the first of January 2018 until the end of March 2018. The researchers collect data from nurses who work in coronary care unit at Orman Heart Hospital, Assiut University.

**Table (2): Frequency of nursing knowledge related to conduction system and physiology of the heart obtained by nurses working in coronary care unit (n=40).**

<b>Nurses 'knowledge related to conduction system and physiology of the heart:</b>		<b>No.</b>	<b>%</b>
What structure serves as the pacemaker in the heart?	Correct	22	55.0
	Incorrect	18	45.0
One of cardiac conductive system components.	Correct	13	32.5
	Incorrect	27	67.5
The phases of the action potential (cardiac impulse) .	Correct	31	77.5
	Incorrect	9	22.5
The location of SA node.	Correct	25	62.5
	Incorrect	15	37.5
The normal heart rate.	Correct	35	87.5
	Incorrect	5	12.5
The role pulmonary valve during ventricular contraction.	Correct	15	37.5
	Incorrect	25	62.5
The pathway of unoxygenated blood.	Correct	20	50.0
	Incorrect	20	50.0
The role of aortic valve during ventricular relaxation	Correct	16	40.0
	Incorrect	24	60.0
The main function of the cardiac conduction pathway	Correct	25	62.5
	Incorrect	15	37.5

Data described as (n & %) chi-squar. SA node: sinoatrial node

**Table (3): Frequency of nursing knowledge related to care for patient with temporary pacemaker obtained by nurses working in coronary care unit (n=40).**

<b>Nurses 'knowledge related to care for patient with temporary pacemaker:</b>		<b>No.</b>	<b>%</b>
The way of confirming electrical capture of the temporary pacemaker.	Correct	11	27.5
	Incorrect	29	72.5
The role of nurse after insertion of temporary pacemaker.	Correct	24	60.0
	Incorrect	16	40.0
The nursing role to avoid damage to the temporary pacemaker.	Correct	16	40.0
	Incorrect	24	60.0
The purpose of monitor vital signs for a client with temporary pacemaker.	Correct	6	15.0
	Incorrect	34	85.0
Is the pacemaker is sensing correctly, If the sense indicator on the pulse generator should flash with each beat?	Correct	30	75.0
	Incorrect	10	25.0
When you observe a pacer spike on the ECG followed by a complex, is this indicate electrical capture.	Correct	22	55.0
	Incorrect	18	45.0
All connections should be checked every two days to ensure they are secure.	Correct	13	32.5
	Incorrect	27	67.5
ECG monitoring strip recordings before & after pacing /pacemaker insertion.	Correct	36	90.0
	Incorrect	4	10.0
Can you sterilize the temporary pacemaker by gamma irradiation or steam (autoclave).	Correct	15	37.5
	Incorrect	25	62.5
Check the battery status at least twice daily.	Correct	3	7.5
	Incorrect	37	92.5

Data described as (n & %) chi-squar. EMF: Electromotive force

**Table (4): level of studied nurses regarding their knowledge score about temporary pacemaker patient`s care.**

Knowledge score	(n= 40)	
	No.	%
Unsatisfactory	31	77.5
Satisfactory	9	22.5

Data described as (n& %) chi-squar.

**Table (5): Total mean practice scores obtained by nurses working in coronary care unit (n=40).**

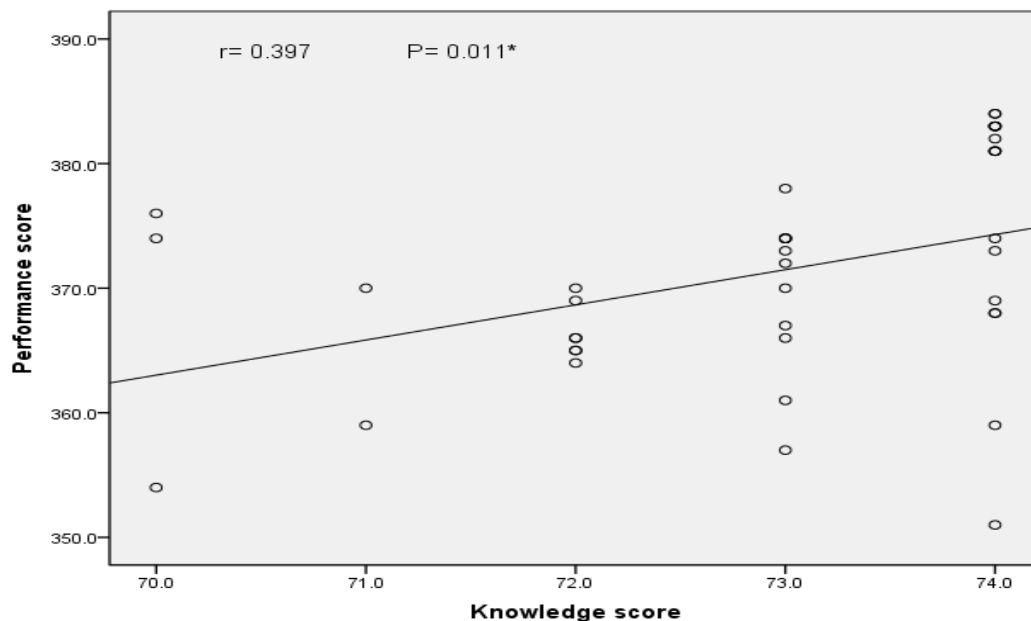
Nurses practices	Maximum score	Mean ± SD
Role of nurse before insertion of pacemaker	12	31.58 ± 5.68
Role of nurse when initiating temporary pacing/ pre procedure nursing role.	12	7.13 ± 2.05
Role of nurse during insertion of pacemaker.	6	3.90 ± 1.34
Role of nurse when assisting with initiation of temporary transvenous pacing.	30	11.63 ± 4.37
Role of nurse after insertion of pacemaker.	16	51.65 ± 16.76
Patient monitoring and care/ post procedure nursing role.	18	7.65 ± 3.26
Practice score.	94	207.98 ± 41.15

Data described as (mean ± SD) independent sample t-test.

**Table (6): level of studied nurses regarding their practice score about temporary pacemaker patient`s care.**

Nurses` practice score	(n= 40)	
	No.	%
Unsatisfactory	37	92.5
Satisfactory	3	7.5

Data described as (n& %) chi-squar.



**Figure (1): Correlation between total nurse's knowledge and their total practice score regarding nursing care for patient with temporary pacemaker.**



**Table (1):** This table shows that; (47.5%) of nurses were in age group from eighteen to equal or less than 22 years and (7.5%) of nurses were in age group from twenty eight to equal or less than thirty two . Concerning their educational level, the higher number of nurses (55.0%) held nursing institute, while the lowest of them (17.5%) held College of nursing. Moreover,(37.5%) of nurse had work experience less than 1 years, (35.0%) of them had from one to three years, (15.0%) of them had from four to six years and(12.5%) of them had more than or equal seven years . In relation to their previous training about care for patient with temporary pacemaker, this table reveals that all nurses were not receiving any previous training.

**Table (2):** Revealed that(55.0%, 32.5%, 77.5%, 62.5%, 87.5%, 37.5%, 50.0%, 40.0% and 62.5%) of the nurses responded with correct answers regarding what structure serves as the pacemaker in the heart?, one of cardiac conductive system components, the phases of the action potential, the location of SA ,the normal heart rate ,the role pulmonary valve during ventricular contraction, the pathway of unoxygenated blood ,the role of aortic valve during ventricular relaxation and the main function of the cardiac conduction pathway.

**Table (3):** Revealed that (27.5%, 60.0%, 40.0%, 15.0%, 25.0%, 55.0%, 32.5%, 90.0%, 37.5%and 7.5%) of the nurses responded with correct answers regarding the confirming electrical capture of the temporary pacemaker, the nursing role after temporary pacemaker insertion, the nursing role to avoid the temporary pacemaker damage, the purpose of monitor vital signs, Is the pacemaker is sensing correctly, the sense indicator should flash with each beat, observe a pacer spike on the ECG followed by a complex, is this indicate electrical capture, all connections should be checked every two days, ECG monitoring strip recordings, Can you sterilize the temporary pacemaker by steam and Check the battery status at least twice daily.

**Table (4):** Indicates that (77.5%) of nurses had unsatisfactory level of knowledge regarding care for patient with temporary pacemaker.

**Table (5):** Shows that low scores of nurse`s practice about ensure the nurses are follow professionalism regarding care for patient with temporary pacemaker.

**Table (6):** Indicates that (92.5%) of nurses had unsatisfactory level of practices regarding care for patient with temporary pacemaker.

**Figure (1):** This figure shows that; there was positive correlation has been founded between total nurse`s knowledge score and their total practice score regarding care for patient with temporary pacemaker.

## Discussion

Temporary pacemaker is the application of an artificial electrical stimulus to the heart in order to produce a contraction of the heart. It is done when the ability of natural pacemaker to pace fails or to cause an effective depolarization. Temporary pacemaker system consists of pulse generator containing the pacemaker's power source to provide the stimulus. **(HadiAtiyah & Mohammed, 2016)**

It consists of batteries, an electrical circuit and circuitry. Bridging cable is extension wire used between the pulse generator and the electrode catheter and pacing leads. It has either one negative electrode (unipolar) in direct contact to heart or two electrode (bipolar) negative and positive electrodes lying within the heart. **(Sullivan, et al., 2014)**

The results of the present study showed that the majority of nurses their age were from eighteen to equal or less than twenty three year and more than half of them have nursing institute degree. Their experience less than one year and all of them were not receiving any previous training. This result disagreed with **(Mohammed, 2010)** Who found that (16.3%) of the study sample their age group ranged between 20 to 24 years, (30.2%) at age group between 25 to 29 years, (25.6%) of them their age ranged between 30 to 34 years while (20.9%) the age ranged between 35 to 39 years and only (7.0%) of them their age 40 years and more, and (90.7%) of the study sample were females while (9.3%) of them were males.

In this study, the findings that answered the question regarding nurse's knowledge about conduction system and physiology of the heart structure revealed that the majority have an unsatisfactory knowledge level with the mean ( $1.33 \pm 1.19$ ) out of 12 scores. This results agree with **(keller & Rains, 2015)** who reported poor nursing knowledge regarding ECG basics and conduction system.

Regarding the knowledge about artificial pacemaker and knowledge about nursing care for patients with temporary pacemaker our result revealed that the majority have an unsatisfactory knowledge level and this result agreed with **( Park, 2011)** who told that poor nursing knowledge concerning temporary and permanent pacemakers. **(Salah, 2015)** Who confirmed that the deficit knowledge of nurses in control group toward arrhythmias might be due to improper preparation of nursing medical department during this phase of the study, in addition to unavailability of scientific nursing journal or books in Arabic and emphases of the importance of motivating the nurses to this important knowledge in the ECG related to arrhythmias.

This result showed that (77.5%) of nurses had unsatisfactory level of knowledge regarding care for patient with temporary pacemaker and this result agreed with (Ali and Youssef, 2015) who concluded that critical and coronary care nurses have inadequate knowledge and practice regarding implantable cardiac devices.

So, we can conclude from the data collected and analyzed in the present study that all studied nurses weren't properly prepared prior to their working in coronary care unit about care proper care for patients with temporary pacemaker and we interpreted that the reason for lack of knowledge about care for patient with TPM was that this topic is not incorporated in the curriculum of critical care nursing for nursing school and institute of nursing, which negatively affected nurses' knowledge and lack of educational programs and training sessions for new nurses.

This result showed that there low scores of nurse`s practice about ensure the nurses are follow professionalism regarding care for patient with temporary pacemaker and this result agreed with (Han, 2017) who showed unsatisfactory nurses` practice regarding care for patient with cardiac pacing.

This result indicated that (92.5%) of nurses had unsatisfactory level of practices regarding care for patient with temporary pacemaker and this result agreed with (Ali and Youssef, 2015) who concluded that critical and coronary care nurses have inadequate knowledge and practice regarding implantable cardiac devices.

Finally this result showed that there was positive correlation between total nurse`s knowledge score and their total practice scores regarding care for patient with temporary pacemaker. This means the lack of nurses' knowledge scores effects on their practice regarding care for patient with temporary pacemaker and this result agreed with (Ali & Youssef, 2015).

So, we can conclude that the lack of nurse`s knowledge affects negatively on their practice regarding care for patients with temporary pacemaker and their outcomes and all new nurses require training programs in coronary care unit and continuing nursing education regarding care for patient with temporary pacemaker.

### Conclusions

Based on the result of the present study, it can be concluded that:

The majority of nurses have poor knowledge and practice regarding care for patient with temporary pacemaker.

### Recommendations

Based on results of the present study the following can be recommended:-

1. Continued nursing education and training programs in coronary care unit should be well organized at Assiut university hospital.
2. Nurses should add to their routine obligations the regular reading of up-to-date references (periodical, textbooks, etc.). They should always be encouraged to attend scientific meetings and conferences to keep pace with the rapidly growing wealth of knowledge and practice necessary for proper nursing service.
3. Nurses in coronary care units are required to successfully complete a test of basic knowledge and skills before assuming independent responsibility for patient care.
4. Encourage nurses for self-education to improve their knowledge to reduce the complications and to give their patient information and instruction about devices that interfere with pacemakers.
5. Provide nurses with periodic training sessions and evaluations to improve and assess their knowledge and practices regarding temporary pacemaker patient's care.

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