Quality of Life of Patients pre/post Pacemaker Implantation

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Abstract

Assessing the quality of life for patients pre/ post pacemaker implantation can help nurses better understand how disease and treatment affect patients' lives. **Aim:** The aim of this study was to compare the quality of life of patients pre/post permanent cardiac pacemaker implantation. **Design:** A descriptive comparative study was utilized for conducting the study. **Setting:** This study was conducted at the cardio electrophysiology unit at Alexandria Main University Hospital, Alexandria, Egypt. **Subjects:** purposive sample comprised sixty patients undergoing permanent cardiac pacemaker implantation. **Tools:** two tools were used; Tool I: Patients' socio-demographic and clinical data structured interview schedule. Tool II: Euro Quality of life -5 Dimensions (EQ-5D) structured interview schedule. **Results:** There were highly statistically significant differences between the pre and post assessments of the studied patients' quality of life one and three months post permanent pacemaker implantation (P< 0.001). Also, highly statistically significant differences were found between pre /post assessment of the studied patients regarding the Euro Quality of life Visual Analogue scale one and three months post permanent pacemaker implantation (P<0.001). **Conclusion**: Based on the findings of the present study, it can be concluded that highly statistically significant differences were observed between the pre / post assessment of the studied patients regarding their quality of life after one and three months' post-permanent pacemaker implantation. However, the patient's QOL significantly declined after three months of implantation compared to one month. **Recommendations**: Nurses should attend updated conferences and in service training programs/or workshops about post permanent pacemaker implantation instructions to be learned to their patients through videos, and printed materials. Replication of the study on large probability sampling should be conducted.

Keywords: Quality of life, pre/post pacemaker implementation

Introduction:

The artificial pacemaker is a lifesaving procedure that has become widely used in recent years. It is defined as an implantable electronic device that uses electrical impulses to motivate the heart's myocardial layer to depolarize or contract when the heart's sinus node is not working properly. (Snegalatha, Anand, Seetharaman, John 2019). There are two types of pacemakers; temporary and permanent, which are implanted according to the type of anomaly in the conduction system (Peate, 2019). Permanent pacemakers are indicated for patients with myocardial infarction, persistent brady arrhythmia, complete heart block, or slow ventricular rate due to congenital or degenerative heart disease or cardiac surgery. (Kusumoto et al., 2019&Snegalatha et al 2019).

Permanent pacemaker implantation (PPI) has shown a reduced mortality rate. Over the past two decades, there has been a dramatic increase in the implantation of implantable cardiovascular electronic devices for the treatment of numerous life-threatening arrhythmias, as well as non-arrhythmic diseases such as heart failure and chronotropic incompetence (Perez., Woo, Sang, and Carrillo 2018). An estimated 1.25 million permanent pacemakers are implanted each year worldwide (Carrión-Camacho, Marín-León, Molina-Doñoro, González-López 2019& Raatikainen et al. 2017). The documented medical records of the statistical data of the cardio electrophysiology unit at the Main University Hospital revealed that the number of patients who were admitted for pacemaker insertion was about 200 patients in 2018 (Teleb 2021).

PPI is often a difficult situation for patients and their families for many reasons. First, patients may experience stress from feeling dependent on an artificial device, fear of device malfunction, fear of losing their life, and the elevated cost of pacemakers. (Sharma,

Singh and Sharma 2018). Additionally, several factors affect implantation, such as early and late complications after surgery, the need for regular follow-up care, and an awareness that it is a lifelong treatment. (Sharma, et al. 2018). Second, patients are unprepared for pacemaker and battery care, insertion site care, activity guidelines (what to do and what not to do), coping with electromagnetic interference, nutritional guidelines, pacemaker malfunction indicators, and follow-up schedules. (University of Ottawa Heart Institute, 2018).

As a result, it affects all elements of a patient's life, including their physical, mental, and functional state, as well as their social interactions. So, proper pacemaker care and long-term monitoring are required for the safety of patients who have permanent pacemakers. Proper pacemaker care includes lifestyle modifications such as maintenance of device efficiency, follow-up of the prescribed diet, management of stress, continuing to practice exercise as tolerated, recognition of complication symptoms, administering medications as prescribed, and follow-up with health providers regularly. (Creber et al., 2016). Therefore, the assessment of health-related quality of life post pacemaker implantation is an important responsibility of the nurses.

Quality of life (QOL) is a reflection of the effects of the disease and its treatment, considering the patient's perspective and experiences. Undesirable QOL is associated with an aggravation of disease severity, less survival, increase in the number of hospital admissions and a reduction in patients' cardiac function (Naimi, 2020). QOL assessment is essential in patients with incurable progressive diseases to consider patients as integrated, active human beings. Moreover, it facilitates the assessment of long-term adverse effects. (Buiting and Olthuis, 2020). Assessing the quality of life of patients post permanent pacemaker implantation in clinical practice can help nurses better understand how disease and treatment affect their lives and learn about disease-related preferences, expectations, and requirements (Chapagai, Andrews, Naik, 2017). Despite the popularization of quality-of-life research, which is reaching more and more new populations, there is still insufficient

research, even in patients with implanted pacemakers in Egypt. The need to carry out research arises from the role that quality of life plays in evaluating the effectiveness of therapeutic activities and other medical services, which justifies the importance of this study (Sikora et al., 2020).

Nurses are committed to obtaining patents view on QOL in order to improve nursing care and ultimately the outcome of the care. Nurses are concerned with QOL because it may alter prescribing habits, treatment regimens, and decision to continue or cease treatment. Assessment of quality of life of patients with chronic disease as those patients with PPI is an important concept for nursing manager to improve the allocation of appropriate health care resources, and to solve health care problems (King,2011). Nurses as members of the treatment team are in a position to improve QOL of patients through nursing interventions, so they must firstly assess QOL of those patients with PPI (Naimi, 2020).

Patients with a PPI have physical limitations as a result of their previous medical condition. Palpitations, chest discomfort, dyspnea, and weariness are common complaints among patients. After using a PPI, symptoms should improve, enhancing quality of life; however, there may be side effects. Device malfunction, infection, PPI syndrome, and changes in a patient's daily routine are all possible problems. The device has triggered a routine. In this setting, determining the Quality of Life is critical. QOL of PPI patients to determine their needs and how the device has affected their life. The findings are likely to aid in the planning of care for these patients, with an emphasis on certain aspects. that are detrimental to one's quality of life This study is also likely to pave the way for future research, including longitudinal studies and clinical trials with interventions intended to improve the quality of life of this population (Gonçalo et al., 2020).

Aim of the study:

This study was performed to compare the quality of life of patients pre/post permanent cardiac pacemaker implantation.

Research questions:

What is the quality of life of patients pre/post permanent cardiac pacemaker implantation**?**

Materials and Method

I. Materials

Research design

Descriptive comparative research design was utilized.

Setting

The study was conducted at the cardio electrophysiology unit at the new Main University Hospital. The setting is present on the fifth floor, which is composed of three rooms (the first room for pacemaker insertion, the second room for pacemaker programming, and the third one for ablation). Pacemaker insertion and programming are done all days of the week from 9am to 2pm except on Thursday and Friday.

Subjects:

Non probability purposive sample technique is used to select 60 adult patients with permanent cardiac pacemakers who met the inclusion criteria. The researcher selects sample based on the researcher's subjective judgment rather than random selection.

The statistical program Epi-Info was used to estimate the sample size using the following parameters:
- Population size of patients on permanent pacemakers over the year 2020 =200
- Expected frequency =50%
- Acceptable error = 10%
- Confidence coefficient = 95%
- Minimum simple size = 55 patients
- Patients were considered eligible to participate in the study if they met the following criteria:
- Adult patients with permanent cardiac pacemaker implantation aged 20 to 60 years' old
- Able to communicate verbally.
- Not scheduled for other surgeries, as evidenced from patients' medical records.

Exclusion criteria:
- Patients with any psychotic disorders.

- Patients with other chronic disease can affect quality of life as diabetes, cancer or stroke.
- Patients with altered level of consciousness.

Tool of the study: Two tools were used to complete the data for this study.

Tool I: Patients' socio-demographic and clinical data structured interview schedule:

It was developed after reviewing the related literature (Sharma, Singh and Sharma 2018. Sikora et al 2021.Magnusson and Liv, 2018) and it consisted of two parts:

***Part 1*-Socio-demographic data**; this part is used to collect data regarding patients' age, sex, residence area, marital status, level of education, occupation, and income.

***Part 2*- Clinical Data: This** part is used to collect data about patient's clinical characteristics such as medical diagnosis, duration of the disease, previous family history of cardiac diseases, prescribed medication, and symptoms pre the insertion of the pace maker.

Tool II: Euro Quality of life - 5Dimentions (EQ-5D) structure interview schedule:

This tool was developed by the Euro QOL group (1990) to assess QOL and modified by the Euro QOL group (2005). It consisted of the following two elements:

A- The EQ-5D-5Level structure interview schedule

It comprises the following five dimensions:

1- Mobility (the ability of the patient to move in comparison with before the surgery).
2- Self-care (the ability of the patient to wash or dress him or herself)
3- Usual activities (the ability of the patient to return to previous activities such as work, study, housework, family or leisure activities)
4- Pain/discomfort (degree of pain or discomfort feeling)
5- Anxiety or Depression (degree of anxiety or depression)

The scoring system: A scoring system related to patients' quality of life responses

was scored on five dimensions have five levels of problems: no problems, slight or mild problems, moderate problems, severe problems, and extreme problems. All questions were scored negatively (5-1), five indicating lower quality of life, and one indicated higher quality of life). Thus, the negatively framed questions should be reversed and transformed into positively framed questions such as (1 = 5), (2 = 4), (3 = 3), and (4 = 2), (5 = 1) before data coding.

Total score for patients` responses were classified as the following:

- A score of more than or equal 60% was considered "high quality of life."

- A score of less than 60% will be considered "low quality of life.".

Figure (1): Euro Quality of life -5Dimentions (Brunner &Suddarth, 2009)**.**

B - Visual analogue scale (VAS): -

This scale recorded the respondent's self-rated health on a twenty cm vertical line (0–100). It was used to assess health status with endpoints labeled the best health you can imagine 100 and zero the worst health you can imagine.

Total score for patients` responses were classified as the following:

- A score of more than or equal 60% was considered "satisfactory health status"

- A score of less than 60% will be considered "unsatisfactory health status.".

II-Method

1. An approval of the Research Ethics Committee, Faculty of Nursing, Alexandria University was obtained before conducting the study.
2. Before beginning the study, the Research Affairs Committee of the Faculty of Nursing at Alexandria University gave their approval.
3. An official letter was sent from the Faculty of Nursing, Alexandria University, to the responsible authorities of the selected setting

to obtain their approval to collect the data after explaining the aim of the study.

4. Official written permission was secured from the responsible authorities of the selected setting before conducting the study.
5. The tools were revised by a panel of five experts from nursing staff and cardiology physician which included professor, two assistant professors and lecturer of medical surgical nursing and cardiologist that revised the tool's content for clarity, relevance, comprehensiveness, understanding, and ease for implementation. All recommended modifications were done.
6. Tool I was developed by the researcher based on a review of the relevant literature.
7. The reliability of tool I was identified using Cronbach's Alpha statistical test. The reliability coefficient was 0.82.
8. Tool II was adopted from Euro QOL group (2005). It was translated into the Arabic language.
9. The reliability of tool II was identified using Cronbach's Alpha statistical test. The reliability coefficient was 0.84.
10. A pilot study was conducted on six patients who fulfilled the inclusion criteria to test the feasibility and applicability of the study tools. Those patients were excluded from the study.

Data collection

a. Data was collected within 8 months, during the period between May 2020 and January 2021.
b. Every patient was interviewed individually pre-permanent pacemaker implantation (on the day of the pacemaker implantation) in their cardio electrophysiology unit. Follow-up interviews were conducted twice according to the hospital's routine follow up policy (one month and three months post permanent pace maker implantation) while ensuring privacy.
c. Each patient was asked to answer the questions. The interview took 20–30 minutes on an individual basis, depending on the degree of understanding and response of the patient.
d. Socio-demographic and clinical data, Euro-quality of life five-dimension questions, and VAS were collected from every patient who underwent pacemaker implantation and was willing to participate in the study via interview.

Ethical Considerations:
- Informed written consent was obtained from every patient prior to data collection and after an explanation of the aim of the study.
- Anonymity was asserted.
- Data confidentiality was asserted.
- Patients' privacy was respected.
- Patients were informed that their participation in the study was voluntary and they could withdraw at any time.

Statistical Analysis

After data collection, it was coded and transferred into a specially designed format so as to be suitable for computer feeding. Following data entry, checking and verification processes were carried out to avoid errors during data entry. The Statistical Package for Social Sciences (SPSS) version 25 for Windows was used to analyze the data. (IBM Corp., 2017).

The following statistical tests were used:

A- Descriptive statistics:
- **Count and percentage**: Used for describing and summarizing qualitative data of bio-socio-demographic characteristics.
- **Mean and standard deviation** are used for quantitative data to obtain an average of the variables.

B-Analytical statistics:

An independent sample t-test (t): was used to test if there are significant relations between two independent variables in relation to their mean values on some measures. It was used in finding significance difference between pre and post assessment of the studied patients regarding their quality of life -5Dimentions.

N.B: The P value of < 0.05 shows a significant result, while a p value of > 0.05 indicates a non-significant result. (IBM Corp, 2017).

Results:

Table (1) illustrates the frequency distribution of study patients in relation to their socio-demographic characteristics.

Regarding patients' age, the results revealed that nearly half (45%) of the patients were in the age group 50 to less than or equal 60 years old. Concerning area of residence, more than half (55%) of the studied patients were living in urban area. In addition, the table shows that the majority of patients (68.3%) were married. Regarding the level of education, this table clarifies that, more than half of the studied patients (51.7%) had basic education.

Considering occupation, it was found that the highest percentage of the studied patients (46.7%) had no work. Also, 63.3% of patients had insufficient family income per month for their daily needs.

Table (2) shows the distribution of the studied patients according to their clinical data.

In relation to medical diagnosis, it was noticed that nearly half (49.2%) of the studied patients had myocardial infarction. Also, it was found that more than half of the studied patients (55.0%) had had cardiac disease for 1 year to less than 10 years. **Concerning family history of cardiac disease,** the table shows that the highest percentage of the studied patients (76.7%) had no history of cardiac disease. **Regarding prescribed medications**, the table illustrates that the highest percentage of the studied patients (38.3%) were taking antihypertensive-ant arrhythmic-anticoagulant medications. while only 8.3% were taking anticoagulants. **Considering the most common symptoms pre the insertion of a permanent pacemaker,** it was found that half of the studied patients (50%) suffered from dizziness and palpitation before the insertion of a permanent pacemaker.

Table (3): Shows comparison between the studied patients pre / post implementation of the permanent pacemaker according to their quality of life.

This table revealed that highly statistically significant differences were observed pre / post assessment of the studied patients regarding their quality of life after one and three months post permanent pacemaker implantation (P<0.001).

Figure (2): Comparison between mean% quality of life scores pre /post implementation of the permanent pacemaker.

This figure shows that the mean percent quality of life score of the studied patients pre pace maker implantation was 38.27 ± 4.90, indicating poor quality of life while immediately after 1-month post pace maker implantation was (75.80 ± 7.11), indicating good quality of life. Additionally, a marked decline was found in the mean percent quality of life score after 3 months post pace maker implantation (58.73 ± 3.33), indicating poor quality of life.

Table (4): Distribution of the studied patients in relation to Euro Quality of life Visual Analogue scale (EQ VAS) Questionnaire values per percentage.

This table reveals that the studied patients reported that their health status ranged from 50-60% before permeant pacemaker implementation indicating **unsatisfactory health status**. Moreover, this table shows that the studied patients reported that their health status ranged from (65-80%,60-70%) post one and three months after permeant pace maker implementation respectively indicating **satisfactory health status**. Moreover, the table also shows that there are marked decline post three months on patients' health status as EQ VAS ranged from (60%-70%).

Table (1): Frequency Distribution of study patients in relation to socio-demographic Characteristics

Socio-demographic Characteristics	No	%
Age (years):		
20<30	5	8.3
30<40	8	13.3
40<50	20	33.3
50≤ 60	**27**	**45.0**
Gender:		
Male	**40**	66.7
Female	20	33.3
Area of residence		
Rural	27	45.0
Urban	**33**	**55.0**
Marital status		
Single	12	20.0
Married	**41**	**68.3**
Divorced	3	5.0
Widow	4	6.7
Education level		
Illiterate	18	30.0
Read & write	4	6.7
Basic education	**31**	**51.7**
Secondary education	5	8.3
University education	2	3.3
Occupation		
Not working	**28**	**46.7**
Manual	8	13.3
cleric work	11	18.3
Professional	7	11.7
Housewife	6	10.0
Average monthly income		
Not enough	**38**	**63.3**
Enough	22	36.7

Table (2): Distribution of the studied patients according to their clinical data.

Clinical Characteristics	No	%
Medical Diagnosis:		
• Congenital heart defects	6	9.8
• Myocardial infarction	**30**	**49.2**
• Coronary artery diseases	17	27.9
• Heart Failure	7	11.5
Duration of the disease:		
• Months to 1 year	20	33.3
• 1<10 years	**33**	**55.0**
• 10<20 years	7	11.7
Family history of cardiac disease:		
• Yes	**46**	**76.7**
• No	14	23.3
Prescribed Medications		
• Anti-hypertensive-anti arrhythmic	10	16.7
• Anti-hyperlipidemic- anti arrhythmic	16	26.7
• Anticoagulants-ant arrhythmic	**23**	**38.3**
• Antihypertensive-antiarrhythmic-anticoagulants	5	8.3
• Antihyperlipidemic-antiarrhythmic-anticoagulants	6	10.0
Symptoms pre the insertion of pace maker.		
• Dizziness, Palpitation	**30**	**50.0**
• Dizziness, Fainting	16	26.7
• Palpitation, chest pain	9	15.0
• Dyspnea, Palpitation	5	8.3

Table (3): Comparison between the studied patients pre / post implementation of the permanent pacemaker according to their quality of life.

Dimensions	pre pace maker implantation	Post one month	Post three months	Test of significance (t-test)	
	Mean± SD	Mean± SD	Mean± SD	p1	p2
Mobility	2.45±0.699	4.23 ±0.722	2.95 ±0.287	0.000*	0.000*
Self-Care	2.38±0.666	3.42±0.671	2.92±0.424	0.000*	0.000*
Usual Activities	1.55±0.565	3.03± 0.802	2.92±0.497	0.000*	0.000*
Pain/Discomfort	1.55±0.565	3.87±0.536	3.03±0.181	0.000*	0.000*
Anxiety/Depression	1.63±0.663	4.40±0.616	2.87±0.468	0.000*	0.000*
Total Score (degree = 25)	9.57±1.23	18.95±1.78	14.68± 0.84	0.000*	0.000*

p_1: Stands for p-value for t-test for comparison between pre with one month post permanent pacemaker implementation among the studied patients

p_2: Stands for p-value for t-test for comparison between pre with 3months post permanent pacemaker implementation among the studied patients.
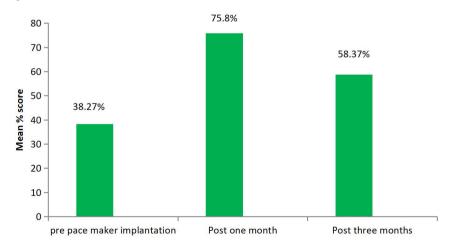
Figure (2): Comparison between mean% quality of life scores pre /post implementation of the permanent pacemaker.

Table (4): Distribution of the studied patients in relation to Euro Quality of life Visual Analogue scale (EQ VAS) Questionnaire values per percentage.

EQ VAS	pre pace maker implantation	Post one month	Post three month
Min-Max (%score)	50-60	65-80	60-70

Discussion:

Pacemaker implantation is one of the most important operations for regulating and treating arrhythmias and cardiac conductive disorders. However, this treatment may cause physical and psychological issues for patients, affecting their quality of life. (Torabi, AliAkbari, Aien, Deriss 2018, Dalgaard et al. 2018; Molna, Ma´te´, Szo˝ke, & Hegyi, 2018). Nurses, as members of the treatment team, have the ability to improve patients' quality of life through nursing interventions (Oliveira et al. 2022). In order to develop treatments aimed at improving the patients' quality of life (QOL), the nurse must be aware of the patients' present QOL. In this context, the present study was carried out to compare the quality of life of patients pre/post permanent cardiac pacemaker implantation. Concerning, patient demographics, the current study found that nearly half of the patients were in the age category of 50 to less than or equal to 60 years old. It can be explained by the increasing frequency of heart disease in older people, as well as repeated exposure to life stressors. Furthermore, physiological changes associated with aging process of coronary arteries. According to Ebada, El Senousy, Mohamed, Abdelatief (2017) in their study entitled "Effect of self-care management on nursing-sensitive patients' outcomes after permanent pacemaker implantation," the proportion of patients getting permanent pacemaker implantation around the age of 40 years has increased in recent years. From the researchers' point of view, it may be related to unhealthy life style especially increased consuming of fast food and sedentary life style among young.

Regarding gender, the findings of the present study revealed that male patients outnumbered female patients. This finding agrees with Figueroa, Alcocer, and Ramos (2016), who in their study entitled "Psychological intervention to modify anxiety, depression, and quality of life in patients with an implantable pacemaker", confirmed that more than half of the study participants were men. This finding could be due to the fact that men are significantly more likely to experience stress from heavy physical activities than women, and that men have fewer options for expressing emotional stress in the workplace. Moreover, the effect of estrogen on coronary arteries among women keep them at lower risk for coronary artery diseases than men before menopause. Concerning marital status, the majority of patients were married, which could indicate that married persons are more susceptible to cardiac problems than singles since they are constantly exposed to the psychological stress of their social function. This outcome is contradicted by Naimi, Eilami, Babuei, Rezaei, Moslemirad. (2020) in study entitled "The Effect of religious intervention using prayer for quality of life and psychological Status of patients with permanent pacemaker" found that the majority of the patients in their study were widowed. This result may be due to psychological effect of loss of spouse and loneliness.

In relation to medical diagnosis, nearly half of the studied patients had myocardial infarction. This finding is contradicted by Sharma, Singh and Sharma 2018 (2018) in their study titled "Assessment of effectiveness of permanent pacemaker care guidelines on patient activity and adherence." They reported that total heart block was the clinical diagnosis of more than half of the patients in the control group and nearly half of the patients in the experimental group. Other common reasons for permanent pacemaker implantation include sick sinus syndrome and second-degree heart block. this difference may be related to residence area, and age group of each sample. Considering the most common symptoms pre the insertion of a permanent pacemaker, it was found that half of the studied patients suffered from dizziness and palpitation before the insertion of a permanent pacemaker. This finding is contradicted by Sharma et al. (2018), who reported that the majority of study subjects in both the control group and study group had

dyspnea followed by syncope upon admission. from the researchers' point of view, the difference of patients complains of the two studies refer to the different cause of arrhythmia.

In relation to mobility, the current study found that post one and three months, all patients had no to moderate mobility problems. These results could be linked to the effect of pacemakers in improving daily life activities and secondarily to improving physiological outcomes associated with arrhythmia. This finding is supported by Sharma etal (2018), who emphasized that independent performance of activities of daily living such as feeding, bathing, grooming, as well as mobility, transfer, toilet use, stair use, etc., was increased in both study and control groups with p value< 0.05 in pre-pacemaker implantation to two months of pacemaker implantation. Pre-implementation of pacemakers, the vast majority of the patients in the study had moderate to severe problems with self-care and daily activities, but post one and three months, the vast majority had no problems or moderate problems with self-care and daily activities. These findings can be taken as indicating that the healing process was virtually complete, the device's programming was finalized, and patients were familiar with the new lifestyle limitations taught in the hospital to avoid difficulties. This was in line with Abbasi, , Negarandeh, Norouzadeh, &Mogadam, (2016) in their study entitled "The Challenges of living with an implantable cardioverter defibrillator: A qualitative study" recommended that following pacemaker implantation, patients should be given suitable and adequate information in order to avoid post-pacemaker problems.

The study reported a reduction in pain post pacemaker implementation compared to pre-implementation. This finding is supported by Magnusson and Liv (2018) in their study entitled "Living with a Pacemaker: patient-reported Pacemaker System." They reported that the vast majority of pacemaker patients had excellent overall satisfaction with their pacemaker system, including freedom from pain, acceptable cosmetic results, good shoulder movement, healthy sleep, and no concerns about device malfunction. The study reported a decrease in anxiety post pacemaker

implementation compared to pre implementation. This could be related to improving self-care management and normal activity, reducing pain post pacemaker insertion, and giving patients a sense of strength and support from education, which is healthier for those with PPM and, consequently, their anxiety. This is in agreement with Sikora et al. (2020) in a study entitled "Quality of life of patients after implantation of a Pacemaker," which reported that the results of the conducted study may have a positive reflection on the improvement of care for cardiac patients. Psychological factors play a crucial role in the quality of life of patients and should be taken into consideration in a therapeutic regimen to encourage better patient cooperation.

The current study revealed that highly statistically significant differences were detected pre / post assessment of the studied patients regarding their quality of life one and three months post permanent pacemaker implantation. This result is supported by Snegalatha et al (2019) in study entitled "Knowledge and attitude regarding permanent pacemaker and the quality of life of patients after permanent pacemaker implantation" reported in their study that a positive correlation between the knowledge and attitude of participants and their quality of life was found post pace maker implementation. In the same line, Polikandrioti (2021) in a study titled "Patient perceptions and quality of life in pacemaker recipients" confirmed that the quality-of-life post pacemaker implementation was associated with patient information degree. Also, Silva, Caminha, and Fer6reira (2019) in a study entitled "Quality of life of individuals with implantable electronic cardiac device" validated that individuals' QOL improves post a cardiac device is implanted, as a result of reduced symptoms in the dyspnea and discomfort domains, as well as modifications in some lifestyle habits. Moreover, Sikora (2020) mentioned that QOL of most subjects with an implanted pacemaker is at least at a good level. These results confirm the proper effect of pace maker on improving physical status and QOL of these patients.

Furthermore, the present study showed that there are marked decline in quality of life of those patients three months' post PPI. It may

be related to late complications of PPI, neglected follow up, or lake of knowledge related to care of pacemaker after surgery which confirm the critical role of nurse in education of those patients related to care of pace maker and its battery, follow up, complications and how to deal with them. A planned and systematic approach to teaching the patient and family about cardiac pacing and follow up are a vital part of nursing care to improve those patients QOL in future.

Based on the results of this study, nursing care for patients with permanent pacemaker necessitates knowledge of the device, its difficulties, and related factors, as well as the patient's hemodynamic status. Nurse expertise can be helpful in-patient training and reduce complications during the device's lifetime. The provision of nursing care and a proper nursing strategy for these patients can help to avoid device problems and malfunctions. In patients with an implanted pacemaker, all of these nursing care can keep those patients still on high quality of life. Hence these must be taken in consideration of nursing therapeutic regimen.

Conclusion:

Based on the findings of the present study, it can be concluded that highly statistically significant differences were observed between the pre / post assessment of the studied patients regarding their quality of life after one and three months post permanent pacemaker implantation. However, the patients' QOL significantly declined post three months of permanent pacemaker implantation compared to one month.

Recommendations:

Upon the completion of this study, the following recommendations are suggested:

Recommendations for patients:

- Nurses should attend updated conferences and in service training programs/or workshops about post permanent pacemaker implantation instructions to be learned to their patients.

- A colored illustrated booklet that updated periodically including all post permanent pacemaker implantation instructions should

be available and distributed to all patients undergoing permanent pacemaker implantation instructions.

Regarding future research:

- Replication of the study is needed to be conducted for larger number of probability sample, as well as long period of study time to confirm the results of the current study.

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