Self-care management behaviors for patients with permanent pacemaker and activities of daily living efficiency

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ABSTRACT

Background: Implanting a permanent pacemaker is a life-saving technique that has grown in popularity recently. Patients can maximize the benefits of a permanent pacemaker implantation through acquiring self-care management skills to integrate into daily activities. **Aim:** The purpose of the study was assessing self-care management behaviors for patients with permanent pacemaker and activities of daily living efficiency. **Design:** A descriptive design was utilized. **Setting:** This study was carried out at a cardioverter-defibrillator clinic at Elnasr Specialized Hospital in Port-Said city. **Sample:** A purposive sample. **Tool:** the data was gathered through three tools; first tool was the Patients' interview sheet. Second tool was self-management behaviors for patient with permanent pacemaker. Third tool was Barthel Index of activities of daily living. **Result:** According to the current study's findings, 73.4% of the patients in the study had unsatisfactory level of maintaining a permanent pacemaker's effectiveness. While the total of daily activities for the study participants were 16.7±1.35. **Conclusion**: The current study revealed that the low level of self-care management behaviors for patients after implantation. While the level of activities of daily living remained stable. **Recommendations:** A pamphlet will be provided to all patients with a permanent pacemaker as part of an ongoing home care program to improve their knowledge and habits around the device.

Keyword: Activities of daily living, Permanent pacemaker, Self-care management.

INTRODUCTION

60 percent of all sudden cardiac deaths occur due to arrhythmia, which can be prevented by inserting a pacemaker, and 600,000 pacemakers are implanted every year. A permanent cardiac pacemaker is implanted device used to keep heart rate adequate when natural mechanisms fail, the artificial cardiac pacemaker is initiated through cardiac pacing where very low electrical energies are delivered to the heart repetitively to stimulate the heart tissue to contract and relax (Jassam & Hassan, 2021).

Moreover the patients who had pacemaker implantations experienced a variety of problems following the procedure as a result of inadequate preoperative planning, postoperative care, and awareness. As a result, the patients had both direct and indirect complications, which could have been brought on by the implantation process itself or by major life changes like: depression, which is common in patients who need pacemakers because they feel dependent on an artificial device, fear of the device malfunctioning, fear of dying, and the high cost of pacemakers; psychological and physical abnormalities (Ali & Srour, 2021) & (Ibrahim, et al., 2024).

With a few restrictions and safety precautions, the patient will have the ability to carry out all activities that are normal for someone of the same age after insertion (activities of daily living). These include preventing pressure on the pacemaker, not elevating the elbow on the pacemaker side above the shoulder for the first four weeks, and avoiding abrupt movements with the afflicted arm for the first eight weeks to allow the pacemaker become established (Weheida, Gebril, Mohamed & Fathy, 2021).

Additionally, cardiac pacemakers have the potential to save a patient's life, but a patient's daily activities may be changed after an implanted pacemaker. Maintaining the device's effectiveness, following a recommended diet, controlling stress, exercising as much as possible, keeping an eye on any abnormalities (such as bradycardia, chest pain, palpitations, or dyspnea, etc.), taking prescribed medications, and routinely visiting doctors are all part of the lifestyle change (Bayomi, 2020).

The main goal of self-management aims to enhance patient health and outcomes through the health care spectrum, which involves early detection, treatment, and at-home care, as well as good lifestyle choices. Therefore, a specialist implanted cardioverter-defibrillator clinic should provide consultations and follow-up care for patients with pacemaker implants. Following implantation, patients are seen more frequently for follow-up device reexaminations three months later, wound checks one week after the procedure, and device cross-examinations one month later. Following a patient's stabilization, follow-up visits are typically increased to once every six months (Bayomi, 2020) & (Beyerbach, 2019).

Furthermore, the permanent pacemaker implantation is merely the beginning of a patient's lifelong treatment, and long-term check-up is essential for both safety and optimal pacing system utilization. This is the reason that increasing self-care skills, achieving better results, and reducing unnecessary hospital stays all depend on patient education and assistance. Teaching and informing patients and their families are crucial components of today's nursing education (Ali & Srour, 2021) & (Ibrahim, et al., 2024).

Significance

The count of patients with implanted cardiac devices is increasing in the current healthcare system. In Egypt, there were 2.66 implantations per million people. Approximately 3 million people have pacemakers, worldwide and 600,000 pacemakers are installed annually. A permanent pacemaker can save lives and keep people from dying (Ali & Srour, 2021).

Therefore, patients who have a permanent pacemaker implanted require information about managing their own care and how to continue with their daily activities while connected to the device (Mohammed & Atiyah, 2016).

Aim of study

The purpose of the study was to assess self-care management behaviors adherence for patients with permanent pacemaker and activities of daily living efficiency.

Research Question

To fulfill the aim of this study, the following research question is formulated:

- What are self-care management behaviors adherence for patients with permanent pacemaker and activities of daily living efficiency?

SUBJECTS AND METHOD

The subjects and methods for this study were explained under the four designs:

I- Technical Design

Research Design:

A descriptive research design was utilized.

Setting:

This study was carried out at a cardioverter-defibrillator clinic at Elnasr specialized Hospital in Port-Said city. It should provide consultations and follow-up care for patients with pacemaker implants.

Subjects:

A purposive sample of 94 patients who agreed to participate in the current study and had permanent pacemaker implantation between the beginning of September 2022 and the end of March was selected.

Tools of data collection:

Tool I: Patients' interview sheet:

This tool was adopted from (Ebada, El Senousy, Mohamed & Abdelatief, 2017), (Yossif &Abd El-aal, 2017) & (Sharma, Shruti, Singh & Sharma, 2018) to evaluate the demographic information, medical history, and current condition of patients who have permanent pacemakers, as well as their lifestyle.

Tool II: self-management behaviors for patient who have implanted permanent pacemaker:-

It was developed by researcher based on reviewing the recent related literature (Ebada, El Senousy, Mohamed & Abdelatief, 2017), (Yossif &Abd El-aal, 2017) & (Sharma, Shruti, Singh & Sharma, 2018). A permanent pacemaker implanted patient's self-management behaviors were assessed using this 48-item test. The items were separated into six categories: maintaining a permanent pacemaker's effectiveness (14 items), medicine administration (6 items), care of the wound site (5 items), participating in physical activity (8 items), and dietary intake (12 items), and check-up (3 items)

Scoring system: According to Ebada, El Senousy, Mohamed, and Abdelatief (2017), the self-management behavior tool was coded with two points for all the time answering questions, one point for sometimes answering questions, and zero points for never answering. The total score was deemed satisfactory when the self-management behavior score was ≥ 80%. If the overall self-management behavior score is less than 80%, it is considered unsatisfactory.

Tool III: Barthel Index of Activities of Daily Living (ADL):

It was created by Collin et al. in 1988 to determine the degree of independence that a patient with a permanent pacemaker has from any assistance by evaluating their level of independence for each of the ten activities listed as follows: bowls, bladder, grooming, feeding, toilet usage, transfer, mobility, dressing, stairs, and bathing.

Scoring system: Collin et al. (1988) defined the scoring system as adding the patient's scores for every item. The range of possible values was 0–20, with a lower score reflecting greater disability. Changes of more than two points in the overall score indicate a likely real change, and a move from completely dependent to independent on one item is also likely to be dependable when measured for improvement following rehabilitation.

II: Operational design

Validity:

The validity of self-care management of permanent pacemaker and Barthel Index of Activities of daily Living (ADL) was ascertained by a jury group of nine experts included five experts in Medical Surgical nursing specialty from Faculty of Nursing in Port-said University, two of physicians from Elnasr specialized Hospital in Port-Said and two of head nurse from Elnasr specialized Hospital in Port-Said. It was conducted to determine clarity, applicability, and appropriateness of the study tool. Some components were added, changed, or removed in accordance with the jury's recommendations.

Reliability:

The Cronbach's alpha coefficient was utilized to evaluate the internal consistency of the instrument; which obtained self-management behaviors for the patients in study were 0.825 and Barthel Index of Activities of Daily Living (ADL) were 0.87.

Pilot Study:

The data collection phase had been preceded by a pilot research 10% (9) of the patients who had a permanent pacemaker placed and who fulfilled the previously stated inclusion conditions were then eliminated from the study sample.

Filed work:

In order to gather data, actual fieldwork began in early September 2022 and continued until the end of March 2023. The patient, who had a permanent pacemaker installed, was given a brief explanation of the study's goal and asked for verbal agreement to participate.

The researcher collected the data on Monday, the only day of the week, during the morning shift, which lasted from 9 a.m. to 3 p.m. In order to finish the study instrument, the researcher conducted individual interviews with each patient who had a permanent pacemaker put within 30 minutes of their availability.

The researcher started by identification of the patient with permanent pacemaker who fulfilled the inclusion conditions of the current study. Each studied patient was interviewed individually to collect the basic data by tool I. The researcher also used the tool II to assess patient's self-behaviors about how to manage the permanent pacemaker**,** and used the tool III to evaluate the level of daily living activities efficiency.

III- Administrative design:

Ethical Consideration:

The article with code number NUR (4/8/2024) (40) been approved by the Faculty of Nursing's research and ethics committee at Port Said University. Before requesting participation in the study, directors, doctors, and patients in a cardioverter-defibrillator clinic at Elnasr specialized hospitals gave their consent, emphasizing the confidentiality of the data gathered. Following explanation of the study's nature and goal, verbal consent was obtained from each patient to participate. The researcher emphasized that all patients were allowed to withdraw from the study at any time without giving a reason, that confidentiality was ensured, and that participation was entirely voluntary.

IV: Statistical design

The gathered data was tabulated, arranged, and statistically examined using SPSS software (Statistical Package for the Social Sciences, version 20). Appropriate statistical tests used to assess a significant statistical difference between the variables in the study.

RESULT

Table (1): shows that 47.9% of the patients in the study were age fall in category of ≥ 60 years old, 58.5% of the patients in the study were males. While, 77.7% of the patients in the study were working, also 67% of the patients in the study were married, and 79.8% of the patients in the study lived with family. Finally, 54.3% of the patients in the study had insufficient money.

Table (2) indicates that 69.1% of the patients in the study smoked, and 71.3% of the patients were eating too much salt within diet. Approximately 29.8% of the patients in the study engaged in regular physical activity, whereas 56.4% of the patients consumed junk food.

Table (3) shows that about 10.6% of the patients in the study were needs help with personal care. While about 75.7% of the patients in the study were independent during mobility. However, 92.6% of the patients in the study were independent during bathing.

Table (4) indicated that 73.4% of the patients in the study had unsatisfactory level of maintaining a permanent pacemaker's effectiveness. Approximately 76.6% of the patients in the study had unsatisfactory level about care of the wound site, whereas 13.8% of the patients had satisfactory level of regularity checkup.

Table (5) revealed that there was statistically significant correlation between dietary intake and daily activity for the patients in the study. While, there was no statistically significant correlation between maintaining a permanent pacemaker's effectiveness and daily activity for the participant in the investigation.

Table (6) indicated that there is no statistically significant association between the patients' demographic traits and their degree of self-management practices.

Table (1): frequency and distribution regarding demographic characteristics for the study patients (n=94).

Variable	Patients (n=94)	
	n	%
Age in Years		
<40 years	10	10.6
40: <50	20	21.3
50: 60	19	20.2
≥ 60 years	45	47.9
Gender		
Male	55	58.5
Female	39	41.5
Occupation status		
Work	73	77.7
Not-work	21	22.3
Level of education		
Illiterate	8	8.5
Read and write	16	17.0
Secondary education	44	46.8
University	26	27.7
Marital status		
Single	5	5.3
Married	63	67.0
Widowed	16	17.0
Divorced	10	10.6
Living status		
Alone	19	20.2
Lives with family	75	79.8
Income		
Enough	43	45.7
Not-enough	51	54.3

Table 2: frequency and distribution regarding lifestyle evaluation of the study patients (n=94).

Variable	**Patients (n=94)**	
	n	**%**
Did you smoke?		
Not-smoker	29	30.9
I'm smoker	65	69.1
Eating too much salt within diet		
No	27	28.7
Yes	67	71.3
Eating junk foods		
No	41	43.6
Yes	53	56.4
Practicing regular physical activity		
No	66	70.2
Yes	28	29.8

Table (3): frequency and distribution regarding Barthal index of activities of daily living (ADL) of the study patients (n=94).

Barthel Index of Activities of Daily Living	**n**	**%**
Bowels		
Occasional accident	8	8.5
Continent	86	91.5
Bladder		
Occasional accident	6	6.4
Continent	88	93.4
Grooming		
Needs help	10	10.6
Independent	84	89.4
Toilet use		
Needs some help	11	11.7
Independent	83	88.3
Feeding		
Needs help	16	17.0
Independent	78	83.0
Transfer		
Minor help	33	35.1
Independent	61	64.9
Mobility		
Wheelchair independent	6	6.4
Walks with help of one person	17	18.1
Independent	71	75.5
Dressing		
Needs help	20	21.3
Independent	74	78.7
Use stairs		
Unable	4	4.3
Needs help	43	45.7
Independent	47	50.0
Bathing		
Dependent	7	7.4
Independent	87	92.6
Total ADL (mean score) 16.7±1.35		

Table (4): frequency and distribution regarding self-care management behaviors of the study patients (n=94).

Self-management behaviors	**Unsatisfactory**		**Satisfactory**	
	n	**%**	**n**	**%**
Maintaining a permanent pacemaker's effectiveness	69	73.4	25	26.6
Medicine administration	53	56.4	41	43.6
Care of the wound site	72	76.6	22	23.4
Participating in physical activity	66	70.2	28	29.8
Dietary intake	68	72.3	26	27.7
Check up	81	86.2	13	13.8
Total	68	72.3	26	27.7

Table (5): relation between the degrees of self-care management behaviors with daily activity of patients who have permanent pacemakers (n=94).

Self-management behaviors	**Daily activity**	
	r	P-Values
Maintaining a permanent pacemaker's effectiveness	0.104	0.120
Medicine administration	-0.069	0.203
Care of the wound site	0.109	0.634
Participating in physical activity	0.081	0.403
Dietary intake	0.258	0.033*
Total self-management behavior	0.117	0.361

***Significant at (P<0.05)** **r=Pearson correlation**

Table (6): relation association between the demographic characteristics of the patients under study and their self-management behaviors (n=94).

Variable	Unsatisfactory		Satisfactory		X^2 (P)
	N	%	N	%	
Age in Years					
18: <30	2	2.1	0	0	4.147 (0.411)
30: <40	6	6.4	2	2.1	
40: <50	16	17.0	2	2.1	
50: 60	35	37.2	2	2.1	
≥ 60 years	25	26.6	4	4.3	
Gender					
Male	52	55.3	7	7.4	0.322 (0.277)
Female	32	34.0	3	3.2	
working status					
Working	71	75.5	8	8.5	0.336 (0.812)
Not-working	13	13.8	2	2.1	
Level of education					
Illiterate	6	6.4	0	0	2.312 (0.365)
Read and write	14	14.9	4	4.3	
Secondary education	45	47.9	3	3.2	
University	19	20.2	3	3.2	
Marital status					
Single	4	4.3	2	2.1	3.238 (0.272)
Married	55	58.5	5	5.3	
Widowed	16	17.0	3	3.2	
Divorced	9	9.6	0	0	
Living status					
Lives alone	21	22.3	2	2.1	0.419 (0.380)
Lives with family	63	67.0	8	8.5	
Income					
Enough	38	40.5	8	8.5	2.172 (0.191)
Not-enough	46	48.9	2	2.1	

*Significant level considered (P<0.05). (X^2) chi-square tests.

DISCUSSION

The best results from a permanent pacemaker implantation may come from patients who receive lifelong support in adhering to their lifelong adaption. This may be achieved by instructing the patient on self-care management strategies to be applied in daily activities (Timby & Smith, 2019).

According to the Personal data of the patients under investigation, the present research found that almost one-third of the study participants were between the ages of 50 and 60. These findings concurred with those of Ali & Srour (2021), who found that most of the patients in the study were between the ages of 40 and 60. This discovery might be explained by a rise in abnormal cardiac conduction system with age, which could be brought on by repeated exposure to duties and stressors throughout life.

This study revealed that over half of the participants under investigation were men. According to Bhat, Kumar, and Parimoo (2018), this conclusion was supported by the fact that two-thirds of the study participants who underwent implanted the permanent pacemaker were men. This outcome could be because males are more likely than women to have cardiac disease and hypertension, and men had been more active and stressed out throughout life.

While, over than two third of the studied patients had bad lifestyle like that smoker, overtaking salt on food, excessive intake fast food, and didn't perform any physical activity; this might be considered a critical indicator for cardiac disease. This result confirmed by Jassam & Hassan, (2020) which mentioned that over half of the studied patients were smoker and participate bad habit effect on cardiac status.

The study's findings demonstrated that over than two-thirds of the participants with implanted permanent pacemakers demonstrated insufficient levels of self-management behaviors, including medication, follow-up, incision site care, and preserving the pacemaker's effectiveness. This outcome supported the finding by Youssef (2014) that patients' pre-implementation education program understanding of permanent pacemaker self-management techniques was insufficient.

Additionally, the study by Orly and Orna (2018) confirmed these findings, which discovered that low level of self-care management before the teaching session. This can be explained that these patients must be given receive information on how to manage their devices and keep them operating efficiently.

In relation to maintaining a permanent pacemaker's effectiveness, approximately two-thirds of the participants in the investigation were unaware of the precautions that should be taken to keep the effectiveness of a permanent pacemaker, including keeping a pacemaker card on hand, avoiding contact with electromagnetic interference, don't raise an arm above shoulder level, and don't perform the strenuous activities. The outcomes were consistent with those of Malm et al. (2017), who demonstrated that most of the patients in the study continually improved their comprehension of the safety measures required to maintain the effectiveness of their permanent pacemakers after completing the educational program.

Concerning the care of the wound site, more than half of the patients in the present investigation had no prior knowledge about wound care, and did not follow incision care precautions. This conclusion was consistent with Yousef's (2014) findings that over half of the patients in the study never took the necessary precautions to take care of their wounds.

Thus, this can be explained by the requirement that study participant receive training in sterile wound care, which includes instruction on how to identify infection symptoms, the value of eating adequate protein, carbs, and vitamins, and the importance of walking in facilitating wound recovery. Special care must be done, such as cleaning the region of the wound, avoiding pressure or trauma to the area, and preserving the area with a pillow when sneezing or coughing (Jassam & Hassan, 2021).

According to the study's findings of dietary intake, around two-thirds of the patients did not know enough about healthy eating habits, such as consuming less salt and eating enough protein. This conclusion was corroborated by Soliman, ElSayied, and Soliman (2022), who discovered that a small portion of the patients under study followed a balanced diet that included a high protein intake and a moderate salt intake.

The patients in this study demonstrated a high degree of independence in performing daily activities, including feeding, bathing, grooming, mobility, transfer, toilet and stair usage, and so on, was found to be satisfactory. In support of these findings, Sharma, Shruti, Singh, and Sharma (2018) discovered that the patient under study exhibited a high degree of independence in carrying out activities of daily living following the implantation of a pacemaker. One possible explanation for this could be that with a permanent pacemaker insertion, patients are able to carry out all of their regular activities.

However, patients who have a permanent pacemaker may feel that certain everyday activities and equipment interfere with the pacemaker's ability to function. As a result, the patients may continue to follow certain guidelines, such as avoiding electromagnetic interference, staying away from strenuous activities, dressing loosely, preventing pressure on the area where the pacemaker is inserted, carrying a pacemaker card, and refraining from raising their arms above shoulder level (Sharma, Shruti, Singh & Sharma, 2018).

The ongoing research study found no significant statistical relationship between the patients' daily live activities and their degree of self-management behavior. This finding contradicts that of Mohamed, Shreif, Mohamed, and Maaty (2016), who discovered a significant association with patients' self-care and their everyday living habits.

According to the opinion of researcher, the study participants need to receive instruction on managing one's own care following the implantation of a permanent pacemaker; however, the patient's daily activities remain unchanged following the implantation of a permanent pacemaker. Furthermore, patients may self-induce constraints as a result of incomplete or inaccurate information, which may negatively impact daily life with implanted permanent pacemakers (Snegalatha et al., 2019).

Finally, no significant statistical association was found between the personal data of the study participants and the degree of self-management behaviors. It is possible that the personal data of the patients are not effect on the degree of self-care management behaviors because the studied patients, regardless of age, sex, or marital status, require an educational program about self-care management behaviors

following permanent pacemaker implantation (Elsehrawy, Elgazzar & El-Tahry, 2021).

CONCLUSION

Based on the current study's findings, it emphasizes how critical it is to identify patients who demonstrate unsatisfactory self-care behavior after permanent pacemaker implantation, as the patients under investigation may need additional assistance to sustain or improve their device-related self-care after implantation. However, the patient's daily activities remain unchanged following the implantation of a permanent pacemaker.

RECOMMENDATIONS

The following suggestions can be made:

1. After a permanent pacemaker is implanted, patients should receive instruction regarding self-care management practices.
2. To improve compliance, follow-up appointments should be planned and given priority for patients who visit frequently.
3. A pamphlet will be provided to all patients with a permanent pacemaker as part of an ongoing home care program to improve their knowledge and habits around the device.

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سلوكيات إدارة الرعاية الذاتية لمرضى جهاز تنظيم ضربات القلب الدائم وكفاءة الأنشطة اليومية

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الخلاصة

إن زراعة جهاز تنظيم ضربات القلب الدائم هي تقنية منقذة للحياة اكتسبت شعبية كبيرة مؤخرًا. يمكن للمرضى تحقيق أقصى قدر من فوائد زرع جهاز تنظيم ضربات القلب الدائم من خلال اكتساب مهارات إدارة الرعاية الذاتية للاندماج في الأنشطة اليومية. **هدف البحث:** تهدف هذه الدراسه الي تقييم سلوكيات إدارة الرعاية الذاتية للمرضى الذين لديهم جهاز تنظيم ضربات القلب الدائم وكفاءة أنشطة الحياة اليومية. **طرق وأدوات البحث:** دراسه غرضيه , أجريت هذه الدراسة في عيادة القلب بمستشفى النصر التخصصي في مدينة بورسعيد, من خلال ثلاث أدوات؛ الأداة الأولى هي ورقة مقابلة المرضى. الأداة الثانية هي سلوكيات الإدارة الذاتية للمرضى الذين لديهم جهاز تنظيم ضربات القلب الدائم. الأداة الثالثة هي مؤشر بارثيل لأنشطة الحياة اليومية. **النتائج:** وفقًا لنتائج الدراسة الحالية، كان لدى 73.4٪ من المرضى في الدراسة مستوى غير مرضٍ في الحفاظ على فعالية جهاز تنظيم ضربات القلب الدائم. في حين بلغ مجموع الأنشطة اليومية للمرضي في الدراسة 16.7±1.35. **الاستنتاج:** كشفت الدراسة الحالية عن انخفاض مستوى سلوكيات إدارة الرعاية الذاتية للمرضى بعد الزرع. في حين ظل مستوى أنشطة الحياة اليومية مستقراً. **التوصيات:** سيتم توفير كتيب لجميع المرضى الذين لديهم جهاز تنظيم ضربات القلب الدائم كجزء من برنامج الرعاية المنزلية المستمر لتحسين معرفتهم وعاداتهم حول الجهاز.