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Knowledge and Reported Practices Regarding Pacemaker among Elderly Patients at Assiut Heart University Hospital

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Abstract
Background: A pacemaker detects heart pulses and sends electrical impulses to maintain normal heart rhythm. Temporary pacemakers treat transient arrhythmias, while permanent ones treat persistent arrhythmias. **Aims of the study:** To assess knowledge and reported practices regarding pacemaker among elderly patients. **Subjects & method**: Descriptive research design was used. **Sample type:** a purposive sample was used in this study. **Setting**: The study was conducted in Assiut Heart University Hospital. The total sample size was 200 elderly patients with pacemakers. Three tools were used. **Tool (I):** Structured interview questionnaire sheet divided into two parts: **Part I:** Patient's demographic data, Part II: Patient's medical data, **Tool II:** Patients Knowledge Assessment Questionnaire and **Tool (III):** Patient Reported Practices Assessment Questionnaire. **Results:** Total number of the studied elderly patients 200 with mean age 71.89 and 51% of the elderly patients were men. The current study findings showed that only 26.5% of the elderly patients had satisfactory knowledge and only 33.5% of the elderly patient's sample has adequate practices regarding pacemakers. There was highly statistical relation between total level knowledge and total practices at p-value <0.001. **Conclusion:** The present study concluded that about three quarters of the elderly patients had poor knowledge regarding pacemaker and nearly two thirds of the elderly patients had inadequate practices regarding pacemaker. **Recommendations:** Implement comprehensive educational programs for patients before pacemaker implantation. And develop educational materials that are tailored to the specific needs and literacy levels of elderly patients regarding pacemaker.

Keywords: Elderly, Knowledge, Pacemakers & Practices.

Introduction:
Pacemakers are vital for treating arrhythmias and heart failure, but their high-cost limits patient access, resulting in over three million deaths annually. The assessment of knowledge and education about active living post-pacemaker implantation poses significant challenges for nursing professionals. Increasing awareness of pacemakers among elderly patients may reduce misconceptions that impede their post-implantation quality of life **(Costa & Psaltikidis, 2022).**

A pacemaker detects heart pulses and sends electrical impulses to maintain normal heart rhythm. Temporary pacemakers treat transient arrhythmias, while permanent ones treat persistent arrhythmias. The device continually monitors heart activity. When a slowdown or pause is detected, it sends a small electrical impulse to encourage normal heart function. The pacemaker ensures the heart does not beat too slowly or take breaks that could be dangerous. If the heart is functioning well, the pacemaker remains inactive to conserve battery life and prevent interference with normal heart rhythm **(Franjic, 2022).**

The proportion of elderly patients requiring pacemaker implantation has increased due to improved therapeutic options for heart disease and augmented life expectancy. It is also related to the pathomorphological changes that occur in the cardiac conduction system with advancing age and the coexistence of hypertension or ischemic heart disease **(Jiang et al., 2022).** As the population ages the incidence of rhythm disturbances raises, increasing the need for cardiac pacemaker. It provides therapeutic solution that suits the elderly **(Parlato et al., 2023).**

For more than 50 years, pacemakers have been utilized in patients with slow heart rhythms. Currently, pacing can be done temporarily or permanently. Temporary pacing methods include transcutaneous, transvenous, or epicardial wires placed during surgery for postoperative use. Permanent pacing involves implanting a pacemaker with leads either transvenously or epicardially, with leadless pacemakers now also an option. Pacing necessitates a generator or battery for electrical energy delivery and leads to convey the energy to the heart. Typically, leads make physical contact with the heart for effective pacing **(Follansbee et al., 2020).**

In general, temporary cardiac pacing indications are similar to those for permanent pacemaker (PPM) placement. It is employed when delays threaten hemodynamic stability, especially when permanent pacing is unavailable, or arrhythmias are transient. Indications include sinus node dysfunction, atrioventricular block, bradycardia during acute myocardial infarction, and cardiac procedures like coronary artery bypass, valve repair or replacement, and transcatheter aortic valve replacement **(Morch, 2020).**

Indications for (PPM) encompass a variety of conditions such as complete heart block, sick sinus syndrome, Mobitz type 2 heart block, left bundle branch block, bifascicular block, trifascicular block, vasovagal syncope with symptomatic sinus bradycardia, left anterior hemiblock with syncope, and atrial fibrillation with heart block **(Muzamil et al., 2024).**

Gerontological nursing assessment for elderly patients with pacemakers is crucial, involving thorough evaluation of device functionality and incision site inspection. Nurses should monitor heart rate, rhythm, and settings for irregularities, infections, inflammation, or hematoma. They must also watch for systemic signs like fever, chills, or high white blood cell count to prevent complications. Diligent assessment by nurses contributes to optimal patient care and successful pacemaker integration into daily life **(Walker & Bradbury, 2023).**

It's crucial to check how well the patient understands pacemaker care to prevent problems after the implant. This helps to identify any misunderstandings about the device's function, limitations, and what needs to be done. Addressing these misunderstandings can help patients take better care of them, follow their treatment plans, and avoid complications. Assessing their knowledge also allows us to tailor educational materials to their specific needs, ensuring they can effectively manage their condition **(Ahmed et al., 2021).**

Significance of the study:

The prevalence of pacemakers is estimated to be 1.25 million implants worldwide each year. Number of cases that made pacemaker in all hospital in Egypt around 7865 cases in the year. and prevalence rose across the study period exceeding 1 in 50 among people aged 75 or older and was underpinned by incidence rates which rose with age, being highest in those 85 years or older over 500/100 000 for men and over 200/100 000 for women, rates for patients over 75 were more than double the rates for those aged 65-74 years, women were around 40% of cases overall **(Abd El-Aziz et al., 2023).**

Every year 1-2 million individuals worldwide die due to a lack of pacemakers' access **(Khalil et al., 2020).** Patients' knowledge and self-care practices are crucial and constructive in achieving appropriate post-pacemaker implantation outcomes **(Hassan et al., 2022).** Therefore, assessment of knowledge and reported practices regarding pacemaker for elderly patients are very important.

Aims of the study:

- To assess knowledge regarding pacemaker among elderly patients.
- To assess reported practices regarding pacemaker among elderly patients.

Research questions:

- What is the level of knowledge regarding pacemaker among elderly patients?
- What is the level of reported practices regarding pacemaker among elderly patients.

Subjects and Method:

Subjects and method of the current study were portrayed under the following designs:

Technical design:

The technical design of this study includes description of research design, study setting, subjects and tools of collection.

Research design:

A descriptive cross sectional research design was used to conduct this study.

The study seting:

This study was carried out at pacemaker outpatient clinic in Assiut Heart University Hospital

Study subjects:

A purposive sample was used in this study consists of (200) elderly patients with pacemaker who attending to pacemaker outpatient clinic. The sample was selected according to the following eligibility criteria:

Inclusion criteria for patients:

- Elderly patients undergoing pacemaker implantation.
- Accept to participate in the study.
- Able to communicate.

Sample size:

The total number of elderly patients [elderly population] who attended to pacemaker outpatient clinic was around 1008 last year (2022). The sample size of the study was calculated by using the software EP /Info, version 3, with a 99 % confidence interval (CI) and it estimated by 200 patients.

Tools of data collection:

Three tools were utilized to obtain pertinent data for the present study.

Tool (I): Structured interview questionnaire sheet:

It was designed and developed by the researcher based on the relevant recent national and international literatures it is divided into two parts:

Part I: Patient's Demographic Data:
The purpose of this section was to evaluate the patient's demographic data, and consist of (7) items (age, gender, marital status, residence, smoking, level of education and occupation).

Part II: Patient's Medical Data:
This part constructed by the researcher, aimed to assess past medical history: (hypertension, diabetes mellitus, and coronary artery disease, heart failure, atrial fibrillation, family history of cardiovascular disease, other).

Present medical history included date and reason and type of pacemaker implantation and symptoms and signs (chest pain, Swelling in legs, shortness of breath, palpitation, Fatigue and dizziness).

Tool II: Patient Knowledge Assessment Questionnaire:
This questionnaire was designed and developed by the researcher based on the following literatures **(Parlato et al., 2023),** (**Rayamajhi et al., 2021).** It aimed to assess patient's knowledge regarding pacemaker for elderly patient. It was concerned with the following: Assess patient's knowledge about pacemaker functioning which include the definition, purpose, types, indications, and lifespan of pacemakers. And assess patient's knowledge about lifestyle modifications and precautions, warning signs, complications and follow-up care.

Tool (III): Patient Reported Practices Assessment Questionnaire:
This questionnaire was designed and developed by the researcher based on the following literatures **(Gill & Meghrajani, 2022), (Rayamajhi et al., 2021).** It amid to assess patient's reported practices regarding pacemaker for elderly patient. It was concerned with the following two parts:

Part I: To assess patient reported practices about pacemaker's follow-up care and lifestyle modification, I asked patients about avoiding exposing the pacemaker to strong electromagnetic fields, attending regular follow-up appointments, and avoiding lifting heavy objects.

Part II: To assess patient reported practices about emergency preparedness measures, such as carrying an identification card and seeking immediate medical attention in case of unusual symptoms related to the pacemaker.

Scoring system for knowledge Questionnaire:
The total number of questions was 9 questions composed of 45 items one grade for the correct answer and zero for incorrect answer. The total knowledge scores were organized as the following:
<60% unsatisfactory level
≥ 60% satisfactory level **(Mohamed et al., 2022).**

Scoring system for reported practices Questionnaire:
The total number of questions was 24 one grade for the correct answer and zero for incorrect answer. The total reported practices scores were organized as the following.
<60% inadequate level, ≥ 60% adequate level, **(Kamal et al., 2023).**

Validity of the tools:
Tools tested for its content validity by group of five experts in the gerontological nursing. The required modifications were done.

Reliability of tools:
- For Tool (I): Structured interview questionnaire sheet: (.718)
- For Tool II: Patient Knowledge Assessment Questionnaire: (.921)
- For Tool (III): Patient Reported Practices Assessment Questionnaire: (.860)

Operational design:
This design involved a description of the preparatory phase, and actual phase.

I- Preparatory phase:
Official letter of endorsement was accomplished from the nursing faculty dean to director of Assiut Heart University Hospital. The letter incorporated an endorsement to do the study, the nature and reason for the study.

II-Pilot study:
Pilot study carried out prior starting of data collection on 20 (10% elderly patients), who excluded from the study. To test tools clarity and to assess the needed time for fulfilling them, the necessary modifications based on the result of pilot study and the questionnaire was reconstructed for ready to use.

III- Ethical Consideration:
- Research proposal has been approved from Ethical Committee in the Faculty of Nursing.
- There is no risk for study patients during application of the research.
- The study adheres to the accepted ethical principles of clinical research.
- Informed consent has been obtained from patient or guidance that is willing to participate in the study, after explaining the nature and purpose of the study.
- Confidentiality and anonymity have been assured.
- Study patients have the right to refuse to participate and or withdraw from the study without any rational any time.
- Study patient's privacy has been considered during collection of data.

Field work:
The elderly were met by the researcher, an explanation of the purpose of the research was done to participated in the study. Face to face individual interview with elderly was began, questionnaire was completed for all persons.

The researcher started to collect data in that period. Data collection was carried out at Heart Hospital at Assiut University. From the 1st of January 2024 and ended at the 30th of June 2024; data were collected from the previous mentioned setting for six months. The approximate time spent during the filling of sheet was around 20-30 minutes.

Statistical analysis:

The collected data was organized, categorized, coded, tabulated and analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Data was presented in tables and figures using numbers, percentages, means, standard deviation and Chi-square and Pearson test was used in order to find an association between variables. Statistical significant was considered at P-value < 0.05.

Results

Table (1): Frequency distribution of the elderly patients according to their demographic characteristics (n=200)

Demographic characteristics	N	%
Age:		
65-70 years	150	75.0
More than 70 years	50	25.0
Age (mean±SD)	**71.89±5.801**	
Gender:		
Male	102	51.0
Female	98	49.0
Level of education:		
Illiterate	146	73.0
Reads and writes	8	4.0
Preparatory	22	11.0
Secondary	16	8.0
University	8	4.0
MaritalStatus:		
Single	6	3.0
Divorced	12	6.0
Married	122	61.0
Widow	60	30.0
Residence:		
Urban	54	27.0
Rural	146	73.0
Occupation:		
Housewife	94	47.0
Retired	54	27.0
Farmer	38	19.0
Not work	14	7.0
Smoking status:		
Never Smoker	108	54.0
Current Smoker	72	36.0
Previous Smoker	20	10.0

Table (2): Frequency distribution of the elderly patients according to their medical history (n=200)

Medical history	N	%
Past medical history:(more than one answer)		
Hypertension	98	49.0
Diabetes	52	26.0
Coronary artery disease	38	19.0
Heart failure	34	17.0
Atrial fibrillation	28	14.0
Other*	31	15.5
Recent symptoms: (more than one answer)		
Fatigue	110	55.0
Chest pain	48	24.0
Dizziness	30	15.0
Swelling in legs	11	5.5
Shortness of breathing	7	3.5
Palpitation	5	2.5
Non	60	30.0
Type of pacemaker:		
Dual	132	66.0
Single	64	32.0
Biventricular	4	2.0
Reason for pacemaker implantation:		
Complete heart block	170	85.0
Symptomatic bradycardia	12	6.0
Cardiomyopathy	10	5.0
Sinus node dysfunction	6	3.0
Atrial fibrillation	2	1.0

*Other * (kidney and liver diseases)*

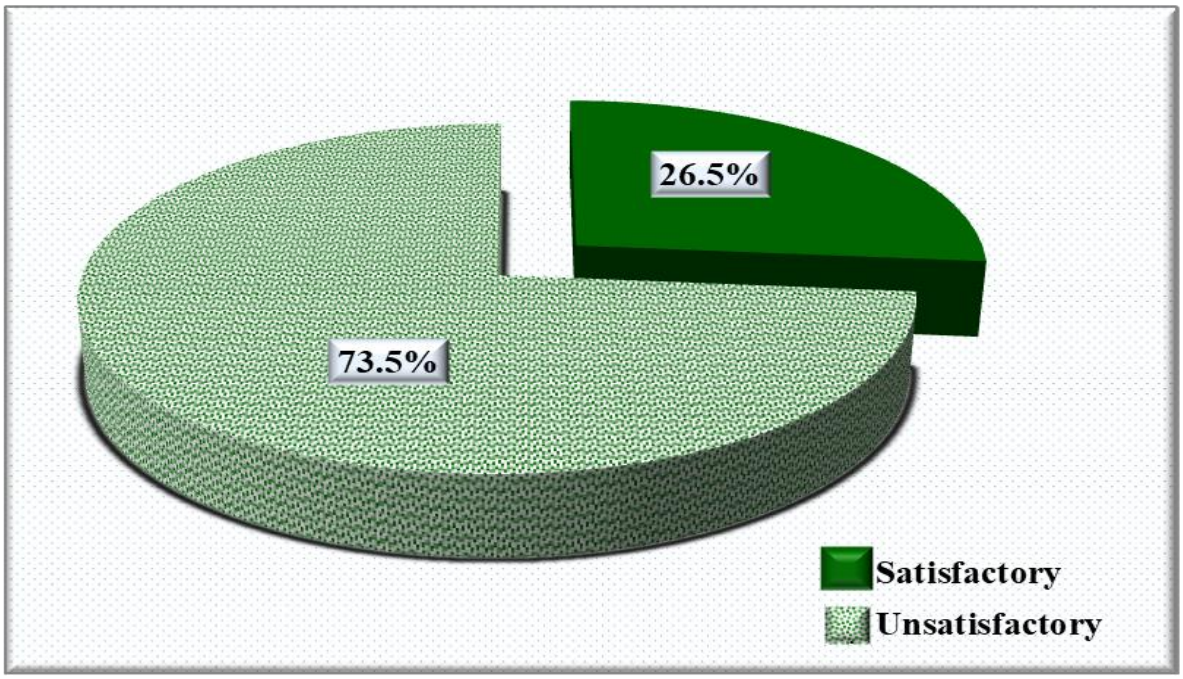


Figure (1): Distribution of studied elderly according total score of knowledge about pacemakers (n=200)

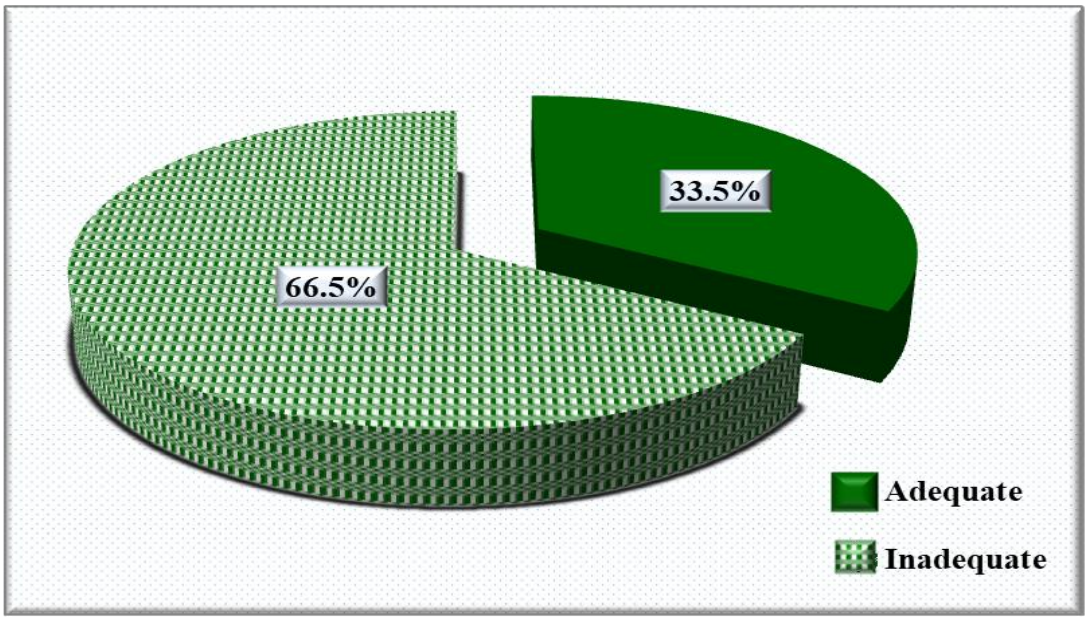


Figure (2): Distribution of studied elderly according total score of practices level regarding pacemakers (n=200)

Table (3): Distribution of the elderly patients reported practices about pacemakers (Follow up care and lifestyle modification) (n=200)

Reported practices	Done		Not done	
	N	%	N	%
1. Do you avoid or minimize exposure to extreme temperatures (hot or cold)?	109	54.5	91	45.5
2. I keep a record of my pacemaker settings and any irregularities in its functioning?	60	30.0	140	70.0
3. Do you get an adequate amount of sleep each night?	48	24.0	152	76.0
4. Do you clean the pacemaker area?	98	49.0	102	51.0
5. Do you avoid lifting heavy objects?	127	63.5	73	36.5
6. Do you take any precautions while taking medications?	20	10.0	180	90.0
7. Do you avoid activities that may interfere with your pacemaker?	99	49.5	101	50.5
8. Are you careful not to expose your pacemaker to strong electromagnetic fields?	70	35.0	130	65.0
9. Do you avoid any electronic devices or gadgets that could potentially interfere with your pacemaker?	65	32.5	135	67.5
10. Do you follow a healthy diet recommended by your healthcare provider?	34	17.0	166	83.0
11. Do you limit your alcohol consumption?	200	100.0	0	0.0
12. Do you avoid smoking or exposure to second-hand smoke?	119	59.5	81	40.5
13. Do you maintain a healthy body weight as advised by your healthcare provider?	40	20.0	160	80.0
14. Do you manage stress levels through relaxation techniques or other methods?	36	18.0	164	82.0
15. I follow the recommended guidelines for wound care around the pacemaker site?	82	41.0	118	59.0
16. I attend regular follow-up appointments with my healthcare provider as recommended?	154	77.0	46	23.0
17. Regularly checking your pacemaker site for signs of infection, redness, or swelling?	48	24.0	152	76.0

Table (4): Relations between the elderly patient demographic characteristics and their total knowledge level about pacemakers (n=200)

Demographic characteristics	Total knowledge level about Pacemakers				P-value
	Satisfactory		Unsatisfactory		
	N (53)	%	N (147)	%	
Age:					
65-70 years	43	81.1	107	72.8	0.229 (NS)
More than 70 years	10	18.9	40	27.2	
Gender:					
Male	34	64.2	68	46.3	**0.025***
Female	19	35.8	79	53.7	
Level of education:					
Illiterate	22	41.5	124	84.4	**0.001****
Reads and writes	11	20.8	5	3.4	
Preparatory	4	7.5	4	2.7	
Primary	2	3.8	4	2.7	
Secondary	8	15.1	8	5.4	
University	6	11.3	2	1.4	
MaritalStatus:					
Single	4	7.5	2	1.4	0.105 (NS)
Divorced	3	5.7	9	6.1	
Married	28	52.8	94	63.9	
Widow	18	34.0	42	28.6	
Occupation:					
Farmer	6	11.3	32	21.8	**0.036***
Manual work	2	3.8	4	2.7	
Housewife	18	34.0	70	47.6	
Not work	5	9.4	9	6.1	
Retired	22	41.5	32	21.8	
Smoking Status:					
Current smoker	19	35.8	53	36.1	.188 (NS)
Previous smoker	2	3.8	18	12.2	
Never smoker	32	60.4	76	51.7	
Residence:					
Urban	21	39.6	33	22.4	**0.016***
Rural	32	60.4	114	77.6	

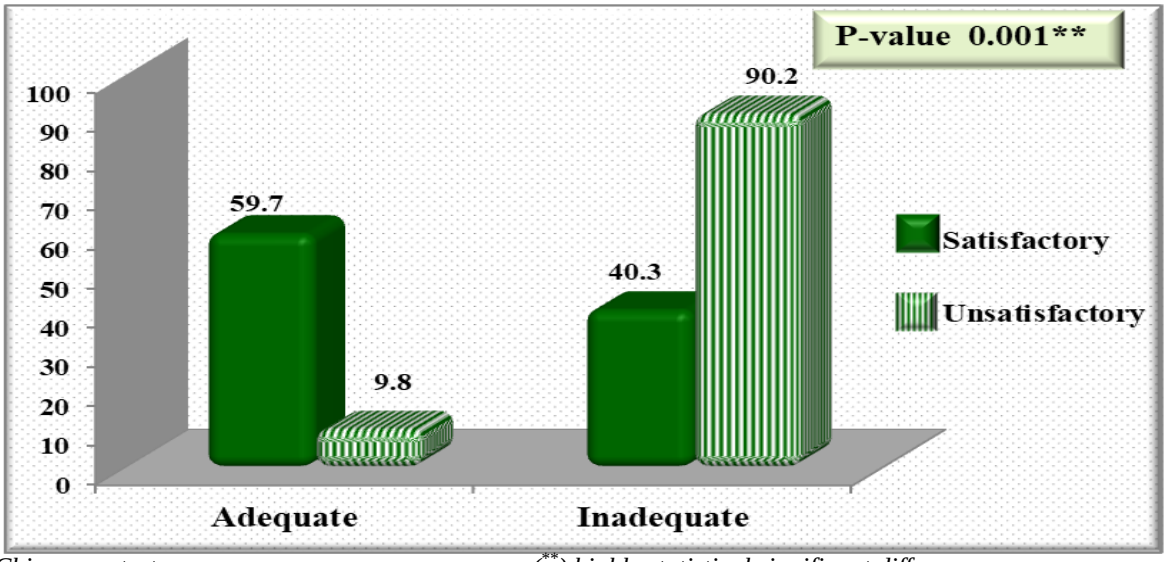
Chi-square test *(**) highly statistical significant difference*
(*) statistical significant difference *(NS) No significant difference*

Table (5): Relations between the elderly patient demographic characteristics and their total practices level about pacemakers (n=200)

Demographic characteristics	Total practices level about Pacemakers				P-value
	Adequate		Inadequate		
	N (67)	%	N (133)	%	
Age:					
65-70 years	49	73.1	101	75.9	0.665 (NS)
More than 70 years	18	26.9	32	24.1	
Gender:					
Male	45	67.2	57	42.9	**0.001****
Female	22	32.8	76	57.1	
Level of education:					
Illiterate	20	29.9	126	94.7	**0.001****
Reads and writes	4	6.0	4	3.0	
Preparatory	14	20.9	2	1.5	
Primary	6	9.0	0	0.0	
Secondary	16	23.8	0	0.0	
University	7	10.4	1	0.8	

Demographic characteristics	Total practices level about Pacemakers				P-value
	Adequate		Inadequate		
	N (67)	%	N (133)	%	
Marital status:					
Single	4	6.0	2	1.5	0.156 (NS)
Divorced	5	7.5	7	5.3	
Married	35	52.2	87	65.4	
Widow	23	34.3	37	27.8	
Occupation:					
Farmer	5	7.5	33	24.8	**0.001****
Manual work	2	3.0	4	3.0	
Housewife	22	32.8	66	49.6	
Not work	5	7.5	9	6.8	
Retired	33	49.2	21	15.8	
Smoking Status:					
Current smoker	23	34.3	49	36.8	0.589 (NS)
Previous smoker	5	7.5	15	11.3	
Never smoker	39	58.2	69	51.9	
Residence:					
Urban	24	35.8	30	22.6	**0.046***
Rural	43	64.2	103	77.4	

Chi-square test *(**) highly statistical significant difference*
(*)statistical significant difference *(NS) No significant difference*



Chi-square test *(**) highly statistical significant difference*
(*)statistical significant difference *(NS) No significant difference*

Figure (3): Relations between patients" knowledge total level and total practices levels about pacemakers (n=200)

Table (1): This illustrates that 75% of patients sample aged (65 - 70) years, with mean age ± SD 71.89±5.801. Concerning their educational level (73%) of the elderly Patients were illiterate. The majority of elderly Patients (61%) were married. Rural areas were found to be the residence for 73% of the elderly Patients. Concerning their occupations (44%) of the elderly Patients were housewives. Regarding smoking status (54%) of the elderly Patients was never smoker and 36% current smoker.

Table (2): This table illustrates that the most common past medical history was hypertension, affecting 49% of elderly patients. Regarding recent symptoms, fatigue was the most prevalent, experienced by 55% of elderly patients. While the most common type of pacemaker implanted was dual (66%). The primary reason for pacemaker implantation was complete heart block (85%).

Figure (1): This figure illustrates that 73.5% of the elderly patients' sample has unsatisfactory knowledge level about pacemakers.

Figure (2): This figure illustrates that 66.5% of the elderly patient's sample have inadequate practices regarding pacemakers.

Table (3): This table illustrates that all of the elderly patients were aware of the importance of limiting alcohol consumption. While vast majority of them (90%) did not took precautions while taking medications. A substantial proportion of patients (83%) did not maintain a healthy diet.

Table (4): There were highly positive relation between the education level and the elderly patient's knowledge. While the gender, occupation and residence were positive related with knowledge. While age, marital status and smoking status were not significantly associated with the total knowledge level about pacemakers.

Table (5): There were highly positive relation between the elderly patient's practices and gender, education level and occupation. While the residence was positive related with practices. While there was no relation between the elderly patient's practices and age, marital status and smoking status.

Figure (3): This figure shows that there was highly statistical relation between total level knowledge and total practices at p-value <0.001.

Discussion:

This study examined a cohort of two hundred patients. The mean age of elderly individuals receiving pacemakers constitutes a paramount element in comprehending the demographic characteristics of recipients of cardiac devices. Research indicates that the mean age of elderly patients undergoing pacemaker implantation is roughly 71.89 years, with discrepancies dependent on particular studies and populations. This conclusion is consistent with antecedent research conducted by **(Khan et al., 2022),** which documented a mean participant age of 71.8 years.

According to researcher opinion, aging typically influences individuals' cardiovascular systems, resulting in a natural decline in efficiency, thereby heightening the probability of arrhythmic complications that may require the intervention of a pacemaker. This demographic data is essential for comprehending the standard patient cohort for pacemaker implantation and for customizing healthcare provisions and interventions correspondingly.

Regarding gender, the present study disclosed that more than half of elderly patients were males. This observation is supported by **(Mohamed et al., 2024),** who identified that males were more predisposed to undertake pacemaker insertion compared to females.

From point of view, the predominance of males in this investigation corresponds with the extensive trend noted in pacemaker implantation research. Numerous factors may contribute to this gender inequality. Physiological distinctions, such as elevated rates of coronary artery affliction in males, could augment their susceptibility to conditions necessitating pacemakers. Moreover, societal determinants like occupational exposures and lifestyle practices may affect the frequency of pacemaker implantation among males.

Regarding educational level, more than half of studied elderly patients were illiterate. This finding was in agreement with **(Kubra et al., 2021),** who found that the majority of their participants were illiterate. Researcher suggest that this finding can be attributed to the limited educational opportunities available to previous generations. Consequently, illiteracy remains a prevalent issue among the elderly population.

Regarding residence and marital status, the present study found that more than half of studied elderly patients were from rural areas, this finding in agreement with **(Attia & Abdelwahab, 2021).** Furthermore, the present analysis disclosed that approximately two-thirds of the elderly patients were married, a conclusion that aligns with **(Khalil et al., 2020),** who determined that nearly two-thirds of the evaluated geriatric patients are married.

Regarding occupation, the results of present study showed that about half of the elderly patients were housewives, this finding aligned with previous research by **(Jassam1 & Hassan, 2021),** who reported that nearly half of their elderly patients were housewives. From the researcher' perspective, this trend can be attributed to historical societal expectations and limited educational and employment opportunities for women. The role of homemaker often meant reduced financial independence and potential social isolation, factors that may have implications for the health and quality of life of these individuals in old age.

Regarding smoking status, the present study revealed that more than one third of elderly patients were current smokers, this finding aligned with previous research by **(Ahmed, 2022),** who demonstrated that more than one-third of the assessed elderly patients were current smokers. From the researcher perspective, the high prevalence of smoking can be attributed to several factors. As normalization of smoking in past generations, limited access to smoking cessation programs tailored for older adults, and the influence of social and cultural norms.

Regarding past medical history, the current study and a previous one by **(Khan et al., 2022),** both found that a significant number of elderly patients have hypertension and diabetes. Approximately half of the patients in both studies had hypertension, while about a quarter had diabetes. Researcher suggest that this finding can be attributed to several factors, including aging, lifestyle choices such as diet and physical activity, and genetic predispositions. Additionally, the presence of one chronic condition often increases the risk of developing others, creating a vicious cycle of comorbidities.

Regarding the presenting symptoms, the study found that over half of elderly patients experienced fatigue, aligning with previous research by **(Polikandrioti et al., 2019),** who reported similar fatigue levels in pacemaker patients. Additionally, nearly a quarter of elderly patients in the current study occasionally suffered from chest pain, consistent with findings by **(Lakshmanadoss et al., 2020),** that indicated a high prevalence of chest pain among elderly individuals who undergo pacemaker implantation.

From point of view, despite the benefits of pacemakers, factors such as advanced age, underlying comorbidities, and individual variations in response to the device may contribute to the persistence of these symptoms. Moreover, the exact causes of these symptoms in some patients may remain unclear, necessitating further investigation.

Regarding type of pacemaker, in this study, two-thirds of elderly patients used dual-chamber pacemakers, while one-third used single-chamber pacemakers. This finding is consistent with a previous study by **(Ahmed, 2022),** who reported that about two-thirds and one-third of elderly patients used dual-chamber and single-chamber pacemakers, respectively.

From point of view, this preference for dual-chamber pacemakers can be attributed to several factors, including their ability to more effectively synchronize both the atria and ventricles of the heart, leading to improved hemodynamics and potentially better symptom relief. Additionally, advancements in technology and reduced complication rates have made dual-chamber pacemakers a more attractive option for many patients.

Regarding reason for pacemaker implantation: The current study revealed that over three quarters of elderly patients diagnosed with complete heart block required a pacemaker. This aligns with the findings of a previous study conducted by **(Markos et al., 2024),** who showed that the majority of elderly patients with complete heart block needed a pacemaker.

Regarding knowledge about pacemaker: The study found that less than one third of them had satisfied knowledge about a pacemaker. This finding is consistent with a previous study by **(Mahmoud et al., 2022),** who reported a lack of knowledge among patients. This may be attributed to a lack of education and awareness about how to manage an artificial pacemaker.

From point of view, potential reasons for this knowledge deficit may include limited pre-implantation counselling, insufficient post-operative follow-up, a general lack of awareness regarding the device and its management, complex medical information, and limited healthcare provider time for detailed explanations.

According to reports on pacemaker practice: the present study revealed that about two thirds had inadequate practice level regarding a pacemaker. This finding is supported by **(Abd El-Aziz et al., 2023),** who found inadequate practice among elderly patients. According to researcher' opinion, potential reasons for this include limited training, lack of updated guidelines, insufficient resources, and varying levels of experience among healthcare professionals. Addressing these issues requires comprehensive educational programs, standardized guidelines, and ongoing quality improvement initiatives.

Concerning the items of practices, Studies on pacemaker practice have shown that most elderly patients have inadequate practices in getting enough sleep and maintaining a healthy diet and weight. This finding is supported by **(Rayamajhi et al., 2021),** who found similar results among elderly patients. Additionally, the current study demonstrates that most elderly patients have inadequate practices in taking medication precautions and checking pacemaker sites for infections. This finding is supported by **(Khalil et al., 2020)**, who found that the vast majority of the elderly patients had inadequate practice level in these items of reported practices.

The current study found that there were significant differences in elderly patients' knowledge about pacemakers based on their education level, gender, occupation, and residence. These findings aligned with those of **(Abd El-Aziz et al., 2023),** who identified significant differences in elderly patients' knowledge and sociodemographic factors, except for gender. However, **(Tripathi et al., 2021),** reported that there was statistically significant difference between patients' knowledge and gender. However, we found no significant difference in pacemaker knowledge based on the age or marital status of elderly patients.

From point of view, these differences may be attributed to disparities in access to healthcare information, educational opportunities, cultural factor and socioeconomic status, which can influence an

individual's ability to comprehend complex medical concepts.

The present study revealed a statistically significant difference between the pacemaker reported practices of elderly patients and their sociodemographic characteristics, such as education level, gender, occupation, and residence. This finding aligns with **(Rayamajhi et al., 2021),** who observed a significant association between elderly patients' practices and sociodemographic factors, including education level, occupation, residence, and gender. However, we found no significant difference in pacemaker practices based on the age or marital status of elderly patients.

The current study demonstrated that there was a highly statistically significant difference between the level of total knowledge and total reported practices of elderly patients regarding pacemaker. This finding was consistent with **(Attia & Abdelwahab, 2021),** who found that there was a highly statistically significant positive correlation between the study and control group regarding the level of total knowledge and total practical.

Conclusion:

Results of the present study concluded that about three quarters of the elderly patients had poor knowledge regarding pacemaker and nearly two thirds of the elderly patients had inadequate practices regarding pacemaker. There was a highly statistically significant difference between the level of total knowledge and total reported practices of elderly patients regarding pacemaker.

Recommendation:

- Implement comprehensive educational programs for elderly patients before pacemaker implantation, covering the device's function, care requirements, potential complications, and lifestyle adjustments.
- Develop educational materials that are tailored to the specific needs and literacy levels of elderly patients regarding pacemaker, ensuring effective understanding and adherence.
- Provide on going education and support after implantation, including follow-up appointments, written materials, and access to online resources.
- Develop standardized training programs for healthcare providers on pacemaker management, including elderly patient education, troubleshooting, and complication management.
- Organize community-based education programs to increase awareness of pacemakers and their management among the elderly population.

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