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Knowledge and Attitude of Patients Regarding Permanent Pacemaker Implantation in Selected Hospitals of Kamrup (Metro), Assam: A Descriptive Survey Study

Suranjita Borgohain[1], Juri Phukon[2]

[1]Nursing Faculty, VKNRL School of Nursing, Numaligarh, Golaghat, Assam, India
[2]Assistant Professor, Regional College of Nursing, Guwahati, Assam, India

ABSTRACT:

Cardiovascular diseases remain the leading cause of mortality worldwide, and Permanent Pacemaker Implantation (PPI) is a life-saving intervention for patients with cardiac conduction disorders. Despite advances in cardiac pacing technology, inadequate patient knowledge and unfavorable attitudes toward pacemakers may contribute to complications, anxiety, and poor adherence to recommended homecare practices.

Aim: To assess the knowledge and attitude of patients regarding Permanent Pacemaker Implantation (PPI) in selected hospitals of Kamrup (Metro), Assam, and to develop an information booklet based on identified educational needs.

Methodology: A quantitative descriptive survey design was employed. The study was conducted at the Cardiothoracic and Neuroscience Center, Gauhati Medical College and Hospital, Assam. A total of 74 patients awaiting PPI were selected using a non-probability consecutive sampling technique. Data were collected through a structured interview schedule comprising socio-demographic variables, a 24-item knowledge questionnaire, and a 14-item five-point Likert attitude scale. The reliability of the tools was established, with coefficients of 0.85 for the knowledge questionnaire (Spearman–Brown split-half method) and 0.74 for the attitude scale (Cronbach's alpha).

Analysis: Data were analyzed using descriptive and inferential statistics. Frequency, percentage, mean, and standard deviation were calculated to describe knowledge and attitude levels. Chi-square test was applied to determine associations between knowledge and selected socio-demographic variables, and Pearson's correlation coefficient was used to examine the relationship between knowledge and attitude.

Results: The findings revealed that the majority of patients had moderately adequate knowledge and moderately favorable attitudes toward PPI. A statistically significant association was observed between knowledge level and selected socio-demographic variables ($p < 0.05$). Furthermore, a moderate positive correlation was found between knowledge and attitude scores, indicating that improved knowledge was associated with more favorable attitudes.

Conclusion: The study concludes that although most patients demonstrated moderate levels of knowledge and attitude regarding PPI, gaps remain in awareness and perception. Structured educational interventions, such as information booklets and nurse-led teaching programs, are essential to enhance patient

understanding, promote positive attitudes, and improve adherence to post-implantation care practices, ultimately optimizing patient outcomes.

Keywords: Permanent pacemaker implantation; knowledge; attitude; cardiovascular disease; patient education; nursing intervention

INTRODUCTION:

Cardiovascular disease (CVD) remains the foremost global cause of mortality, accounting for nearly 20 million deaths annually and representing a substantial proportion of deaths due to non-communicable diseases worldwide.[1] According to the World Health Organization, CVD contributes to approximately 32% of all global deaths, with a disproportionately high burden in low- and middle-income countries. In India, the epidemiological transition over the past four decades has led to a dramatic rise in cardiovascular morbidity and mortality. Current estimates indicate that CVD accounts for nearly 60% of total deaths from non-communicable diseases and approximately 28% of overall mortality in the country.[2] Rapid urbanization, sedentary lifestyle, dietary transitions, tobacco use, diabetes, and hypertension have significantly contributed to this growing public health crisis.[3]

Among the various manifestations of CVD, cardiac conduction abnormalities such as complete heart block, sick sinus syndrome, and symptomatic bradyarrhythmias represent critical conditions requiring timely intervention. Permanent pacemaker implantation (PPI) has become a well-established and effective therapeutic modality for the management of these rhythm disorders.[4] Advances in cardiac pacing technology including dual-chamber systems, rate-responsive devices, and MRI-compatible pacemakers have significantly improved survival rates, symptom control, and functional capacity in affected patients.[5] Clinical guidelines from major cardiology societies recommend PPI as the definitive treatment for high-grade atrioventricular block and other symptomatic conduction disturbances.[6]

Although PPI is associated with improved prognosis and enhanced quality of life, the procedure introduces lifelong dependency on an implanted electronic device, which may generate psychological distress and uncertainty among patients. Studies have consistently shown that many pacemaker recipients possess inadequate knowledge regarding device functioning, battery longevity, activity restrictions, electromagnetic interference, and the importance of regular follow-up.[7] Lack of awareness regarding safety precautions such as the use of mobile phones, induction cooktops, metal detectors, and certain medical procedures like magnetic resonance imaging (MRI) often results in misconceptions and unnecessary anxiety.[8]

Furthermore, insufficient knowledge may negatively influence adherence to post-implantation care practices, thereby increasing the risk of complications such as lead displacement, wound infection, inappropriate activity restriction, and delayed reporting of symptoms.[9] Research also indicates that patients who demonstrate better understanding of their device tend to exhibit more favorable attitudes, improved coping mechanisms, and higher quality-of-life scores.[10]

Educational interventions, including structured teaching programs, counselling sessions, and information booklets, have been shown to significantly enhance patient knowledge, reduce misconceptions, and promote adherence to lifestyle modifications and follow-up regimens.[11] Nurse-led educational initiatives are particularly effective in addressing patient concerns, correcting misinformation, and facilitating psychological adjustment after implantation.[12] Despite the growing prevalence of pacemaker implantation

in India, especially in tertiary care centers, limited research has been conducted in the North Eastern region assessing patients' knowledge and attitudes toward PPI.

Given the increasing burden of cardiovascular diseases and the expanding use of permanent pacemakers, there is a pressing need to evaluate patient awareness and perceptions in this regional context. Therefore, the present study was undertaken to assess knowledge and attitude levels among patients awaiting Permanent Pacemaker Implantation and to develop an evidence-based information booklet to address identified gaps and improve patient outcomes.

OBJECTIVES:

1. To assess the level of knowledge of patients regarding Permanent Pacemaker Implantation.
2. To assess the level of attitude of patients regarding Permanent Pacemaker Implantation.
3. To determine the association between knowledge level and selected socio-demographic variables.
4. To determine the association between attitude level and selected socio-demographic variables.
5. To find the correlation between knowledge and attitude regarding PPI.
6. To develop and validate an information booklet on PPI care.

RESEARCH METHODOLOGY:

The research was carried out at the Cardiothoracic and Neuroscience Center of Gauhati Medical College and Hospital (GMCH), Assam. The accessible population comprised 74 patients who were admitted to the cardiology ward and scheduled for permanent pacemaker implantation. A non-probability consecutive sampling technique was employed to recruit the participants**.** The tool consists of three sections as follows:

SECTION I- Socio-demographic Proforma: This proforma was developed by the investigator which includes 13 items on demographic variables which includes age, gender, religion, type of family, place of residence, marital status, education, occupation, family income per month, sources of information, Medical diagnosis, family history of heart disease, family history of pacemaker implantation

SECTION II- Knowledge questionnaire related to Permanent Pacemaker Implantation: This section comprised of structured questionnaire for assessing the knowledge regarding Permanent Pacemaker Implantation (PPI) among patients.

It consists of 24 multiple choice questions and having one correct answer. Respondents were informed to reply only one answer for each question. The correct answer was given score 1 (one) and wrong answer was given a score of 0 (zero).

The knowledge scores were interpreted as inadequate=0-10, moderately adequate=11-19 and adequate=20-24

SECTION III-Attitude scale related to Permanent Pacemaker Implantation: It comprised of attitude scale on Permanent Pacemaker Implantation. A 5-point Likert Scale was formulated by the researcher to assess the attitude on Permanent Pacemaker Implantation. The tool consists of 14 items. Respondents were informed to reply on one response of the Likert Scale on each item. Each item was categorized and score as "Strongly agree=5, Agree=4, Undecided=3, Disagree=2, strongly disagree= 1 for positive statements and for negative statements score is reverse.

RESULTS:

Table1: Frequency and percentage distribution of the patients according to their ages.

AGE	FREQUENCY (f)	PERCENTAGE (%)
41-50 years	3	4%
51-60 years	32	43%
60-70 years	39	53%
Total	74	100

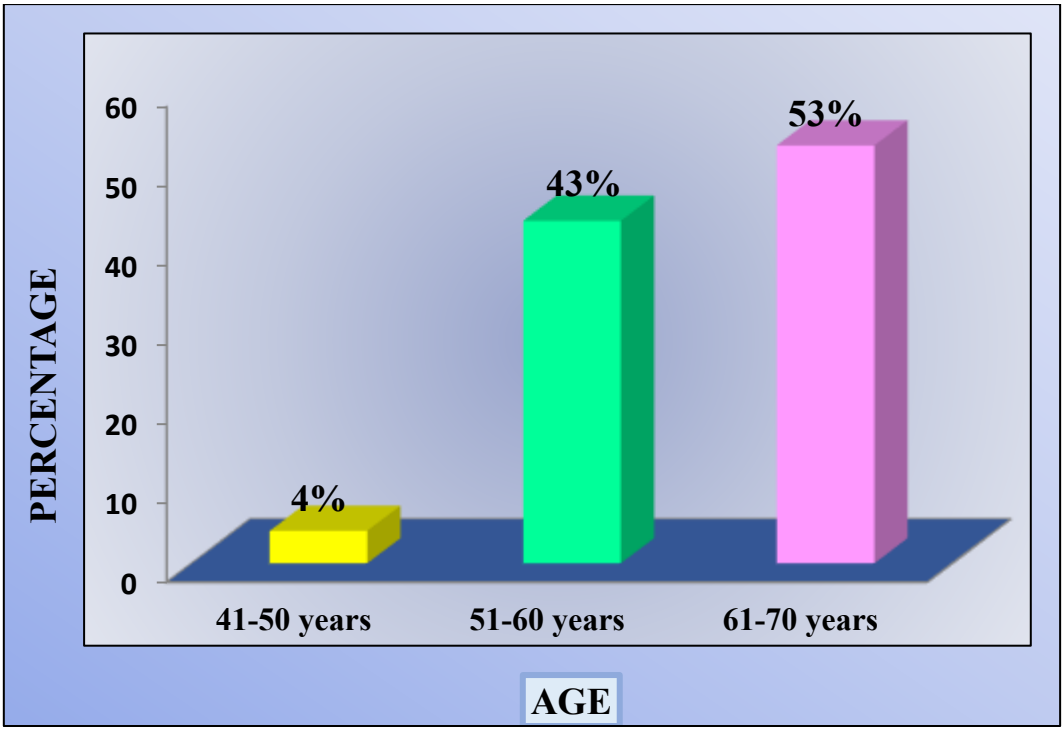

Figure 1: BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO THEIR AGE.

TABLE 1.2
FREQUENCY AND PERCENTAGE DISTRIBUTION THE PATIENTS ACCORDING TO THEIR GENDER
n=74

GENDER	FREQUENCY(f)	PERCENTAGE (%)
Male	38	51%
Female	36	49%
Total	74	100

Table 1.2 shows that majority of the patients i.e., 38 (51%) are males and 36 (49%) were females.

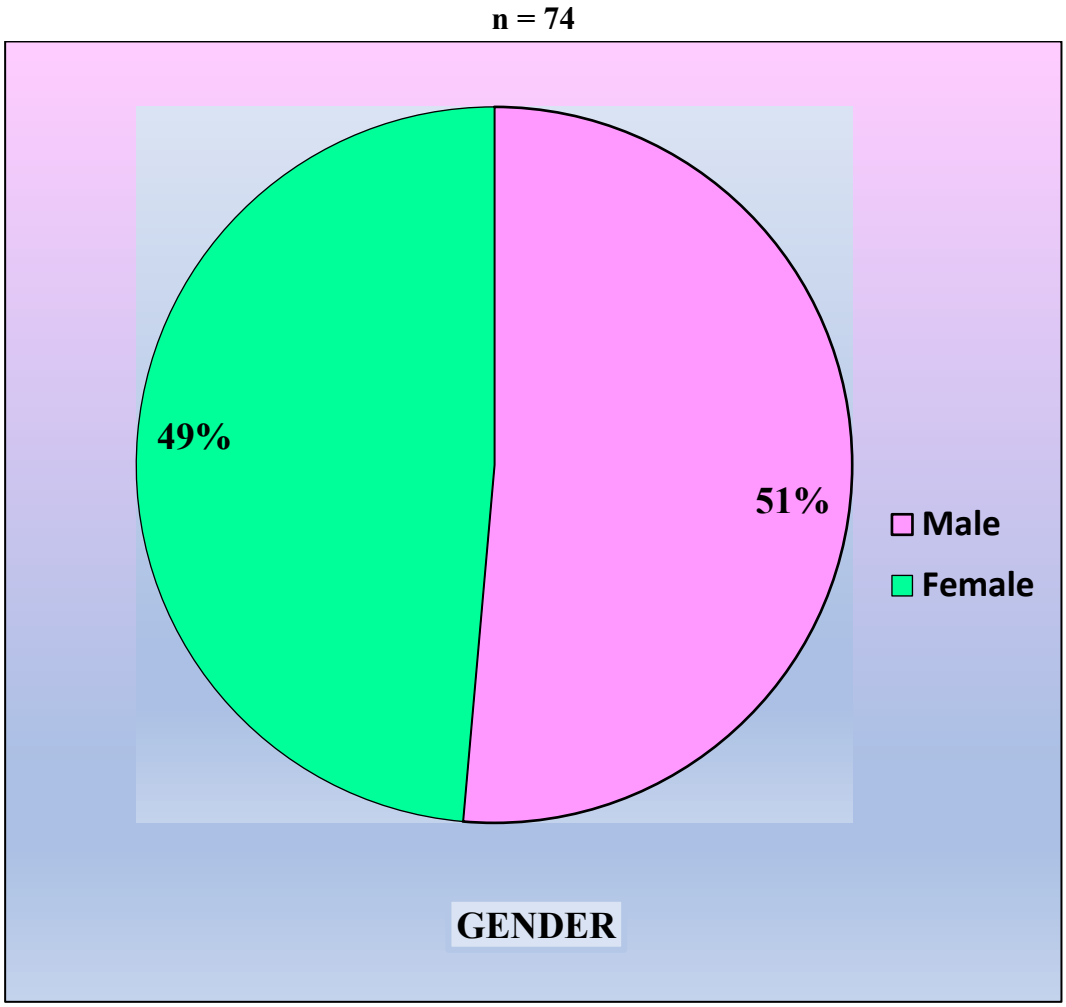

FIGURE 4
PIE DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO GENDER.

TABLE 1.3
FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS ACCORDING TO THEIR RELIGION
n=74

RELIGION	FREQUENCY (f)	PERCENTAGE (%)
Hinduism	44	60%
Islam	17	23%
Christianity	13	17%
Total	74	100

Table 1.3 shows that majority of the patients i.e., 44(60%) belongs from Hinduism and 17 (23%) from Islam religion and 13(17%) belongs from Christian religion.

n= 74

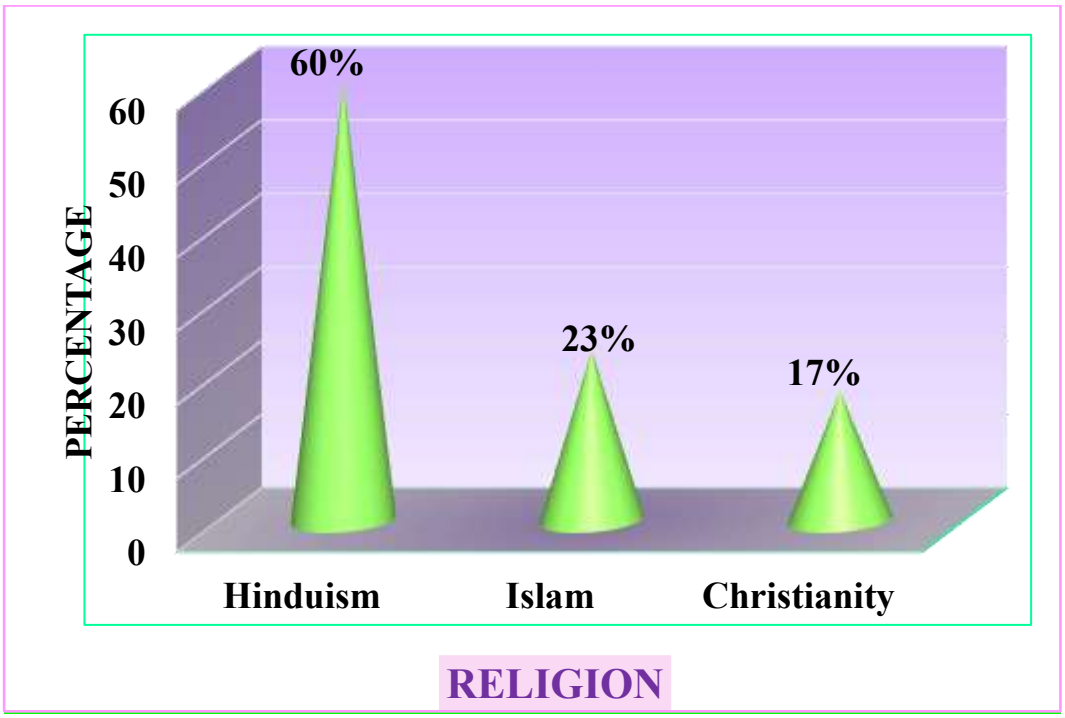

FIGURE 5
CONE DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO RELIGION

TABLE 1.4
FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS ACCORDING TO TYPE OF FAMILY
n=74

TYPE OF FAMILY	FREQUENCY (f)	PERCENTAGE (%)
Nuclear family	51	69%
Joint family	23	31%
Total	74	100

Table 1.4 shows that majority of the patients i.e., 51 (69%) belonged to nuclear family and 23 (31%) from joined family.

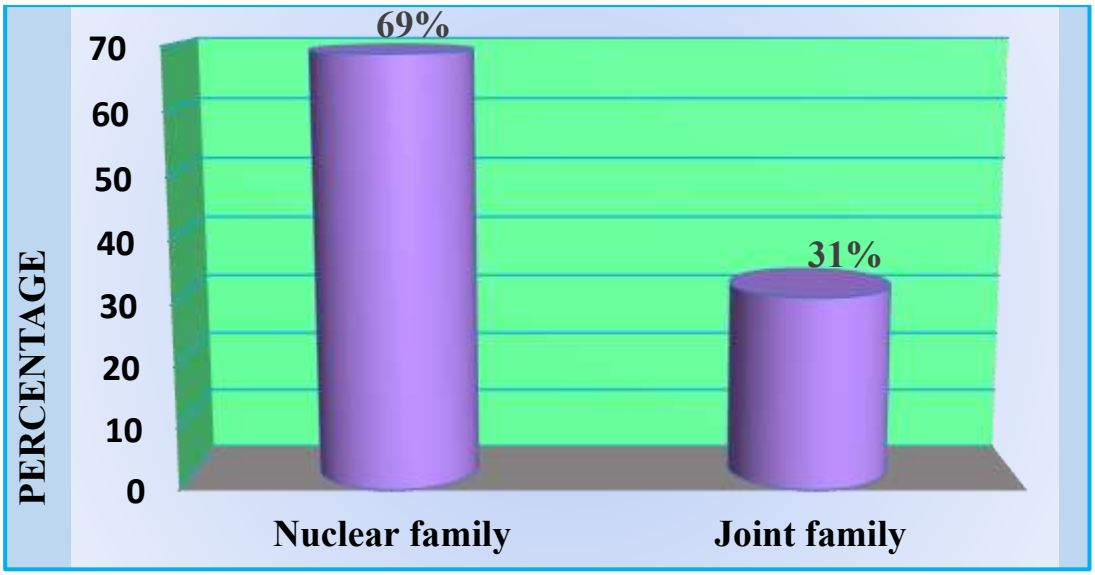

FIGURE 6
BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO TYPE OF FAMILY

TABLE 1.5
FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS ACCORDING TO THEIR AREA OF RESIDENCE.
n=74

RESIDENCE	FREQUENCY (f)	PERCENTAGE (%)
Urban	34	46%
Rural	40	54%
Total	74	100

Table 1.5 depicts that majority of the patients 40 (54%) belongs from rural area and 34 (46%) patients from urban area.

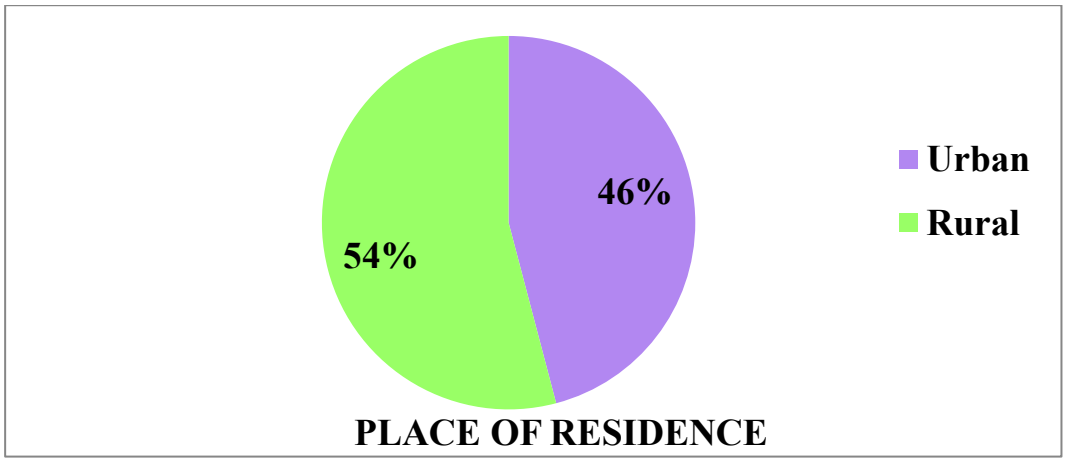

FIGURE 7 PIE DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO PLACE OF RESIDENCE

TABLE 1. 6
FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS IN TERMS OF THEIR MARITAL STATUS
n=74

MARITAL STATUS	FREQUENCY (f)	PERCENTAGE (%)
Unmarried	7	10%
Married	59	80%
Divorced/ Separated	1	1%
Widower	7	9%
Total	74	100

Table 1.6 shows that the majority of the patients, 59 (80%), were married, while 7 (10%) were unmarried, another 7 (9%) were widowed, and 1 (1%) was divorced.

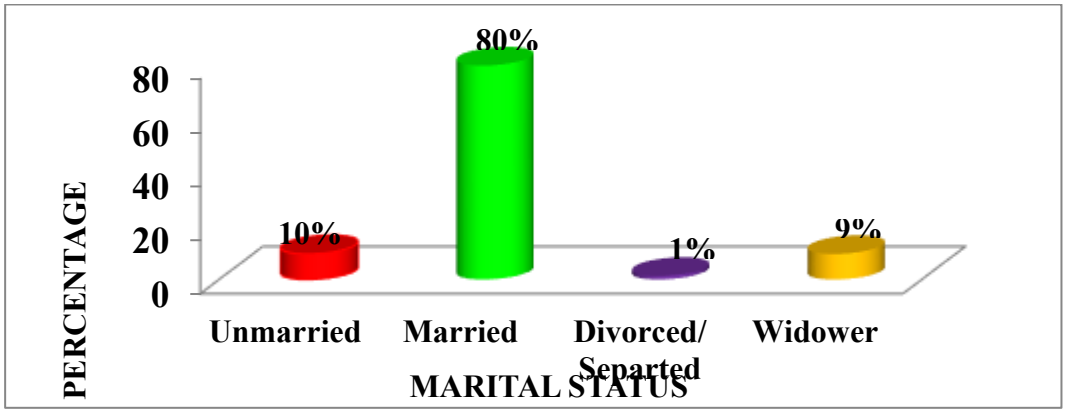

FIGURE 8
BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO MARITAL STATUS

Table 1.7
FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS IN TERMS OF EDUCATION
n=74

EDUCATION	FREQUENCY (f)	PERCENTAGE (%)
No formal education	9	12%
Can read and write	18	24%
Primary school	23	31%
Up to 10^{th} / Matriculation	16	22%
High secondary	7	10%
Graduate and above	1	1%
Total	74	100

Table 1.7 shows the educational status of the patients: 23 (31%) had completed up to primary school, 18 (24%) could read and write, 16 (22%) had finished up to class 10/matriculation, 9 (12%) had no formal education, 7 (10%) had attained higher secondary education, and 1 (1%) was a graduate.

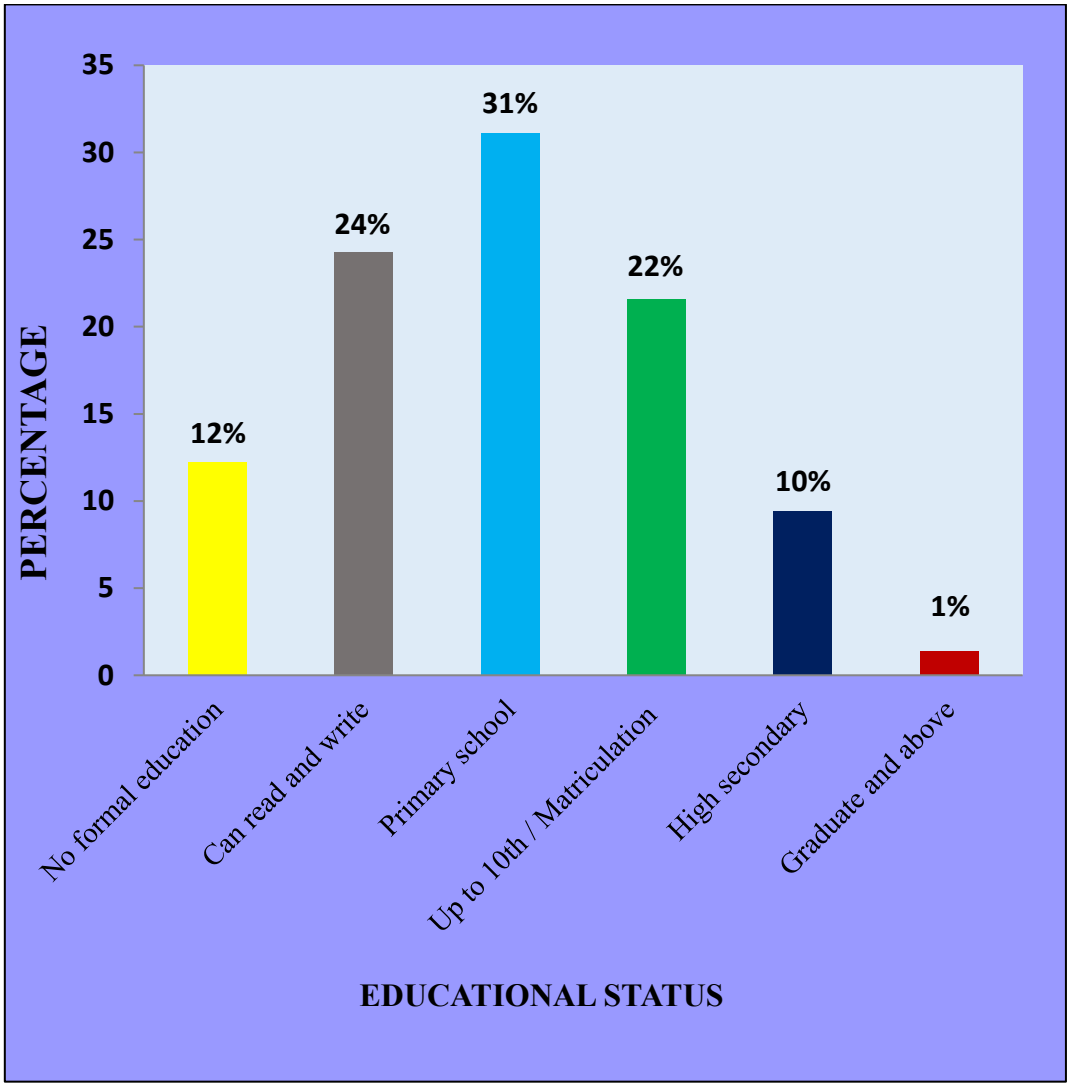

FIGURE 9
BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO EDUCATIONAL STATUS

Table 1.8
FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS ACCORDING TO THEIR OCCUPATIONAL STATUS
n=74

OCCUPATIONAL STATUS	FREQUENCY (f)	PERCENTAGE (%)
Unemployed	6	8%
Daily wager/ earner	7	9%
Homemaker	32	43%

Retired	11	15%
Private job	9	12%
Self employed	9	12%
Total	74	100

Table 1.8 shows that most patients are homemakers, accounting for 32 (43%). Additionally, 11 (15%) are retired employees, 9 (12%) work in private jobs, 9 (12%) are self-employed, 7 (9%) are daily wage earners, and 6 (8%) are unemployed. There are no government employees among the patients.

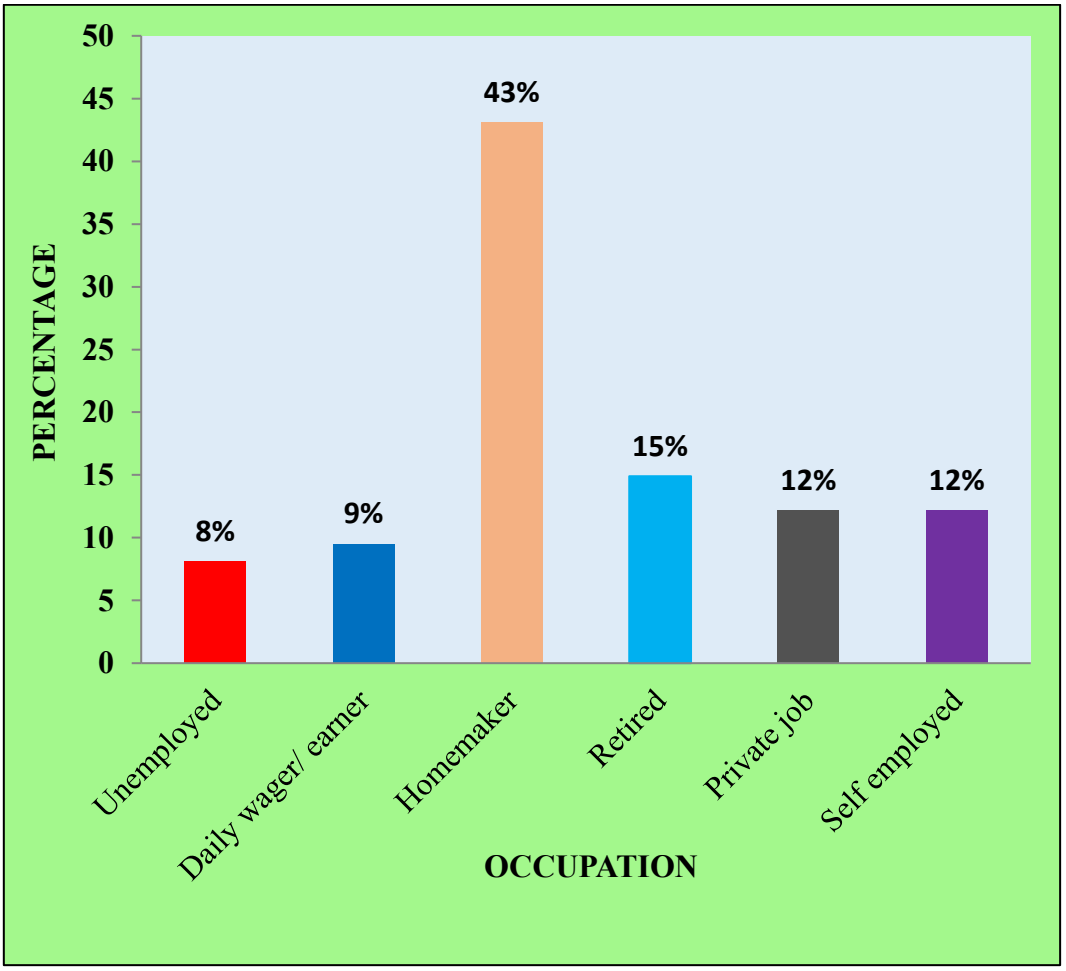

FIGURE 10
BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO OCCUPATION

Table 1. 9
FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS IN TERMS OF MONTHLY FAMILY INCOME
n=74

FAMILY INCOME IN RUPEES	FREQUENCY (f)	PERCENTAGE (%)
≤ 9,307	7	10%

9,308 - 27,882	37	50%
27,883 - 46,474	21	28%
46,475 – 68,534	7	10%
68,535 – 92,950	1	1%
92, 951 – 185,894	1	1%
Total	74	100

Table 1.9 shows that the majority of patients, 37 (50%), had a monthly family income ranging from Rs. 9,308- 27,882. Additionally, 21 (28%) had an income between Rs. 27,883- 46,474, while 7 (10%) had incomes between Rs. 46,475- 68,534, and another 7 (10%) earned Rs. 9,307 or less. One patient (1%) had an income between Rs. 68,535- 92,950, and another (1%) had a family income of Rs. 92,951-185,894. No patients had a family income of Rs. 185,895 or more.

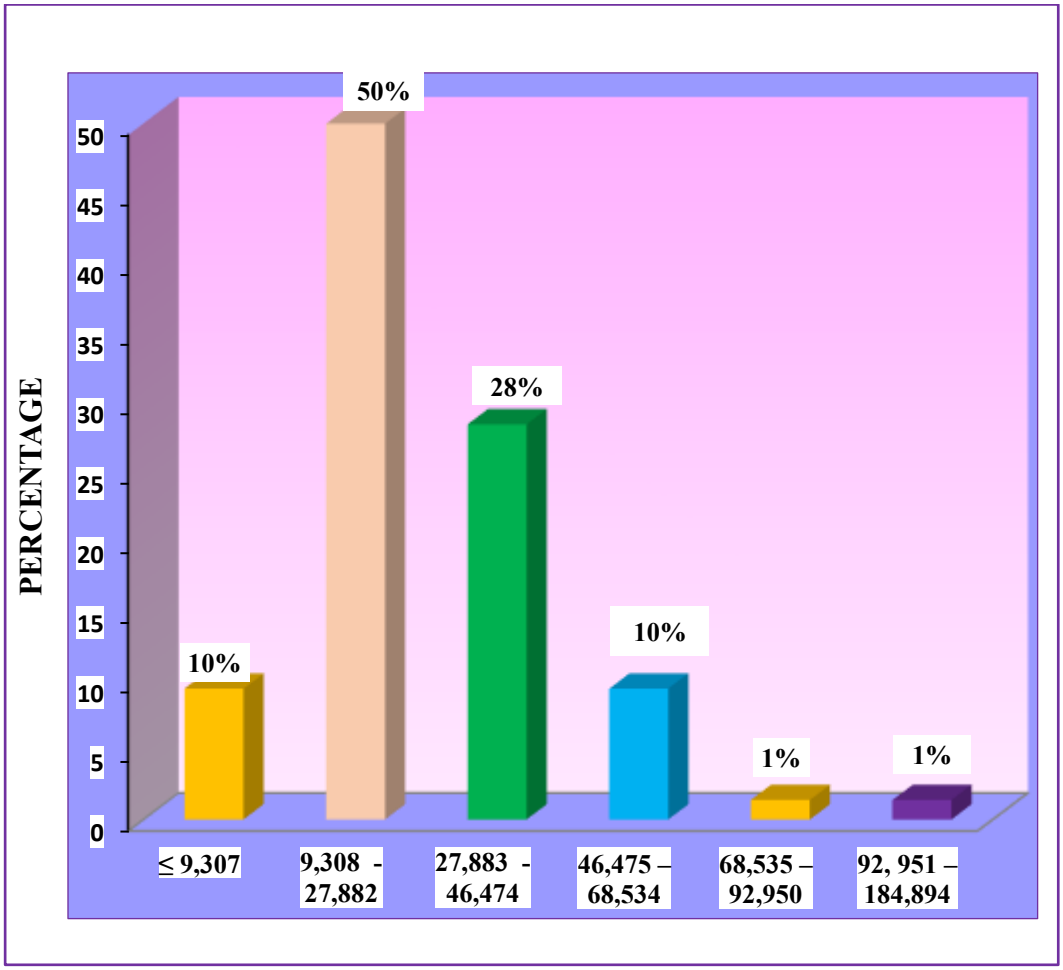

FIGURE 11
BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO FAMILY INCOME PER MONTH IN RUPEES.

TABLE 1.10 (a) FREQUENCY AND PERCENTAGE DISTRIBUTION BASED ON THE AVAILABILITY OF INFORMATION SOURCES REGARDING PERMANENT PACEMAKER IMPLANTATION (YES/NO)

n=74

SOURCE OF INFORMATION(Yes/No)	FREQUENCY (f)	PERCENTAGE (%)
Yes	74	100%
No	0	0%
Total	74	100

Table 1.10(a) shows that all of the patients previously had a source of information.

TABLE 1.10 (b) FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS IN TERMS OF SOURCE OF INFORMATION

n=74

SOURCE OF INFORMATION	FREQUENCY (f)	PERCENTAGE (%)
Health personnel	42	57%
Family members/ friends/ relatives	21	28%
Electronic media	6	8%
Print media	5	7%
Total	74	100

Table 1.10(b) shows that the majority of the sources of information came from health personnel, accounting for 42 (57%). Additionally, 21 (28%) reported family members, friends, or relatives as sources; 6 (8%) cited electronic media; and 5 (7%) referred to print media.

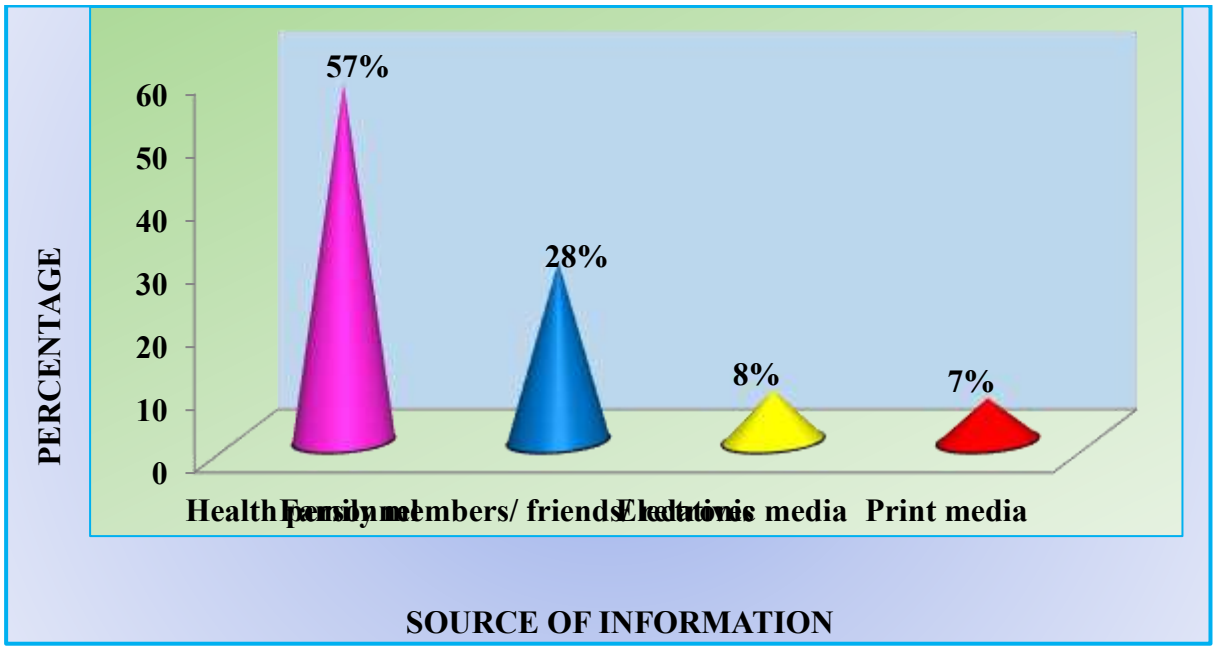

FIGURE 12

CONE DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF SOURCE OF INFORMATION OF PATIENTS

TABLE 1. 11
FREQUENCY AND PERCENTAGE DISTRIBUTION OF PATIENTS IN TERMS OF MEDICAL DIAGNOSIS
n=74

MEDICAL DIAGNOSIS	FREQUENCY (f)	PERCENTAGE (%)
ACS	1	1%
AV Block	1	2%
BFHB	3	4%
CHB	60	81%
DCMP	1	1%
LBBB	3	4%
RBBB	3	4%
Sick Sinus Syndrome	2	3%
Total	74	100

Table 1.11 shows that the majority of patients, 60 (81%), had CHB, while 3 (4%) had BFHB, 3 (4%) had LBBB, 3 (4%) had RBBB, 2 (3%) had Sick Sinus Syndrome, 1 (1%) had DCMP, 1 (2%) had an AV block, and 1 (1%) had ACS.

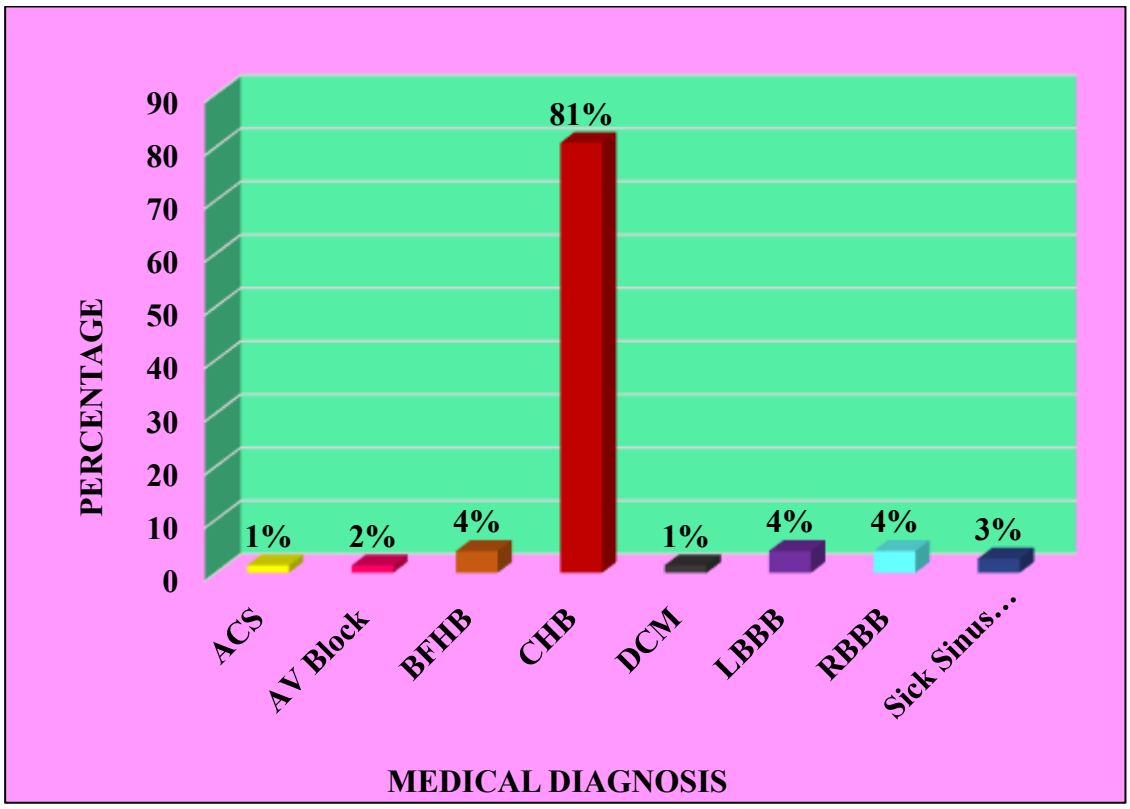

FIGURE 13
BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF MEDICAL DIAGNOSIS OF THE PATIENTS

TABLE 1. 12
FREQUENCY AND PERCENTAGE DISTRIBUTION OF FAMILY HISTORY OF PATIENTS IN TERMS OF HEART DISEASE
n=74

FAMILY HISTORY OF HEART DISEASE	FREQUENCY (f)	PERCENTAGE (%)
Yes	39	53%
No	35	47%
Total	74	100

Table 1.12 shows that the majority of patients, 39 (53%), had a family history of heart disease, while 35 (47%) did not have such a history.

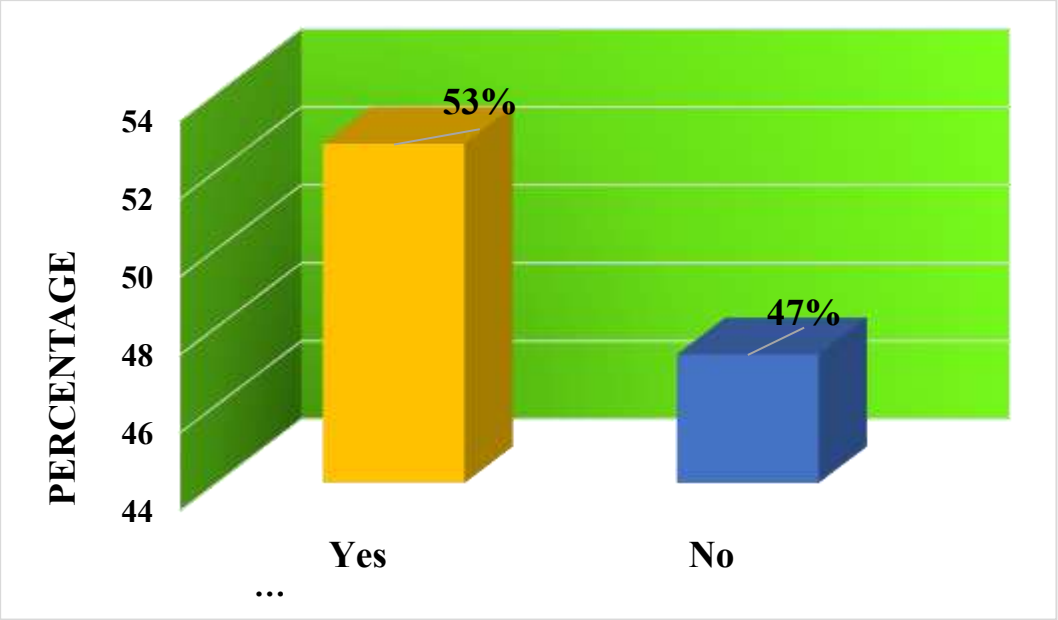

FIGURE 14
BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO FAMILY HISTORY OF HEART DISEASE

TABLE 1.13
FREQUENCY AND PERCENTAGE DISTRIBUTION OF FAMILY HISTORY OF PACEMAKER IMPLANTATION OF PATIENTS
n=74

FAMILY HISTORY OF PACEMAKER IMPLANTATION	FREQUENCY (f)	PERCENTAGE (%)
Yes	21	28%
No	53	72%
Total	74	100

Table 1.13 shows that the majority of patients, 53 (72%) had no family history of pacemaker implantation, while 21 (28%) had a family history of pacemaker implantation.

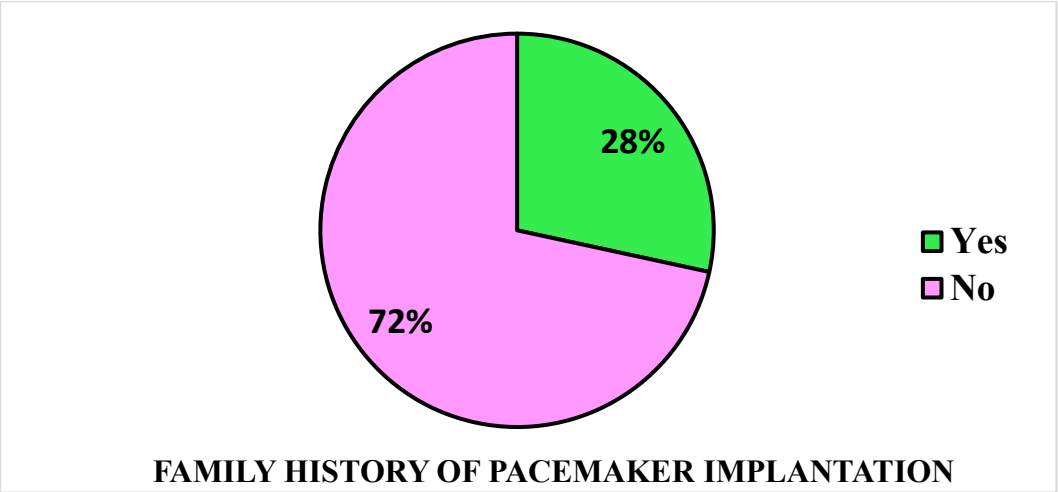

FIGURE 15
PIE DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF THE PATIENTS ACCORDING TO FAMILY HISTORY OF PACEMAKER IMPLANTATION

SECTION II: Findings related to level of knowledge of Patients regarding Permanent Pacemaker Implantation

This section presents data regarding the level of knowledge of Patients regarding Permanent Pacemaker Implantation. The knowledge of patients regarding Permanent Pacemaker Implantation was assessed through structured interview schedule consisting of 24 items. The maximum score is 24 and minimum is 0. Out of which score was statistically categorized as:

- **Adequate =** (> Mean +Standard Deviation) i.e., 20-24,
- **Moderately adequate**= (Mean- Standard Deviation) to (Mean + Standard Deviation) i.e. 11-19
- **Inadequate** = <Mean-Standard Deviation i.e., 0-10

TABLE 1.1
FREQUENCY AND PERCENTAGE DISTRIBUTION OF LEVEL OF KNOWLEDGE OF PATIENTS REGARDING PERMANENT PACEMAKER IMPLANTATION
n = 74

LEVEL OF KNOWLEDGE	FREQUENCY (F)	PERCENTAGE (%)	SCORE RANGE	MEDIAN	MODE	MEAN	SD
Inadequate knowledge (0-10)	8	11%	6-22 16	15	18	15.10	3.837
moderately adequate knowledge (11-19)	56	76%					
adequate knowledge (20-24)	10	13%					

Total	**74**	**100**

Table 1.14 shows that the majority of patients, 56 (76%), have moderately adequate knowledge regarding Permanent Pacemaker Implantation. Additionally, 10 (13%) have adequate knowledge, while 8 (11%) have inadequate knowledge. The mean score is 15.10, with a standard deviation of 3.837 and a score range of 16, where 6 is the lowest score and 22 is the highest among the respondents.

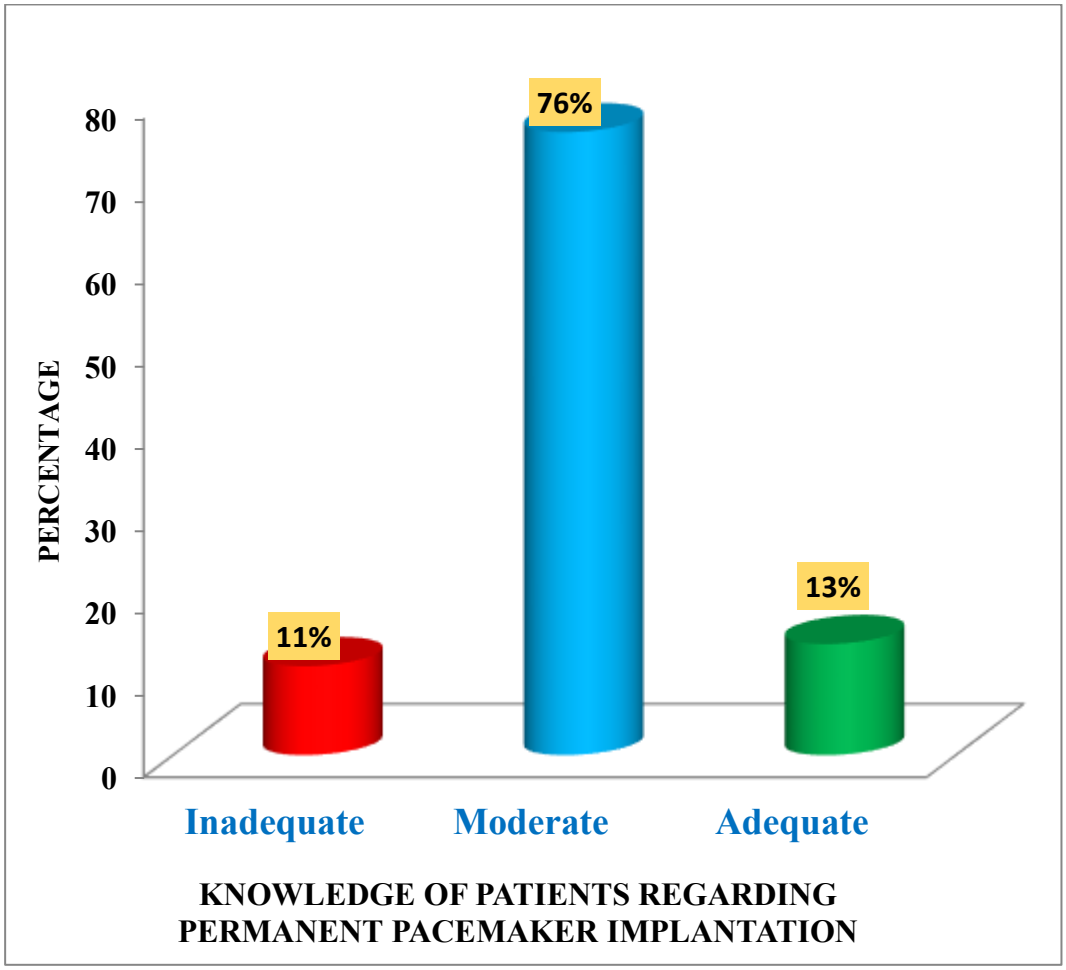

FIGURE 17
BAR DIAGRAM REPRESENTING PERCENTAGE DISTRIBUTION OF LEVEL OF KNOWLEDGE REGARDING PERMANENT PACEMAKER IMPLANTATION

SECTION III: FINDINGS RELATED TO LEVEL OF ATTITUDE OF PATIENTS REGARDING PERMANENT PACEMAKER IMPLANTATION

This section presents data regarding the level of attitude on Permanent Pacemaker Implantation among 74 patients. The attitude of patients regarding Permanent Pacemaker Implantation was assessed through structured interview schedule. It consists of 14 questionnaires in which 8 are positive statements and 6 were negative statements.

The attitude items are scored by 5-point Likert scale. The maximum possible score is 70 and minimum is 14. Out of which attitude score was statistically categorized as:

- **Favourable** (> Mean + Standard Deviation) i.e., 54-70,
- **Moderately favourable** = (Mean-Standard Deviation) to (Mean + Standard Deviation) i.e., 37-53

- **Unfavourable** = < Mean – Standard Deviation i.e., 14-36

TABLE 1.15
FREQUENCY AND PERCENTAGE DISTRIBUTION OF LEVEL OF ATTITUDE OF PATIENTS REGARDING PERMANENT PACEMAKER IMPLANTATION
n=74

Level of attitude	frequency (f)	percentage (%)	Score range	Median	Mode	Mean	SD
Unfavourable attitude (14-36)	25	34%	21-60 39	46	45	45.18	7.690
Moderately favourable attitude (37-53)	39	53%					
Favourable attitude (54-70)	10	13%					
Total	74	100					

Table 1.16 shows that majority of the patients i.e., 39 (53%) have moderately favorable attitude regarding Permanent Pacemaker Implantation**,** 25 (34%) of the patients have unfavorable attitude and rest 10 (13%) have favorable attitude regarding Permanent Pacemaker Implantation. The mean score is 45.18, SD 7.690 and score range is 39 with 21 being the lowest and 60 being the highest score of the respondents.

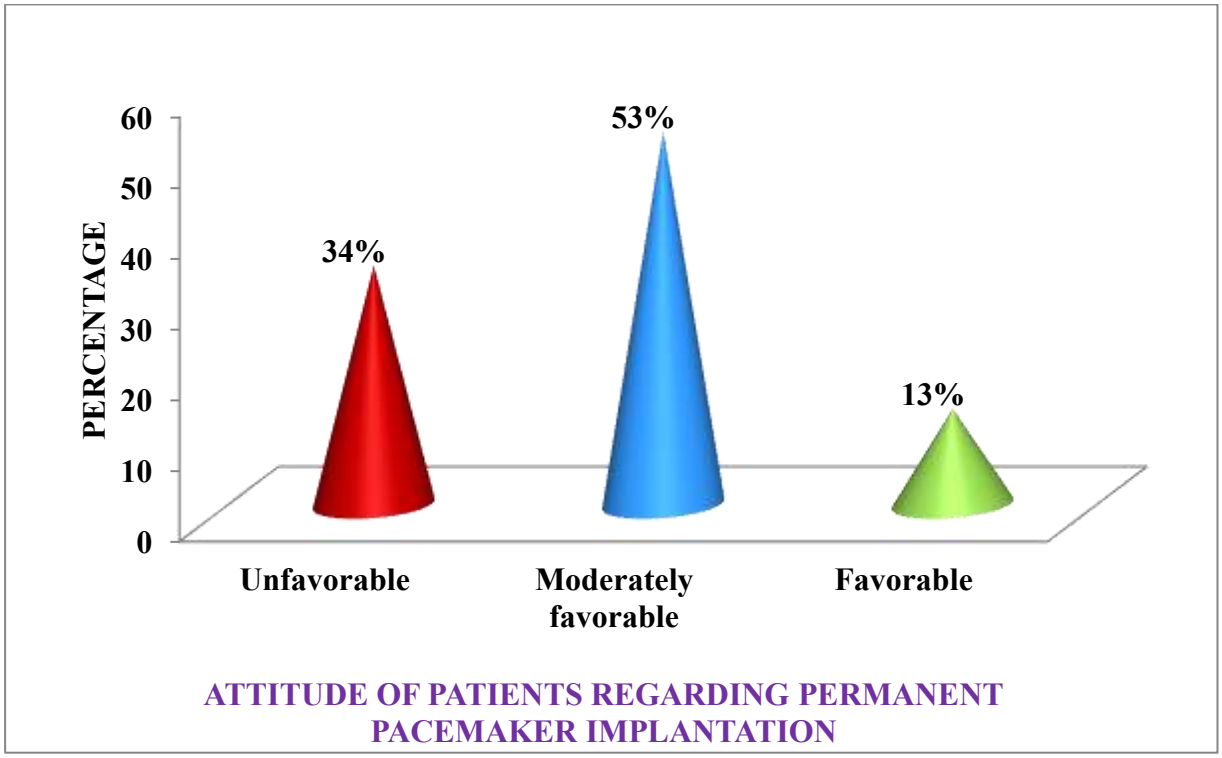

FIG 17
CONE DIARAM REPRESENTING PERCENTAGE DISTRIBUTION OF LEVEL OF ATTITUDE OF PATIENTS REGARDING PERMANENT PACEMAKER IMPLANTATION.

DISCUISSION:

The study was conducted to assess the knowledge and attitude of Patients regarding Permanent Pacemaker Implantation in selected hospitals of Kamrup (M) Assam with a view to develop an Information Booklet. The following conclusions are drawn from the study's findings:

- Majority of the patients had moderately adequate knowledge and moderately favorable attitude regarding Permanent Pacemaker Implantation
- Significant association was found between knowledge and selected sociodemographic variables such as place of Residence, Source of information and family history of heart disease.
- Significant association was found between attitude and selected sociodemographic variables such as age and education.
- Significant correlation was found between knowledge and attitude regarding Permanent Pacemaker Implantation
- Based on the findings of the present study, it is found that only 10(13.5%) have adequate knowledge and 10 (13.5%) have favorable attitude regarding Permanent Pacemaker Implantation. Therefore, to increase the knowledge and to develop a positive attitude regarding Permanent Pacemaker Implantation among patients, an information booklet was made by the investigator. The study findings had brought out the gaps that exist in the patients' knowledge. So conscious effort need to be taken by the nurses to provide appropriate strategies and adequate information on such life –saving devices in order to improve knowledge and attitude of patients regarding Permanent Pacemaker Implantation.

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