

## RESEARCH ARTICLE

## ANXIETY AND DEPRESSION IN PATIENTS WITH PERMANENT CARDIAC PACEMAKER

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### Abstract

**Objective:** To explore factors associated with anxiety and depression of patients with permanent cardiac pacemaker. **Material and methods:** The study sample consisted of 230 patients with a pacemaker who visited for check a public hospital outpatient department. Data collection was conducted using a questionnaire which included patients' characteristics and the "Hospital Anxiety and Depression Scale" (HADS). **Results:** High levels of anxiety and depression were observed in 26.9% and 14.1% of the sample, respectively. Regarding anxiety, a statistically association was observed between anxiety levels and gender ( $p < 0.001$ ), age ( $p = 0.040$ ), number of children ( $p = 0.042$ ), existence of a family member with pacemaker ( $p = 0.050$ ), patients degree of information about their health ( $p = 0.013$ ) and finally the degree of family's information ( $p = 0.027$ ). In terms of depression, a statistically significant association was observed between depression levels and gender ( $p = 0.002$ ), age ( $p = 0.001$ ), marital status ( $p = 0.012$ ), existence of other family member with health problem ( $p = 0.034$ ) or with pacemaker ( $p = 0.003$ ), patients information about their health ( $p = 0.006$ ) and the relation with nursing staff ( $p = 0.001$ ). **Conclusions:** It is important to assess patients' characteristics when implementing strategies to confront with psychiatric disorders in this vulnerable population group.

**Keywords:** anxiety-depression, pacemaker

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## ΕΡΕΥΝΗΤΙΚΟ ΑΡΘΡΟ

## ΑΓΧΟΣ ΚΑΙ ΚΑΤΑΘΛΙΨΗ ΑΣΘΕΝΩΝ ΜΕ ΜΟΝΙΜΟ ΒΗΜΑΤΟΔΟΤΗ ΚΑΡΔΙΑΣ

Αγγελική Μαμουρέλη, Φωτούλα Μπαμπάτσικου, Παναγιώτα Φλεβάρη, Διονύσιος Λευθεριώτης, Εμμανουήλ Φραγκιαδάκης, Μαρία Πολυκανδριώτη

Μεταπτυχιακό Πρόγραμμα Σπουδών: «Εργαστηριακή και Κλινική Νοσηλευτική Καρδιολογία» Τμήμα Νοσηλευτικής της Σχολής Επαγγελματιών Υγείας και Πρόνοιας του ΤΕΙ Αθήνας

### Περίληψη

**Σκοπός:** Η διερεύνηση των παραγόντων που σχετίζονται με το άγχος και την κατάθλιψη ασθενών με μόνιμο βηματοδότη καρδιάς. **Υλικό και Μέθοδος:** Το δείγμα μελέτης αποτέλεσαν 230 ασθενείς με βηματοδότη που προσέρχονταν για έλεγχο σε εξωτερικό ιατρείο δημόσιου νοσοκομείου. Για τη συλλογή των δεδομένων συμπληρώθηκε ερωτηματολόγιο το οποίο περιελάμβανε τα χαρακτηριστικά των ασθενών και την κλίμακα "The Hospital Anxiety and Depression Scale" (HADS). **Αποτελέσματα:** Υψηλά επίπεδα άγχους και κατάθλιψης παρατηρήθηκαν στο 26,9% και 14,1% του δείγματος, αντίστοιχα. Όσον αφορά το άγχος, παρατηρήθηκε στατιστικά σημαντική συσχέτιση μεταξύ των επιπέδων του άγχους και του φύλου ( $p < 0.001$ ), της ηλικίας ( $p = 0.040$ ), του αριθμού των παιδιών ( $p = 0.042$ ), της ύπαρξης άλλου μέλους της οικογένειας με βηματοδότη ( $p = 0.050$ ), του βαθμού πληροφόρησης των ασθενών για την υγεία τους ( $p = 0.013$ ) και του βαθμού πληροφόρησης των μελών της οικογένειας ( $p = 0.027$ ). Σχετικά με την κατάθλιψη, παρατηρήθηκε στατιστικά σημαντική συσχέτιση μεταξύ των επιπέδων κατάθλιψης και του φύλου ( $p = 0.002$ ), της ηλικίας ( $p = 0.001$ ), της οικογενειακής κατάστασης ( $p = 0.012$ ), της ύπαρξης άλλου μέλους στην οικογένεια με πρόβλημα καρδιάς ( $p = 0.034$ ) ή με βηματοδότη ( $p = 0.003$ ), της πληροφόρησης των ασθενών ( $p = 0.006$ ) και της σχέσης με το νοσηλευτικό προσωπικό ( $p = 0.001$ ). **Συμπεράσματα:** Είναι σημαντικό να αξιολογούνται τα χαρακτηριστικά των ασθενών κατά την υλοποίηση προγραμμάτων αντιμετώπισης των ψυχικών διαταραχών στην ευαίσθητη αυτή πληθυσμιακή ομάδα.

**Λέξεις κλειδιά:** άγχος, κατάθλιψη, βηματοδότης

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## Introduction

About 3 million people worldwide have a pacemaker and about 600 thousand pacemakers are implanted annually.<sup>1,2</sup> Given population ageing and increase of cardiovascular disease, the number of patients undergoing pacemaker implantation is constantly increasing.<sup>3-6</sup> The vast majority (>80%) of pacemakers are implanted in the elderly.<sup>2</sup>

This life-saving device in treatment of life threatening arrhythmia implies significant burden on patients such as difficulties in work and activities, psychic anxiety, loss of energy and insomnia.<sup>3</sup> Indeed, patients with pacemaker often experience various financial, physical and social problems that may trigger the onset of emotional disorders. Implantation of pacemaker implies a number of tasks for patients such as modifying their prior activities, adopting a new way of living and following treatment including regular monitoring of the device.<sup>3-6</sup>

It is conceivable that patients experiencing anxiety and depression may not be able to cope with all of the above challenges in their lives. Though anxiety and depression have a prevalence ranging from 15% up to 50% in cardiac patients,<sup>6</sup> however, there are still many difficulties in assessing this co morbidity in patients with pacemaker as a part of everyday clinical practice. Possibly, health professionals often fail to recognize these needs or to take the necessary steps only when patients complain. On the other hand, patients themselves may be reluctant to reveal such problems as they pay more attention to the device.<sup>7-9</sup>

Unrecognized anxiety and depression may have devastating effects on the outcome of the disease, such as frequent hospital

readmissions, longer hospital stays and failure to adhere to treatment.<sup>3-6</sup> Knowing variables affecting anxiety and depression will help healthcare professionals to promote psychiatric health of this increasing portion of the population.

The present study has been conducted with the aim of exploring factors associated with anxiety and depression in patients living with a pacemaker.

## Material and method

### Study population

The sample of the study consisted of 230 patients who had a pacemaker (149 men and 81 women). This sample was a convenience sample. The study sample consisted of 230 patients with a pacemaker who visited a hospital outpatient department. Criteria for inclusion of patients in the study were: a) good comprehension of Greek language and b) having permanent implanted pacemaker.

Data collection was performed using a questionnaire developed by the researchers so as to fully serve the purposes of the study. Data collected for each patient included: socio-demographic characteristics (eg, gender, age, education level, marital status, number of children, etc.), clinical characteristics (eg, when the symptoms started, co-existence of other disease, adherence to treatment guidelines, etc.), and finally relations with the medical-nursing staff or other patients.

### Assessment of Anxiety - Depression

For the evaluation of patients' mental health (depression and anxiety) the "Hospital Anxiety And Depression Scale (HADS)" was used. This scale was proposed in 1983 by Zigmond AS & Snaith RP.<sup>10</sup>

The scale consists of 14 questions that assess how patients felt during the previous week. Patients are able to answer every question in a 4-point Likert scale from 0-3. Seven of 14 questions assess the level of depression and the other seven evaluate the anxiety level. Scores attributed to questions are summed separately for anxiety and depression, leading to two scores with range 0-21. Higher score indicate higher levels of anxiety and depression, respectively. In addition, it has been proposed and it is widely used in the literature, the following categorization: score 0-7 indicating no anxiety or depression, score 8-10 indicating moderate levels of anxiety or depression, and score > 11 indicating high levels of anxiety or depression. The scale HADS has been translated and was tested for its validity and reliability from Mystakidou et al, the 2004.<sup>11</sup>

### Statistical Analysis

Categorical variables are presented with absolute and relative frequencies (%), whereas quantitative variables are presented with median and interquartile range since normality did not hold (tested with kolmogorov-smirnof test and graphically with Q-Q plot). To evaluate the association between levels of anxiety/depression and patient's characteristics the Chi-square test of independence was used. Multinomial logistic regression was performed to estimate the effect of patient's characteristics on the levels of anxiety/depression (dependent variable). Results are presented with Odds Ratio (OR) and 95% confidence intervals. The level of statistical significance was set to  $\alpha=5\%$ . The analysis was performed with the statistical package SPSS, version 20 (SPSS Inc, Chicago, IL, USA).

### Limitations of the study

Some limitations must be considered when interpreting the present results. First, causation cannot be inferred since the findings merely support the association between anxiety and depression in pacemaker and several demographic, clinical and other self reported variables. Next, the use of a convenience sample from a single hospital limits the ability to generalize to all patients.

### Ethical considerations

The study was approved by the Ethical Committee where it was conducted. Patients who met the entry criteria in the study were informed by the researchers for the purposes of this research. All patients participated only after they had given their written consent. Data collection guaranteed anonymity and confidentiality. All subjects had been informed of their rights to refuse or discontinue participation in the study, according to the ethical standards of the Declaration of Helsinki (1989) of the World Medical Association.

### Results

#### Sample description

Men accounted for the 64.8% of the sample, while about half of the sample was over 70 years of age. Of the 230 patients, 63.9% were married, 44.2% had primary school education and 56.4% of patients had 2 children. Moreover, 16.1% of the patients had implanted the pacemaker before 50 years of age and for the 21% the symptoms had started under the age of 50. About 70% had a DDD pacemaker (dual chamber pacemaker) while 30.3% had VVI (the first letter indicates the chamber of the heart being paced : Ventricle, the second letter the heart chamber being sensed :Ventricle and

the third letter indicates how the device should respond when it senses a cardiac event: Inhibited).

Over half the sample (56.8%) suffered from another disease, 51.7% had another family member with a heart problem and 20.5% had another family member with a pacemaker. The majority of the sample stated that they were well informed about their heart problem (46.3%). Moreover, 76.9% stated that they followed strictly the orders of the therapeutic regimen. Lastly, the majority of the patients had very good relations with the nursing and medical staff (82.3% and 83%, respectively) and 23.5% had relations with other patients of the same group. (Appendix Tables A1 and A2).

### **Levels of Anxiety and depression**

Table 1 presents the results concerning the levels of anxiety and depression of patients with a pacemaker. Results showed that the 60.1% and 69.0% of patients reported low levels of anxiety and depression, respectively. High levels of anxiety and depression were observed in 26.9% and 14.1% of the sample, respectively.

### **Characteristics associated with anxiety and depression**

Tables 2-3 present the association between patients' characteristics and the levels of anxiety and depression, respectively.

A statistically significant association was observed between anxiety levels and gender ( $p < 0.001$ ), age ( $p = 0.040$ ), number of children ( $p = 0.042$ ), whether there was another family member with a pacemaker ( $p = 0.050$ ), the degree of information patients had for their state of health ( $p = 0.013$ ) and whether family members were well informed ( $p = 0.027$ ). More specifically,

women had more frequently high levels of anxiety (41.8%) than men (18.8%). Similarly, patients aged 50-70 had more frequently high levels of anxiety (35.5%) than patients aged  $< 50$  years (17.1%) and those aged  $> 70$  years (24.1%). Patients with none or one child also had more frequently high levels of anxiety (37.9%) than those with more than one child (21.6%). Those with another family member with a pacemaker had more frequently high levels of anxiety (37.8%) than others (23.7%). In addition, patients who stated that they were well informed about their health problem or reported that their family members were properly informed had lower levels of anxiety (21.4% and 18.6%, respectively). (Table 2)

Regarding depression, a statistically significant association was observed between depression levels and gender ( $p = 0.002$ ), age ( $p = 0.001$ ), marital status ( $p = 0.012$ ), whether there was another family member with a heart problem ( $p = 0.034$ ) or a pacemaker ( $p = 0.003$ ), the degree of information ( $p = 0.006$ ) and the relationship with the nursing staff ( $p = 0.001$ ). More specifically, women had more frequently high levels of depression (22.4%) than men (9.5%). Similarly, patients aged 50 years and over 70 had more frequently high levels of depression (about 17% each) compared to those aged  $< 50$  years of age, who did not have high levels of depression at all (0%).

Divorced/widowed patients had more frequently high levels of depression (27.5%) than married (8%) and single patients (14.3%). Participants who had another family member with a heart problem or a pacemaker had more frequently high levels of depression (19% and 18.6%, respectively) compared to those who did not (9.3% and 13%, respectively). Finally, patients reporting being little

or no at all informed about their health problem had higher levels of depression (30.8%).(Table 3)

### The impact of patient characteristics on the levels of anxiety/depression

Multinomial logistic regression was performed to determine which independent factors have a statistically significant impact on anxiety/depression. Table 4a shows that women had 4.62 and 2.76 times higher probability than men to show moderate and high levels of anxiety compared to low levels (OR=4.62 [95% CI: 1.81-11.78], p=0.001 and OR=2.76 [95% CI: 1.30-5.82], p=0.008). Patients aged 50-70 years had a 4-fold greater probability than those aged <50 years to have high levels of anxiety compared to low levels (OR=4.03 [95% CI: 1.18-13.75], p=0.026).

Patients with more than one child had 59% less chance than those with none or one child to experience high levels of anxiety compared to low levels (OR=0.41 [95% CI: 0.17-0.99 ], p=0.049). In addition, patients who were little or not at all informed for their health problem had 10.47 times higher probability than patients who were very well informed to show moderate levels of anxiety compared to low levels (OR = 10.47 [95 % CI: 2.07-53.03], p=0.005)

Table 4b shows that women had 2.85 times higher probability than men to show moderate depression levels compared to low levels (OR=2.85 [95% CI: 1.12-7.25] , p=0.028). Patients aged 50-70 years had 10.62 times greater probability than patients <50 years of age to experience moderate levels of depression compared to low levels (OR=10.62 [95% CI: 1.04-108.97 ], p=0.047). Single and divorced patients were 37.26 and 11.14 times more likely respectively than married patients to experience

high levels of depression compared to low levels (OR = 37.26 [95% CI: 2-694.57 ], p=0.015 and OR=11.14 [95% CI: 2.98-41.6], p=0.001). In addition, patients who were little or not at all informed about their health problem had 6.73 greater chance than patients who were well informed to experience high levels of depression compared to low levels (OR=6.73 [95 % ΔΕ: 1.41-32.02], p=0.017). Finally, patients who had a good relationship with nursing staff had 5.34 times higher probability than patients with a very good relationship to experience moderate levels of depression compared to low levels (OR =5.34 [95% CI : 1.86-15.35], p=0.002).

### Discussion

The present study showed that 26.9% and 14.1% of the sample experienced high levels of anxiety and depression, respectively. Several reasons are held to be responsible for anxiety and depression in pacemaker patients, such as post-operative complications, dependency on device, change in body image, major lifestyle changes and knowledge deficits of every individual or environmental interaction that may adversely affect the proper functioning of the device. This vulnerable population may fail to regain prior family roles or activities thus being isolated from social environment.<sup>8-9</sup> All these limitations coupled with the economic burden, such as reduction of income or living standards affect negatively the psychological state of the patient.<sup>10-15</sup>

According to results, women were more possible to show anxiety and moderate levels of depression which is partially attributed to different social and family roles of women such as caring for family members or even to the fact that women may express their feelings more openly or easily.<sup>7</sup>

Patients aged 50-70 years had a 4-fold greater probability to have high levels of anxiety and 10.62 times greater probability to have moderate depression levels. According to literature, young patients may feel limited by not being able to continue working, driving or participating in sports and other prior activities or have more body awareness whereas older patients may be more accepting of physical limitations which accompany ageing.<sup>16</sup> Furthermore, the elderly have more growing medical needs as they frequently reach to implantation with several comorbidities and multiple long-term medication. Additionally, they may experience a heavier burden of the disease mainly due to inadequate care from their children, lack of medical guidance and psychological support.<sup>15</sup>

Data also revealed lower levels of anxiety in well informed patients and higher levels of depression in participants being little or not all informed of their health problem. Insufficient information may arise several doubts that undermine effective therapy since patients do not know the precise way to handle with the disease requirements.<sup>17-19</sup> Furthermore, several misconceptions may result in self-imposed restrictions that can adversely affect ordinary activities.<sup>20</sup> Therefore, patients being unable to understand the provided information should be early recognized by healthcare professionals before hospital discharge.<sup>19-24</sup>

Information is to be transmitted using no medical terms or formal language. Detailed information allows patients to gain control over symptoms or treatment<sup>18</sup> and more specifically, printed information material may improve care process or facilitate self-care.<sup>21</sup> Knowledge is the only medicine for pacemaker patient to relieve the

burden of disease. Merely discussing about the disease may help to rectify false beliefs and set realistic goals<sup>22</sup> since this population needs to trust technology and place the technical checks in to life.<sup>16</sup> Lost of confidence in various aspects of everyday living is the most common issue that needs to be addressed.<sup>24</sup>

Patients need information on understanding pacemaker function as well as several restrictions such as avoiding electromagnetic fields, following precautions regarding mobile phone use, monitoring the insertion site for signs of infection and others.<sup>23</sup> Exploring patients' perception regarding implanted device in daily life is essential as a recent study showed a significant proportion of patients considering many routine activities as unsafe including passing through metal detectors (31%), bending over (37%) and sleeping on the side of pacemaker (30%).<sup>20</sup>

On the other end of the spectrum, knowledge of patient experiences related to the device is important to inform care planning. Research data are limited thus illustrating a gap in educational preparation of nurses involved in the care for these patient groups.<sup>16</sup>

The present findings that anxiety and depression are related to marital status, to the number of children as well as to the degree of family awareness about the disease may indicate the important role of support which enables patients to obtain better psychological defenses to manage therapeutic regimen or accept cardiac device.<sup>25</sup> Indeed, close relationships with family and friends along with psychological aid through education and supportive follow-up, may be essential to reduce anxiety, isolation and negative responses. Furthermore, family

awareness may foster self-efficacy behaviors or encourage patients to take action to maximize well-being.

Regaining normalcy has been shown to be the main concern of patients' relatives. The way relatives perceive normalcy depends on the circumstances under which the patient received the pacemaker. For example, whether the situation was dramatic with an acute onset of unconsciousness or non-dramatic with periods of dizziness or without any symptoms. However, relatives discover new possibilities in life thanks to the pacemaker mainly when patients had been seriously affected by their disease. Interestingly, relatives welcome the checks at the pacemaker ward as an important part of security and moreover seek for guidance to confront with device related issues.<sup>26</sup>

Finally, the present study showed 5.34 times higher probability to experience moderate depression for participants reporting good relationship with nursing staff compared to those having very good relationship. Personal contact at scheduled in-hospital visits when are checked the device performance and patient clinical status exert a beneficial effect on psychological dimension for the patient with pacemaker while home monitoring remote control system represents a new area of interest.<sup>27</sup> Health care professionals should support patients in a professional manner by providing clear, relevant information and

planning a self-care program based on assessment of their needs. Holistic approach demands emphasis on education so as to enable patients to manage effectively their new life and safety.<sup>28-30</sup>

### Conclusions

According to the results of the present study, high levels of anxiety had women, patients aged 50-70, those having none or one child, those having another family member with a pacemaker, whereas lower levels of anxiety had patients being well informed about their health problem or those that their family members were properly informed.

Regarding depression, high levels of depression had women, patients aged 50 years and over 70, the divorced or widowed, those having another family member with a pacemaker, and those who stated that they were a little or not at all informed about the state of their health.

Patient's expression needs to be encouraged from the preoperative phase through to the outpatient pacemaker follow-up clinic phase. Eliminating emotional burden of this sensitive and challenging population needs continuous evaluation by multidisciplinary team approach.

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**Appendix**
**Table 1:** Levels of anxiety and depression of patients with pacemaker (N=230)

	N(%)
<b>Levels of Anxiety</b>	
Low levels	134 (60.1%)
Moderate levels	29 (13.0%)
High levels	60 (26.9%)
<b>Levels of Depression</b>	
Low levels	147 (69.0%)
Moderate levels	36 (16.9%)
High levels	30 (14.1%)

**Table 2:** Characteristics associated with anxiety levels

	Low levels of anxiety	Moderate levels of anxiety	High levels of anxiety	
	N(%)	N(%)	N(%)	p-value
<b>Gender</b>				
Male	104 (72.2%)	13 (9.0%)	27 (18.8%)	<b>&lt;0.001</b>
Female	30 (38.0%)	16 (20.3%)	33 (41.8%)	
<b>Age (Years)</b>				
<50	27 (77.1%)	2 (5.7%)	6 (17.1%)	<b>0.040</b>
50-70	36 (47.4%)	13 (17.1%)	27 (35.5%)	
>70	71 (63.4%)	14 (12.5%)	27 (24.1%)	
<b>No of Children</b>				
0-1	31 (53.4%)	5 (8.6%)	22 (37.9%)	<b>0.042</b>
>1	103 (63.6%)	24 (14.8%)	35 (21.6%)	
<b>Family member with a pacemaker</b>				
Yes	20 (44.4%)	8 (17.8%)	17 (37.8%)	<b>0.050</b>
No	114 (64.4%)	21 (11.9%)	42 (23.7%)	
<b>Degree of information of the state of health</b>				
Very	49 (62.0%)	4 (5.1%)	26 (32.9%)	<b>0.013</b>
Enough	66 (64.1%)	15 (14.6%)	22 (21.4%)	
A little/Not at all	18 (45.0%)	10 (25.0%)	12 (30.0%)	
<b>Degree of information of your family for your heart problem</b>				
Very	55 (59.8%)	9 (9.8%)	28 (30.4%)	<b>0.027</b>
Enough	60 (69.8%)	10 (11.6%)	16 (18.6%)	
A little/Not at all	18 (41.9%)	9 (20.9%)	16 (37.2%)	

**Table 3:** Characteristics associated with depression levels

	Low levels of depression	Moderate levels of depression	High levels of depression	
	N(%)	N(%)	N(%)	p-value
<b>Gender</b>				
Male	106 (77.4%)	18 (13.1%)	13 (9.5%)	<b>0.002</b>
Female	41 (53.9%)	18 (23.7%)	17 (22.4%)	
<b>Age (Years)</b>				
<50	32 (94.1%)	2 (5.9%)	0 (0.0%)	<b>0.001</b>
50-70	38 (53.5%)	21 (29.6%)	12 (16.9%)	
>70	77 (71.3%)	13 (12.0%)	18 (16.7%)	
<b>Status</b>				
Married	104 (75.4%)	23 (16.7%)	11 (8.0%)	<b>0.012</b>
Single	14 (66.7%)	4 (19.0%)	3 (14.3%)	
Divorced/ Widowed	28 (54.9%)	9 (17.6%)	14 (27.5%)	
<b>Family member with heart problem</b>				
Yes	64 (61.0%)	21 (20.0%)	20 (19.0%)	<b>0.034</b>
No	83 (76.9%)	15 (13.9%)	10 (9.3%)	
<b>Family member with a pacemaker</b>				
Yes	21 (48.8%)	14 (32.6%)	8 (18.6%)	<b>0.003</b>
No	125 (74.0%)	22 (13.0%)	22 (13.0%)	
<b>Degree of information of the state of health</b>				
Very	56 (71.8%)	11 (14.1%)	11 (14.1%)	<b>0.006</b>
Enough	72 (75.0%)	17 (17.7%)	7 (7.3%)	
A little/Not at all	19 (48.7%)	8 (20.5%)	12 (30.8%)	
<b>Relations with nursing staff</b>				
Very good	128 (74.0%)	20 (11.6%)	25 (14.5%)	<b>0.001</b>
Good	17 (47.2%)	15 (41.7%)	4 (11.1%)	

**Table 4a:** Impact of patient characteristics on the levels of anxiety.

	Reference Category: Low levels of anxiety			
	Moderate levels of anxiety		High levels of anxiety	
	OR (95% CI)	p-value	OR (95% CI)	p-value
<b>Gender</b>				
Male	Ref. Cat.		Ref. Cat.	
Female	4.62 (1.81-11.78)	<b>0.001</b>	2.76 (1.3-5.82)	<b>0.008</b>
<b>Age (Years)</b>				
<50	Ref. Cat.		Ref. Cat.	
50-70	1.96 (0.29-13.3)	0.489	4.03 (1.18-13.75)	<b>0.026</b>
>70	0.66 (0.09-4.71)	0.677	1.91 (0.55-6.61)	0.306
<b>Number of Children</b>				
0-1	Ref. Cat.		Ref. Cat.	
>1	1.29 (0.35-4.82)	0.700	0.41 (0.17-0.99)	<b>0.049</b>
<b>Family member with a pacemaker</b>				
Yes	Ref. Cat.		Ref. Cat.	
No	0.6 (0.2-1.75)	0.349	0.55 (0.24-1.27)	0.160
<b>Degree of information of the state of health</b>				
Very	Ref. Cat.		Ref. Cat.	
Enough	3 (0.78-11.58)	0.110	0.67 (0.28-1.59)	0.369
A little/Not at all	10.47 (2.07-53.03)	<b>0.005</b>	1.78 (0.56-5.58)	0.326
<b>Degree of information of your family about heart problem</b>				
Very	Ref. Cat.		Ref. Cat.	
Enough	0.59 (0.19-1.86)	0.371	0.58 (0.25-1.36)	0.213
A little/Not at all	1.49 (0.43-5.16)	0.530	1.73 (0.65-4.61)	0.276

**Table 4b:** Impact of patient characteristics on the levels of depression.

	Reference Category: Low levels of depression			
	Moderate levels of depression		High levels of depression	
	OR (95% CI)	p-value	OR (95% CI)	p-value
<b>Gender</b>				
Male	Ref. Cat.		Ref. Cat.	
Female	2.85 (1.12-7.25)	<b>0.028</b>	1.75 (0.54-5.66)	0.347
<b>Age (Years)</b>				
<50	Ref. Cat.		Ref. Cat.	
50-70	10.62 (1.04-108.97)	<b>0.047</b>	-	-
>70	3.39 (0.26-43.43)	0.348	-	-
<b>Status</b>				
Married	Ref. Cat.		Ref. Cat.	
Single	3.21 (0.32-32.61)	0.324	37.26 (2-694.57)	<b>0.015</b>
Divorced/ Widowed	1.15 (0.36-3.63)	0.816	11.14 (2.98-41.6)	<b>0.001</b>
<b>Family member with heart problem</b>				
Yes	Ref. Cat.		Ref. Cat.	
No	1 (0.32-3.08)	0.996	0.35 (0.1-1.2)	0.095
<b>Family member with a pacemaker</b>				
Yes	Ref. Cat.		Ref. Cat.	
No	0.32 (0.1-1.08)	0.066	1.07 (0.27-4.28)	0.927
<b>Degree of information of the state of health</b>				
Very	Ref. Cat.		Ref. Cat.	
Enough	0.78 (0.28-2.2)	0.636	0.28 (0.07-1.09)	0.067
A little/Not at all	1.57 (0.34-7.21)	0.564	6.73 (1.41-32.02)	<b>0.017</b>
<b>Relations with nursing staff</b>				
Very good	Ref. Cat.		Ref. Cat.	
Good	5.34 (1.86-15.35)	<b>0.002</b>	0.27 (0.04-1.68)	0.160

**Table A1:** Patient demographics (N=230)

	n (%)
Gender (Males)	149 (64.8%)
Age (Years)	
<30	3 (1.3%)
30-40	14 (6.1%)
41-50	19 (8.3%)
51-60	31 (13.5%)
61-70	47 (20.4%)
71-80	90 (39.1%)
>80	26 (11.3%)
Status	
Married	145 (63.9%)
Single	23 (10.1%)
Divorced/	8 (3.5%)
Widowed	47 (20.7%)
Living together	4 (1.8%)
Education	
Primary school	96 (44.2%)
Secondary school	73 (33.6%)
University	28 (12.9%)
MSc-PhD	19 (8.8%)
No of Children	
0	29 (12.8%)
1	30 (13.2%)
2	128 (56.4%)
>2	40 (17.6%)

**Table A2:** Patient clinical characteristics (N=230)

	n (%)
Age when pacemaker was placed (years)	
<30	4 (1.8%)
30-40	16 (7.1%)
41-50	16 (7.1%)
51-60	44 (19.6%)
61-70	48 (21.4%)
71-80	86 (38.4%)
>80	10 (4.5%)
Age when symptoms started (years)	
20-30	8 (3.7%)
31-40	22 (10.0%)
41-50	16 (7.3%)
51-60	82 (37.4%)
61-70	20 (9.1%)
>70	71 (32.4%)
Type of pacemaker	
VV	69 (30.3%)
DDD	159 (69.7%)
Other disease (Yes)	130 (56.8%)
Other family member with heart problem (Yes)	119 (51.7%)
Other family member with a pacemaker (Yes)	47 (20.5%)
Degree of information of the state of health	
Very	82 (35.8%)
Enough	106 (46.3%)
A little	37 (16.2%)
Not at all	4 (1.7%)
Degree of information of your family for your heart problem	
Very	95 (41.9%)
Enough	88 (38.8%)
A little	43 (18.9%)
Not at all	1 (0.4%)
Do you follow strictly the therapeutic regimen	
Very	170 (76.9%)
Enough	49 (22.2%)
A little	1 (0.5%)
Not at all	1 (0.5%)
Relations with nursing staff	
Very good	186 (82.3%)
Good	38 (16.8%)

	n (%)
<i>Moderate</i>	2 (0.9%)
Relations with medical staff	
<i>Very good</i>	190 (83.0%)
<i>Good</i>	37 (16.2%)
<i>Moderate</i>	2 (0.9%)
Relations with other patients (Yes)	54 (23.5%)