# Psychosocial Adaptation and Quality of Life Differences between Pacemaker and Implantable Cardiovertor-Defibrillators in a Sample of Egyptian Patients

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**Abstract:** Background: The use of ICDs in cardiac patients have been expanding in recent years with consequent decreased mortality risk 30% to 54% by decreasing the incidence of sudden cardiac death. After implantation of an ICD, patients face a lot of psychological problems, whereas patients with implanted pacemaker face less problems. These differences would be expected to influence the patients' perception of the implants and their appraisal of their quality of life. Objectives: To study the differences between the two devices regarding health related quality of life, anxiety and depression in the ICD group compared with the pacemaker group for patient management during follow up. Subjects & Methods: 35 patients were selected successively in a comparative cross sectional study, having a pacemaker (n= 21) and ICD (n= 14) implanted between 2000 and 2007 at the Kaser EL-Eini Hospital Cairo University, critical care department and followed in pacemaker and ICD follow up clinic. The patients were assessed using Quality of life Scale, Symptom checklist 90 (SCL90), Middle sex Questionnaire, Beck rating scale for depression, Coping with life stressor scale and life satisfaction scale. Results: The ICD patients showed higher rates on the Somatization, depression, anxiety, hostility, phobia and paranoid symptoms than the pacemaker group. Life satisfaction scales were higher in the pace maker group than the ICD patients. Quality of life were higher in the pace maker group in the mood, financial and self scales.
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**Keywords**: ICD, depression, anxiety, follow up.

## 1. Introduction

Use of implantable cardiovertor defibrillators (ICDs) has become the standard of care for patients at high risk for life-threatening ventricular arrhythmias. Compared with other available treatments, in clinical trials, ICDs have had a consistent, superior effect on mortality (**Goldberger and Lampert, 2006**). In high-risk patients with cardiac disease, use of the devices decreased mortality risk 30% to 54% by decreasing the incidence of sudden cardiac death (**Greenberg *et al.*, 2004**).

Indications for the use of ICDs have been expanding in recent years following the publications of several large multi-centre trials and now included preventive implantation for patients with coronary artery disease and a severely depressed ejection fraction (**Moss *et al.*, 2002**). This has resulted in increased implantation rates and thus steadily growing numbers of ICD recipients worldwide (**Seidl and Senges, 2003**).

The purpose of an ICD is to monitor cardiac rhythms and deliver therapy in the form of anti-tachycardia pacing, cardioversion or defibrillation. Cardioversion and defibrillation involve delivery of an unexpected jolt that can cause a variety of sensations varying from a tingle, touching an electric fence or being kicked in the chest (**Dunbar, 2005**). At the same time, concerns remain regarding the quality of life (QoL) of these patients. Small observational studies have indicated a poor QoL for ICD patients (**Gallagher *et al.*, 1997**).

More recent studies have generally shown a similar or even better QoL among ICD patients not receiving shocks than patients treated with drugs, but QoL scores decreasing with increasing numbers of shocks received from the device (**McCready and Exner, 2003**).

Clinicians are usually unaware of the psychosocial impact of implanted pacemakers and ICDs. After implantation of an ICD, the most common psychological problems are anxiety, depression, anger and fear. Patients fear that they will be shocked by the device, that the device will not work, that they may die and that physical activity will trigger the device (**Sears *et al.*, 1999**).

Taking these factors into account, it is quite possible that the device itself may provoke anxiety and thus result in reduction of the QoL of ICD patients.

Until recently, ICDs have been bulkier than pacemakers, but smaller devices are now available which, like pacemakers, are implanted in the pectoral

region. Superficially, whether a patient receives a pacemaker or an ICD, they will ultimately have the experience of a foreign device implanted into the body. Moreover, the same clinicians tend to be involved in the implantation and follow up of both pacemaker and ICD patients. However, ICD discharges (shocks) are often painful and are delivered at unpredictable times, whereas pacemaker stimulation is hardly ever felt by the patients. These differences would be expected to influence the patients' perception of the implants and their appraisal of their quality of life (**leosdottir *et al.* , 2006**).

Because of the complexity of these devices, there is a tendency for outpatient visits to be concentrated mainly on the technical aspects of device function, with the risk that psychosocial factors may be ignored. For this reason, a better understanding of factors likely to contribute to patients' perception of their health would be helpful in their management and in the training of clinicians.

In this study we aim to investigate the differences between the two devices, we expected that there would be reduced health related quality of life and increased anxiety and depression in the ICD group compared with the pacemaker group.

## 2. Subject and Method

After obtaining approval of the hospital Ethics committee (Kasr El Eini Hospital) and written informed consent, 35 patients were selected successively in a comparative cross sectional study, mean age (49.71±20.8 years), having a pacemaker (n= 21) or an ICD (n= 14) implanted between 2000 and 2007 at the Kaser EL Eini Hospital Cairo University, critical care department pacemaker and ICD follow up clinic.

**Tools:**

1. **Quality of life scale (Bech, 1993):** This questionnaire consists of 30 questions to assess somatic problems, thinking problems, mood problems, social stressor, economic problems and special problems. The test was translated and standardized.
2. **Symptom checklist 90 (SCL90) (Derogatis, 1977 translated by El-Behery, 1984):** The Arabic version of SCL90 was used: It measures nine psychological symptoms on 5-point likert-type scale namely: Somatization, obsession, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. It yields nine sub scores and a total score of psychological distress.
3. **Middle sex questionnaire:** It consists of 48 questions, was translated into Arabic by **Abdel Gawad and El-rakhawi (1976)**. The test has high degree of validity and reliability. It consists of 6 subscales to measure the tendency for anxiety, phobia, obsessions, psychosomatic manifestation, depression and hysteria. Scores above 8 means tendency of the subject toward the item questioned.
4. **Beck rating scale for depression:** It is a rating scale of the degree of depression, the patients were classified into three classes taking in consideration the sum of the parameters of each scale and according to the total score: <22: normal variants, 22-42: mild degree of depression, 43-63: moderate degree of depression and >64 severe degree of depression.
5. **Coping with life stressor scale (Poon, 2003):** it consists of 30 phrases measures three scale, positive coping with 13 phrases, negative coping with 7 phrases and behaviors for coping with 10 phrases.
6. **Life satisfaction scale (El-Dosoky, 2003):** It consists of 5 scales happiness, social, secure, psychological satisfaction, and social appreciation. Each scale consists of 12 phrases which has 5 degree from 0-4 then the whole sum is calculated and higher grades indicates high degree of life satisfaction and low grades indicates low degree of life satisfaction.

**Statistical Methods:**

Data were statistically described in terms of mean ± standard deviation (±SD), frequencies (number of cases) and relative frequencies (percentages) when appropriate. Comparison of quantitative variables between the study groups was done using Student t test for independent samples in comparing 2 groups when normally distributed. For comparing categorical data, Chi square ($\chi 2$) test was performed. Exact test was used in stead when the expected frequency is less than 5. Correlation between various variables was done using Pearson moment correlation equation for linear relation in normally distributed variables and Spearman rank correlation equation for non normal variables. A probability value (p value) less than 0.05 was considered statistically significant. All statistical calculations were done using computer programs Microsoft Excel version 7 (Microsoft Corporation, NY, USA) and SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 15 for Microsoft Windows.

## 3. RESULTS

Thirty five patients were selected 22 males and

13 females, mean age (49.71±20.8 years), having a pacemaker (n= 21) or an ICD (n= 14).

**Outcome Measures:**

There were statistically significant difference between the two groups as regards the positive, negative and behavior for coping with stress and the ICD patients were higher in using the coping scales than the pace maker group.

Life satisfaction scales were higher in the pace maker group but the difference did not reach a significant values.

Regarding the Middle sex scale which shows us the tendency to psychiatric symptoms were higher in ICD patients and this means that they have greater tendency for anxiety, phobia, obsessions, and depression.

Beck depression inventory showed higher scores in ICD patients but with no statistical difference and also both groups were ranging from normal to mild degree of depression.

**Regarding the symptom checklist:** Somatization, depression, anxiety, hostility, phobia and paranoid symptoms were higher in the ICD group than the pacemaker group but the difference did not reach a statistical difference.

Quality of life was higher in the scale of mood, financial, and self in the pacemaker group but the difference between the two groups did not reach statistical significant difference.

**Table 1:** Shows the descriptive data of all questionnaires in both groups:

| | | Pacemaker Group A (No= 21) | | ICD Group B (No= 14) | | P value |
|---|---|---|---|---|---|---|
| | | Mean | SD | Mean | SD | |
| **Age** | | 52.9 | 23.5 | 44.8 | 15.3 | 0.226 |
| **Coping life Stressor** | Positive | 21.9 | 7.15 | 28 | 3.6 | 0.006* |
| | Negative | 9.4 | 4.3 | 13.7 | 3.2 | 0.002* |
| | Behavior | 14.3 | 5.7 | 20 | 2.6 | 0.002* |
| **Life Satisfaction** | Happy | 41.5 | 16.1 | 37.2 | 16.4 | 0.450 |
| | Social | 40 | 8 | 37.6 | 10 | 0.465 |
| | Secure | 37.8 | 11 | 27.9 | 9.3 | 0.010 |
| | Psych. Satisfaction | 43.8 | 13 | 38.7 | 17.3 | 0.325 |
| | Social appreciation | 42 | 9.8 | 38.2 | 13.5 | 0.337 |
| | Satisfaction | 43.1 | 10.8 | 39.4 | 14.6 | 0.547 |
| **Middle Sex** | Anxiety | 4.6 | 3.4 | 8.5 | 11.38 | 0.147 |
| | Phobia | 5.4 | 2.7 | 8.14 | 7.9 | 0.163 |
| | Obsession | 4.7 | 1.3 | 8.8 | 10.9 | 0.096 |
| | Somatic | 5.8 | 2.6 | 8.4 | 10.2 | 0.274 |
| | Depression | 6.4 | 2.4 | 8.8 | 9.7 | 0.279 |
| | Hysteria | 2.6 | 1.4 | 6.6 | 13.9 | 0.202 |
| **Beck** | | 16.8 | 13.2 | 19.4 | 11.1 | 0.547 |
| **Symptom Checklist** | Somatization | 16 | 7.4 | 18 | 10.4 | 0.513 |
| | Obsession | 13 | 4.3 | 13.6 | 5.8 | 0.733 |
| | Interpersonal Sensitivity | 9.3 | 5.7 | 9.3 | 4.7 | 0.990 |
| | Depression | 16.9 | 9.6 | 17.07 | 9.07 | 0.959 |
| | Anxiety | 9.6 | 4.5 | 10.9 | 6.6 | 0.508 |
| | Hostility | 3.6 | 3 | 7.6 | 5.5 | 0.010 |
| | Phobia | 7.33 | 5.04 | 8.14 | 4.14 | 0.622 |
| | Paranoid | 4.9 | 4.1 | 7.6 | 4.6 | 0.638 |

**Table 2:** Shows the quality of life in both groups:

| Quality of life scales | Pacemaker Group A (No= 21) | | ICD Group B (No= 14) | | P value |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Physical | 22.6 | 11.1 | 21.14 | 6.9 | 0.651 |
| Cognitive | 27.3 | 8 | 27.3 | 9 | 0.994 |
| Mood | 27.4 | 10.9 | 23.1 | 9.3 | 0.237 |
| Social | 26.4 | 7.4 | 28 | 9.6 | 0.602 |
| Financial | 30 | 7.6 | 26 | 11.3 | 0.211 |
| Self | 27.4 | 9.7 | 24.5 | 8.1 | 0.371 |

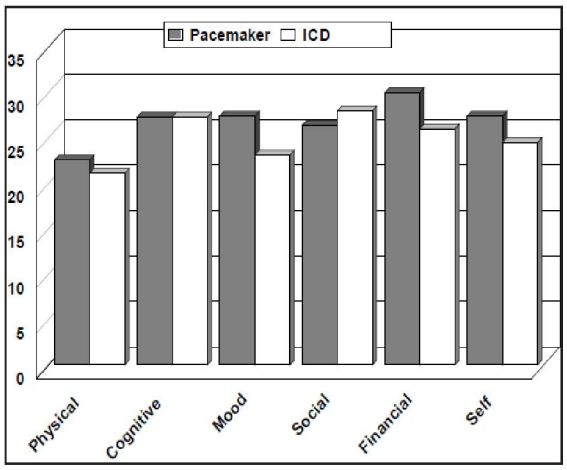


**Fig. 1:** Quality of life.

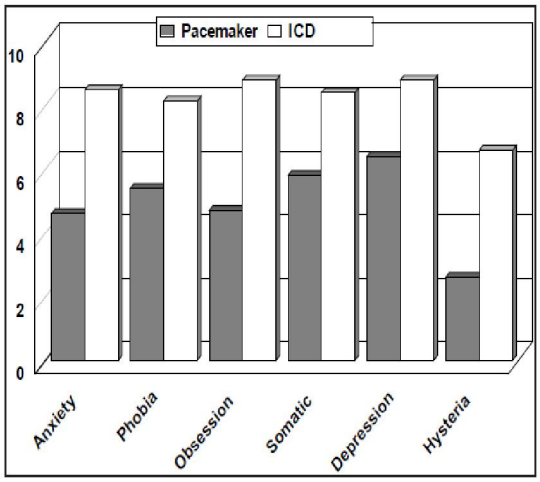


**Fig. 3:** Middle Sex.

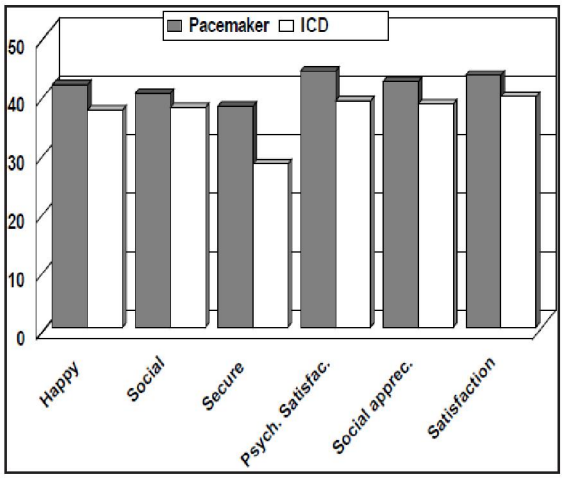


**Fig. 2:** Life satisfaction.

## 4. Discussion

The use of the ICD and cardiac pace maker for life threatening ventricular arrhythmias is standard therapy and the fact that the patients will always be using them ushering to the importance of studying the quality of life of these patients and the psychiatric morbidity that they may suffer from. ICD Patient must overcome both the stress of experiencing a life threatening arrhythmias and the challenge of adjusting to ICD (**Sears *et al.*, 1999**).

The results of our study showed that total scores of SCL90 regarding somatization, depression, anxiety, hostility and phobia were higher in the ICD group than the pacemaker group that were coinciding with Middle sex scale which showed that the tendency to psychiatric symptoms were higher in ICD patients especially anxiety, phobia, obsession and depression which was supported by **Lemon and Edelman(2007)** who found that within this population anxiety sensitivity is associated with distress during high-threat situations, but the

relationship diminishes once the threat has passed. In addition the foreign body preoccupation, fear of unpredictable painful shocks and uncertainty of the timing of activity of ICD make the ICD group experiencing more anxiety, this was consistent with **Eckert and Jones (2002)** who found that ICD patients frequently report anxiety, lack of control, and powerlessness due to shocks from the ICD which are reported as uncomfortable and can occur under any circumstance. Most studies examining psychological disorders among ICD patients agree on anxiety being the one most commonly encountered in this patient group, with diagnostic rates for clinically significant anxiety ranging from 13 to 38% (**Heidenreich *et al.*, 2002**).

Our results were not coinciding with **Duru *et al.*(2001)** who evaluated signs of anxiety and depression in ICDs patients, compared with patients with pacemakers; probable anxiety disorder was encountered in 13.1, 9.7, and 13.3% of the pacemaker, non-shocked, and shocked ICD patient groups and probable depressive disorder in 5.2% of the pacemaker patients and 6.5% ICD patients. These differences could be attributed to larger sample size and division of ICD group into shocked or not which affected the results of anxiety.

Also the Beck depression inventory showed higher scores in ICD patients reflecting higher tendency for depression which was matched with **Leosdottir *et al.* (2006)** who showed higher scores of depression where 9.8% of the ICD patients and 3.7% of the pacemaker patients met cut-off levels for moderate or severe depression by means of the BDI.

Regarding Quality of life in our study it was higher in the scale of mood, financial, and self in the pacemaker group but the difference between the two groups did not reach statistical significant difference which was matching with **Namerow *et al.* (1999)** who found that Qol of ICD patients were significantly worse compared to patients with no ICD especially in the psychological wellbeing and also the ICD patients who received shocks showed lower levels than non shock receiver. This was different from **Duru *et al.* (2001)** found no difference in Qol scales when comparing ICD patients and pacemaker patients and also **Leosdottir *et al.* (2006)** where health-related QoL appears to be similar among ICD patients and pacemaker recipients. These results could be attributed to the possibility that their patients were taught about the ICD and what to expect and how they can handle their fear.

As regards coping with stress, the ICD group showed higher coping scores both positively and negatively reflecting higher perception of sense of stress and consequently both adaptive and non adaptive coping strategies.

**Difficulties and Limitations:**

1. ICD follow up takes longer time than pacemaker follow up that makes ICD patients participation difficult.
2. Limited number of patients due to the non compliance of the patients to the follow up visits.

**Recommendation**

1. Follow up study of the quality of life and mood symptoms.
2. Factors associated with increased psychological distress include, age, sex, social support, co-morbid condition, coping behavior and multiple ICD activation.
3. Reassurance program that help to reduce negative perception of symptoms and promoting psychological adaptation.

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