



Comparison of Depression Level in Patients Prior to and After Implantable Cardioverter-Defibrillator

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Abstract: Today's, implantable cardioverter defibrillator (ICD) is mainly invented to save patients who face high-risk life threatening dysrhythmia of the ventricles to prevent the patient from sudden cardiac death. There is limited information about patients' compatibility and psychological reaction after implantation. The main purpose of this article was to compare the level of experienced depression by male and female patients before and after implantation of the device. In this comparative cross-sectional study, 65 male and 30 female illegible patients were selected through convenience sampling method from Shahid Rajaee Heart Hospital and the medical centers which affiliated to Tehran Arrhythmia Clinic. A demographic questionnaire and HADS questionnaire was used to collect data before and two to four months after implantation of the device. Collected data was analyzed by using SPSS software. The mean level of depression in male was 5.36 prior to insertion device while it was 7.23 in female patients. Comparing depression level in male and female patients prior to ICD showed a significant statistical difference ($P=.046$). The levels of depression in male and female patients after insertion the device were 6.61 and 8.86 respectively. Comparing of depression level in both gender showed a significant statistical difference ($P=0.021$). In addition, the results showed that people with higher education experienced lower level of depression in both before and after device implantation. The study found that women experience higher level of depression before and after an ICD implant with comparison men. Since gender is a predisposing variable for having higher level of depression, health care providers need to consider gender issue when they provide psychological support for the patients with ICD.

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INTRODUCTION

Cardiac arrest in more than 80% cases is initiated by a sudden onset of ventricular tachycardia which swiftly makes progress toward ventricular fibrillation. Since spontaneous cessation of ventricular fibrillation is considered a rare phenomenon,

it should be treated promptly in the case of occurrence. Treatment measures for this group of patients involve cardiopulmonary resuscitation and defibrillation. The time gap between the onset of an attack and initial attempts to defibrillate the cardiac muscle is regarded as an important determining factor for patients' survival. Therefore, the mortality rate in the patients who suffer cardiac arrest in a place outside of hospital is apparently too high because of delayed access to a defibrillator and the patients' inability to receive medical care in time [1]. Implantable cardioverter defibrillator (ICD) was mainly invented to save patients who face high-risk life threatening dysrhythmia of the ventricles to prevent the patient from sudden cardiac death.

ICD is a device which controls the heart rhythm and diagnoses rapidly fatal ventricular dysrhythmia. If there is a ventricular dysrhythmia, ICD delivers electrical energy to the cardiac muscle in order to regulate the heart rhythm. The delivered energy can be customized according to individual patients' need. ICD delivers 1 to 40 watt of electrical energy to the cardiac muscle within 10 to 20 seconds of dysrhythmia onset in a patient. This period is considered as an appropriate time for the treatment of fatal ventricular dysrhythmia. ICD is implanted in the left pectoral region by a similar method which is used to implant a permanent pacemaker. The device is implanted in a patient either as single chambered or dual chambered [2].

The first practical model of ICD was successfully tested on a dog in 1969. ICD was implanted for the first time in a human in 1980 at John Hopkins Hospital [2]. The Food and Drug Administration (FDA) approved using ICD for treatment of ventricular dysarrhythmias in 1985. Thereafter, it has been generally used to a great extent and was implanted worldwide in over 50,000 cases [2]. In 2009, a published report indicated that there is almost 100,000 patients who had been treated by ICD and there is also 20,000 to 40,000 new ICD implantation each year [3].

Today, ICD is used as a standard treatment in high risk patients for life threatening dysrhythmia (4). ICD is used as a primary treatment of fatal ventricular dysrhythmia or as a preventive treatment in patients who suffer from cardiomyopathy and are at high risk for developing ventricular dysrhythmia and sudden cardiac death [2].

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Although ICD has many advantages, there are a number of problems and disadvantages for ICD. The most important disadvantages of ICD are inappropriate electrical discharge in absence of constant ventricle arrhythmia and its high cost. Other than these disadvantages, Dunbar *et al.* [5] reported that patients experience high level of anxiety, exhaustion and psychological stress immediately after ICD implantation and in a period of three months. According to the published studies, the level of depression is proportionately higher in those patients who have had an experience of an electrical shock discharge [5, 6].

There is a lack of adequate study in relation to patient's psychological response before and after ICD implantation. The main purpose of this article was to compare the level of depression in men and women before and after implantation of ICD.

PATIENTS AND METHODS

A comparative cross-sectional study was conducted in Shahid Rajaei Heart Center and the hospitals which affiliated to Tehran Arrhythmia Clinic, Iran. The study population was the candidate patients for ICD implantation who were aged over 18-year-old. A convenience sampling method was used to select a total number of 95 patients in the study (65 male and 30 female). The exclusion criteria were having previous history of ICD device implantation, suffering from mental or physical diseases, being drug abuser and being in the hospital for long period.

When the illegible samples were identified, an informed consent form was obtained in this research. The data was continuously collected through the questionnaire. The questionnaire consisted of two parts. The first part was used to collect demographical and health-related information including age, gender, education, and marital status, number of children, financial status, medication and background history. The second part was a self-report questionnaire, the Hospital Anxiety and Depression Scale (HADS). HADS is a self-assessment tool which consists of 14 questions (7 questions are related to anxiety and 7 questions are related to depression). HADS is designed to assess the existence and intensity of anxiety and depression in patients over past few weeks. Validity of HADS was determined by content validity method and reliability of the questionnaire confirmed by determining Chronbach's alpha co-efficient via a pilot study. Chronbach's alpha co-efficient is calculated as 0.75 for the pilot study.

Research samples completed the first part of the questionnaire and HADS a day before ICD device implantation. They also completed HADS between

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two and four weeks after implanting ICD when they had a follow-up visit in the clinic. The data were analyzed by using SPSS, version 14. P???

Almost 80 percent of the male and female patients who participated in our research study were married. 63.3 percent of the female patients were uneducated whereas lack of education in male participants was only 24.6 percent. Specification relevant to both groups was indicated in table 1.

RESULTS

Mean of age among male patients was 55.7 ± 13.36 and the in the female group was 56 ± 15.26 .

Table 1: distribution of characteristics of studied units in terms of gender

		Male		Female	
		Frequency	Percent	Frequency	Percent
Age	<40	12	18.5	4	13.3
	40-49	5	7.7	2	6.7
	50-59	19	29.2	11	36.7
	60-69	16	24.6	8	26.7
	>70	13	20	5	16.7
Marital Status	Single	9	13.8	2	6.7
	Married	54	83.1	24	80
	Widow	2	3.1	4	13.3
Educational Status	Un Read	16	24.6	19	63.3
	<Diploma	18	27.7	5	16.7
	Diploma	14	21.5	1	3.3
	Bachelor And Upper	17	26.2	5	16.7
Economic Status	Weak	33	50.8	21	70
	Moderate	23	35.4	7	23.3
	Good	9	13.8	2	6.7
The Number Of Children	<2	20	30.8	6	20
	3-6	37	56.9	16	53.3
	7-11	8	12.3	6	20
	>12	0	0	2	6.7
Side effects	Yes	21	32.3	10	33.3
	No	44	67.7	20	66.7
Defibrillator use	Yes	10	15.4	6	20
	No	55	84.6	24	80

Table 2 shows that mean depression was higher for females (7.23) than males (5.36) before insertion of cardioverter defibrillator. As shown in Table 2, mean depression was significantly higher for females than males ($P < 0.05$); that is, females experienced higher level of depression than males.

Table 2: comparison of depression among patients before insertion of cardioverter defibrillator in terms of gender

Variable	Male		Female		Mean difference	t	df	Sig
	mean	Standard deviation	mean	Standard deviation				
Gender	5.36	3.15	7.23	4.48	-1.86	-2.33	93	0.05

Table 3 shows that mean depression was higher for females (8.66) than males (6.61) after insertion of cardioverter defibrillator. Mean depression was significantly higher for females than males ($P < 0.05$); that is, females experienced higher level of depression than males (Table 3).

Table 3: comparison of depression among patients after insertion of cardioverter defibrillator in terms of gender

Variable	Males		Female		Mean difference	t	df	Sig
	mean	Standard deviation	mean	Standards deviation				
Gender	6.61	3.75	8.66	4.40	-2.05	-2.34	93	0.05

As shown in Table 4, results from t-test showed that difference between mean scores of male patients with depression increased after insertion of cardioverter defibrillator.

Table 4: Results of t-test to compare depression of males before and after insertion of the cardioverter defibrillator

variable	Mean difference	Std deviation	t	df	Sig
Depression depression1-depression2	-1.25	3.57	-2.81	64	0.01

As shown in Table 5, results from t-test showed that difference between mean scores of female patients with depression increased after insertion of the cardioverter defibrillator.

Table 5: Results of t-test to compare depression of female patients before and after insertion of the cardioverter defibrillator

Variable	Mean difference	Std deviation	t	df	Sig
Depression depression1-depression2	-1.43	3.39	-2.32	29	0.05

Table 6 shows results of ANOVA test. Observed F indicated a significant difference in depression levels of patients before insertion of the cardioverter defibrillator in terms of education. Results from follow-up test suggested that the higher education, the lower depression people experienced.

Table 6: results of ANOVA to compare depression of patients before insertion of the cardioverter defibrillator in terms of education

Before depression	Sum of squares	df	Mean square	f	sig
Between groups	198.781	3	66.26	5.53	0.01
Within group	1091.05	91	11.99		

Table 7 shows results of ANOVA test. Observed F indicated a significant difference in depression levels of people after insertion of cardioverter defibrillator in terms of education. Results from follow-up test to compare means suggested that the higher education, the lower depression people experienced.

Table 7: results of ANOVA to compare depression of studied patients after insertion of the cardioverter defibrillator in terms of education

After depression	Sum of squares	df	Mean square	f	sig
Between group	160.227	3	53.41	3.50	0.05
Within group	1390.194	91	15.28		

DISCUSSION

The study results showed that the level of depression experiencing after ICD device implantation is different in feminine and masculine gender. Comparatively, women were observed to experience a higher level of depression than men did after implanting ICD. Gender, therefore, is considered as an important factor which impacts on differing levels of depression in the male and female patients. Different level of experienced depression in male in female can be explained due to different personality [68] and strategies which they use to adapt themselves with their own condition.

In addition, women were less educated than men in this study. Lower level of education can also be considered as another important factor which influences the level of depression in feminine gender. Education level can play an important role in patient capability to grasp and follow the provided information and instructions about ICD device. Besides, lower level of education leads to

a lack of knowledge in patients and causes an increases of the experienced anxiety in a female patient.

The study results showed that both male and female patients suffer a considerable level of depression after having ICD. The level of experienced depression in female patients was more than male patients. Therefore, female patients need more attention when they have ICD. A higher level of experienced anxiety in women after implantation of device can cause anxiety to become chronic in women. Chronic anxiety may lead to a higher incidence of depression in them. It need that health care providers assess the level of depression in patients with ICD and provide psychological support to them, particularly in women to prevent chronic anxiety and depression. This study was a cross-sectional study and the number of samples was small. These issues limit the findings of the research.

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