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RESEARCH ARTICLE

A STUDY OF THE BIOPSYCHOSOCIAL REHABILITATION OF PATIENTS WITH MYOCARDIAL INFARCTION SIX MONTHS AFTER THEIR DISCHARGE FROM THE CARDIAC CARE UNIT

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Abstract

Background: Acute myocardial infarction is one of the leading causes of death in the developed world. The purpose of this research is to study the biopsychosocial rehabilitation of patients with myocardial infarction six months after their release from the heart attack unit.

Method and Material: The population of the study consisted of patients who had suffered a myocardial infarction and had been hospitalized in the heart attack unit of a University General Hospital six months ago. The study sample was 100 patients. The sampling method is simple randomization.

Results: Problems of anxiety and sadness with a percentage of 50% are in first place, followed by problems of pain and discomfort at a percentage of 24%, problems in performing usual daily activities at a percentage of 22%, mobility problems at a percentage of 16 % and finally the problems of self-care at a rate of 12%. There is a statistically significant difference between genders, with men being more affected with mobility problems (p-value= 0.014) and with performing usual activities (/p-value= 0.003). Patients who are ≤65 years of age appeared to be more affected compared to those >65 years of age in terms of mobility problems (/p-value= 0.009).

Conclusions: Quality of life improves for most patients after myocardial infarction. Whether or not patients have problems on one or more dimensions of the EQ-5D is highly related to the patient's profile. Fewest problems are observed in the self-care dimension and most problems are reported in the anxiety or sadness dimension.

Keywords: Myocardial infarction, quality of life, EQ-5D, rehabilitation.

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INTRODUCTION

Worldwide, cardiovascular diseases (CVD) are the first cause of death. According to the World Health Organization (WHO), 7.4 million deaths in 2015 were due to coronary heart disease, and by 2030, it is estimated that 23.6 million people will die from cardiovascular disease.[1] A preponderance of these deaths results from a myocardial infarction (MI).[2,3]

When patients return home after hospitalization for their coronary event, most of them experience some or all of the following emotions: existential dread, guilt, denial, and a sense of loss related to their former lifestyle. Depression is common after myocardial infarction and may not only lead to a reduced long-term quality of life but may actually contribute to increased mortality among patients.[4] Myocardial infarction affects the individual's biopsychosocial well-being and imposes limitations on daily functioning and in the individual's life in general.[5] The bio-psychosocial model suggests that biological, psychological and social factors are all correlative. This model provides the basis for understanding the holistic approach to patient care and the determinants of disease.[6] The bio-psychosocial model has been used extensively to understand risks for the development and progression of coronary heart disease and for understanding the impact of certain coping strategies.[7-9]

Mental health is often given less priority in medicine. The focus is often on treating the disease processes rather than attending to the overall human needs of the patient.[10] The progressive evidence supporting the association of mental health disorders (MHD) and cardiovascular disease (CVD) has prompted the American Heart Association to include major depression and bipolar disorder as moderate-risk conditions associated with accelerated atherosclerosis and early CVD.[11] However, there is a paucity of data on the burden of MHD among patients with acute cardiovascular disease. Anxiety and depression are both common to occur after an acute cardiac event, such as an acute myocardial infarction or coronary artery bypass graft surgery (CABGS). It is generally accepted that approximately one in five patients meet diagnostic criteria for depression while hospitalized for a heart attack and up to one in three experience severe anxiety.[12,13] While relatively few studies have reported rates of anxiety and depression at later points during patients' recovery, there is evidence that early symptoms resolve for many patients within the first few months after hospital discharge.[12,14] Patients who are anxious or depressed after an acute cardiac event are at increased risk for a subsequent event and premature death.[15] Adverse health effects appear to occur or increase when anxiety or depressive symptoms persist or occur during the recovery phase after discharge from the hospital.[14,16]

The extent of cardiac rehabilitation may affect the outcome of acute myocardial infarction.[17] Cardiac rehabilitation may improve cardiopulmonary function and reduce risk factors for heart disease such as hypertension, diabetes and hyperlipidemia. [18] In addition, cardiac rehabilitation also reduces the recurrence of heart disease and the associated mortality rate by 20-24% and improves the overall quality of life for the patient.[19] There are three phases of cardiac rehabilitation. Phase I is from admission to discharge, Phase II is from discharge to 6 weeks after disease onset, and Phase III is from 6 weeks to 3 months after disease onset. Phase I is inpatient cardiac rehabilitation and Phases II and III are accomplished in an out-patient setting. Inpatient cardiac rehabilitation can reduce the complications of bed rest, reduce patient anxiety, and educate patients on issues such as the importance of controlling risk factors and returning to independent daily activity.[20]

Quality of life, coping strategies, social support, and self-efficacy are important psychosocial variables that strongly influence the experience of acute myocardial infarction. [21] Therefore, the study of bio-psychosocial recovery of patients with myocardial infarction is imperative. The purpose of this study is to investigate the bio-psychosocial rehabilitation of patients with myocardial infarction six months after their discharge from the Coronary Care Unit.

METHODS

Sample

The target group of the study was patients who had suffered a myocardial infarction and had been hospitalized at the cardiac care unit of a University General Hospital. The sample of the study was 100 patients. The sampling method is simple randomization. The way in which the questionnaire was completed by the patients was through telephone interviews conducted by the

researcher with each individual patient.

Sample inclusion and exclusion criteria

The patients included in the study had been hospitalized in the cardiac care unit of the University General Hospital of Patras, a city in Greece. Patients must have been discharged at least six months prior to the interview.

Research design

The study is a retrospective quantitative randomized controlled study. Initially, an application was submitted for approval of the study by the Department Ethics office of the University General Hospital to ensure that the study could be carried out in the Cardiac Care Unit. The study was conducted from April 2022 to June 2022.

Research tool

The EQ-5D is a general health-related quality of life measure created by a multidisciplinary community of health scientists called the EUROQOL GROUP. In its basic version, this questionnaire consists of two distinct tools: the descriptive system and the visual analogue scale (VAS scale). [22,23]

The descriptive system is based on five questions. Each aims to assess a different dimension of quality of life. The measurement is done on three levels, depending on the absence, the existence of some and the existence of serious problems with respect to each dimension. The five dimensions are: Mobility (K), Daily activities (DA), Self-service (A), Pain or discomfort (PD) and Anxiety or depression (sadness) (AK).

The five dimensions of the three levels create a set of 3^5=243 different health states, where each is coded with five digits, from sequences of numbers 1, 2 and 3. Each of these states can be assigned a social valuation value.

Also, the EQ-5D is a general-purpose instrument, multi-dimensional, yet concise and simple. It can be considered as the golden ratio between simplicity and requirement for multidimensional assessment of health-related quality of life. Among the advantages of the EQ-5D are the high completion rates due to the brevity and comprehensibility of the instrument. Also, its reliability and validity have been verified, research has demonstrated the high correlation of its dimensions with those of other widely used instruments. On the contrary, the disadvantages of EQ-5D are the reduced sensitivity and the strong ceiling effect.[24–29]

Finally, the EQ-5D has undergone the process of cultural adaptation to the Greek language. [29] In a recent study, in which both the analog scale and the York A1 tariff index were also used, the instrument demonstrated good validity and reliability with a representative sample of Greek general population. [30]

Statistical analysis

The statistical program IBM SPSS STATISTICS 22.0 was used to generate the data. In order to be able to analyze the resulting data, the average value (mean) and the Standard Deviation (SD) were also used. The absolute (N) and relative (%) frequencies contributed to the description of the qualitative variables. With the help of histograms, symmetry indices and the non-parametric Kolmogorov-Smirnov test, the distributions of the summary scales were checked and confirmed to deviate significantly from the normal distribution. This deviation is mainly due to the ceiling effect, namely the high percentages recorded by the scales at their upper values. The x^2 test was used for correlations between groups. A p-value of 0.05 was set for statistically significant difference.

RESULTS

The researcher contacted by telephone 126 patients and 100 of them wanted to answer and participate in the study, setting the response rate at 79 .3%. Of the 100 patients who participated in the study, 62% were men and 38% were women (Figure 1). The minimum age of the sample was 37 years and the maximum was 88 years, with a mean value of 63.68 years and a SD of 12.876. Sixty percent of the study subjects were patients under 65 years of age. (Table 1,2).

The first question about the mobility problems revealed that 36% had no problems walking, 24% had few problems while walking, 24% had moderate problems walking, 10% had severe walking problems and 6% are unable to walk (Figure 2). Regarding self-care, 44% of the patients answered that they have no problem washing or dressing themselves and 30% reported that they have little problems washing or dressing themselves, See Figure 3 for details about other members of the study. When asked if can carry out their usual daily activities (e.g., work, study,

household, family, or leisure activities), 30% reported that have no problem doing their usual daily activities and 22% perceived that experience only minor problems carrying them out. See Figure 4 for complete results. Information about pain and discomfort post-myocardial infarction is displayed in Figure 5. No pain or discomfort was reported by 18% of the respondents and 28% experienced little pain or discomfort. Only 14% described their pain and discomfort as excessive. Regarding the anxiety and sadness that patients experience after a myocardial infarction, 8% reported little or no anxiety or sadness. However, 34% described excessive anxiety and sadness. (See Figure 6 for additional results.)

In the last question, patients were asked to draw a vertical line to the point on the scale that they thought to be the rate of their current state of health. The mean value of the centile psychometric scale was 54.70 and the SD was found to be 23.015, with a minimum value of 0 and a maximum of 90 (0 represents the worst possible state of health and 100 the best possible state of health) (Table 3).

According to Table 4, men tended to experience more problems in all dimensions than women, by a difference of 5-10%. There was also a differentiation based on age.

In the correlations carried out using the X^2 index, it was clearly seen that there is a statistically significant difference between gender, with men being more affected with mobility problems (p-value= 0.014) and with the performance of usual activities (p-value= 0.003). Also, there was a statistically significant difference between the age groups. Patients who are ≤65 years old appeared to be more affected compared to those >65 years old in terms of mobility problems (p-value= 0.009), performance of usual activities (p-value= 0.005) and anxiety or sadness (p-value= 0.020).

DISCUSSION

The results of this research generally corresponded with those of other studies, which showed that several socio-economic and demographic factors, such as gender and age, are determinants of health-related quality of life both for the general population and for cardiac patients. [30,31]

In the study 62% were men, which is supported by other studies as men tend to have heart attacks earlier and later in life than women. [32–34] In the study by Valero-Masa et al in 2017 it was shown that women have a lower incidence of myocardial infarction (23.2% vs. 76.8%) [(35)]. However, the same study found that compared to men, women had a higher risk profile with older age (70.1±14.4 years vs. 62.3±13.4, P<0.001), more cardiovascular risk factors (except smoking), longer time from symptom onset to arrival at hospital (5.2±4.1 hours vs. 4.2±3.7), higher Killip classification (1.6±1.1 vs. 1.4±0.8), fewer complete revascularizations (67.8% vs. 77.9% in men), and higher in-hospital mortality (10.1% vs. 4.0%). Another study in 2019 confirms that male gender is a predisposing risk factor for the development of a cardiovascular event. [34]

The minimum age of the study sample was 37 years and the maximum 88 years, with a mean value of 63.68 years. Also, 60% were patients under 65 years old and 40% were patients over 65 years old. The study by Dzubur et al in 2019 agrees with the findings of the study as it appeared that myocardial infarction occurs at younger ages.[35] In particular, the study by Yunyun et al in 2014 proved that a lifestyle of young people, which includes a high level of stress, professional problems, limited periods of relaxation, smoking, poor diet and alcohol consumption, leads to disorders of the organism as a whole and therefore to coronary heart disease with its most serious manifestation, acute myocardial infarction. [36]

Subsequently, it appeared that the mobility problems that patients who have suffered a myocardial infarction may experience do not bother them to a great extent as 6 out of 10 patients did not experience any problems or had little mobility problems (60%). This is confirmed by a recent study in 2021, who investigated falls in patients who had suffered a myocardial infarction, finding that only 21.6% reported falls without medical intervention and 6.4% a severe fall, who required medical intervention, 6 months after hospital discharge.[37] Factors independently associated with serious medical falls included older age, polypharmacy, reduced functional mobility, previous history of falling, and living alone. Also, one more study showed that participants reported having the highest burden of problems of any level, including mobility, during hospitalization, which significantly improved 6 months after discharge. [38]

For self-care in patients after myocardial infarction, it was found that about 7 out of 10 patients have no or little problems washing or dressing themselves, while only 1 in 10 have serious problems or are unable to wash or dress themselves. Also, about 5 in 10 had no problems or minor problems carrying out their usual daily activities (e.g. work, study, household, family or leisure activities) and just 2 in 10 had severe problems or were unable to do their usual activities. This finding contrasts with the results of the Hurdus study which showed that for EQ-5D dimensions, 66.6% of participants reported ≥1 problem during hospitalization, which increased to 70 .8% at 30 days, 58.4% at 6 months and 56.9% at 12 months. Every domain improved at every time point over the 12-month period, except for self-care, which showed a modest increase from 7.7% to 8.2% at 6 and 12 months, respectively [(38)]. The same findings were confirmed in a study three years ago where 69.1% reported experiencing one or more perceived health problems in mobility, self-care, usual activities, pain/discomfort and anxiety/depression during hospitalization and 59, 7% in 12 months. Problems improved for most survivors with self-care and performance of usual activities not significantly changed. [39] Furthermore, one study showed that self-care behavior in general (including usual activities) had a significant relationship with depressive symptoms (P<0.0001). [40] Regarding pain or discomfort after myocardial infarction, it was found that about 4 in 10 had no or little pain or discomfort and 2 in 10 had severe or excessive pain or discomfort. Still, 3 in 10 experienced no or little stress or sadness, and 5 in 10 experienced severe or excessive stress or sadness. Thus, it seems that patients are psychologically affected after the onset of myocardial infarction. This is also confirmed by in a study where they observed that up to 31 days after an acute myocardial infarction, more than two thirds of the patient's experienced depression and/or anxiety disorders.[41] Regarding the mechanism that could cause depression and anxiety disorder after acute myocardial infarction, could be explained as a type of post-traumatic stress, in which people suffering from an illness that puts them at risk of imminent death make them think about how life will change after this clinical event, such as changes in habits, possible consequences and limitations in activities of daily living. The experience of illness can trigger stressful feelings and reactions, which include images of depression and anxiety disorder. [42] Furthermore, the study by researcher Ossola found that the development of a first depressive episode after myocardial infarction, in a model proportional hazard, was associated with nearly 3 times the risk of recurrent cardiac event (odds ratio = 2.590, 95% confidence interval [CI] [1.321, 5.078], p = .006).[43]

More specifically, researchers studied the EQ-5D dimensions in published articles found that there were improvements in all aspects of patient health 6 months after discharge for cardiac patients. [44] Furthermore, one more study found that about one in four patients reported no problems in all five dimensions (57.9% reported no problems in mobility, 88.4% reported no problems in self-care, 67 .1% reported no problems with usual activities, 41.1% reported no problems with pain/discomfort, and 56.2% reported no problems with anxiety/depression). Fewer problems are observed in the self-care dimension and most problems are reported in the pain/discomfort dimension. [45] A conclusion that does not deviate from the findings of the present study. The above study also showed that older patients and women reported more problems, patients with behavioral risk factors and patients with comorbidities were more likely to have severe or extreme problems, and finally the comparison between countries showed significant differences in reported problems. The above studies are in general agreement with the findings of the present study.

The average value (mean) of the one-hundred-degree psychometric scale was 54.70 and the Std. Deviation was found at 23.015, therefore it appeared that the general health of the sample is in a moderate state. And this is also confirmed by the measurements of the health conditions with the average health condition being at 48%.

In the study, the problems of anxiety and sadness with a percentage of 50% (34% excessive anxiety/sadness) are in the first place, followed by the problems of pain and discomfort with a percentage of 24% (14% excessive pain/discomfort), the problems in the performance of usual daily activities at a rate of 22% (6% are unable to carry out usual activities), mobility problems at a rate of 16% (6% being unable to walk) and finally self-care problems at a rate of 12% (4% are unable to care for themselves). Findings that are also confirmed by the above studies.

Specifically, the Smedt et al study found (2020) that 41.1% have no pain/discomfort problems, 56.2% have no anxiety/depression problems, 57.9% have no mobility problems, 67, 1% have no problems with usual activities and 88.4% have no problems with self-care. [45]

In the correlations carried out using the X^2 index, it was obvious that there is a statistically significant difference between gender and the age groups. The study by Serpytis et al showed that women had a higher prevalence of depression and/or anxiety disorders compared to men and also tended to have more severe manifestations of both depression and anxiety disorders. Furthermore, in older men, depression was more severe and anxiety disorder less severe, whereas in women these comorbidities showed a linear presentation in severity, independent of the age factor. [41]

CONCLUSIONS

In conclusion, it was found that the most problems faced by patients with myocardial infarction after 6 months of discharge from the cardiac care unit appear in the dimension of anxiety and sadness and the least in the dimension of self-care. There is a statistically significant difference between genders, with men being more affected with mobility problems and with the performance of usual activities. Patients who are ≤65 years old appeared to be more affected compared to those >65 years in terms of mobility problems, performance of usual activities and anxiety or sadness. Therefore, whether patients with coronary heart disease or not have problems in one or more dimensions of the EQ-5D, as well as the severity of the problems reported, is highly related to the patient's profile.

Assessment of health-related quality of life both in hospital and after discharge may be important in determining which patients might benefit from tailored interventions. Also, the continued existence of health disparities represents an important public health problem and requires further research to address these age- and sex-related health disparities for patients with myocardial infarction.

Implications and Recommendations for Practice and Research

Feeling safe is an overpowering need of ICU patients with myocardial infarction after 6 months of discharge from the cardiac care. Many factors could influence perceptions of feeling safe in these patients, including family and friends, staff, religion, and knowing, regaining control, hoping, and trusting. In many areas nurses can intervene to strengthen the various factors that affect feeling safe. For example, nurses can work closely with family members, building trusting relationships, so families can be incorporated as part of the team to provide support for patients.

Our own team's proposals are related to the development of a holistic nursing framework in the rehabilitation care of the myocardial infarction patient, because that could contribute to a better recovery. Concepts in this framework include the body-mind-spirit interaction, negative life stress, coping styles, and the patient's relationship to illness. Social support in the form of physical care, along with coping skills, is usually enough to maintain health, integrity, control, and wholeness. But professional care is required when the disease is noticed, or symptoms appear. For this reason, nursing intervention is deemed necessary to improve public health.

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ANNEX

Table 1. Mean and standard deviation of the age of the study sample.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
AGE	100	37	88	63,68	12,876
Valid N (listwise)	100				

Table 2. Distribution of the sample by age

AGE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	≤65	60	60,0	60,0	60,0
	>65	40	40,0	40,0	100,0
	Total	100	100,0	100,0	

Table 3. Mean value and standard deviation of the health assessment of the sampled patients after myocardial infarction.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
We would like to know how good or bad your health is TODAY.	100	0	90	54,70	23,015
Valid N (listwise)	100				

Table 4. Main survey data.

	Total sample	*Men*	*Women*	*≤65 years*	*>65 years old*
Mobility (K)					
I have no problem walking	36%	28%	8%	18%	18%
I have minor problems walking	24%	8%	16%	20%	4%
I have moderate problems walking	24%	16%	8%	12%	12%
I have serious problems walking	10%	6%	4%	4%	6%
I am unable to walk	6%	4%	2%	6%	0%
SELF-CARE (A)					
I have no problem washing or dressing alone	44%	32%	12%	28%	16%
I have minor problems with washing or dressing	30%	14%	16%	18%	12%
I have moderate problems with washing or dressing	14%	8%	6%	6%	8%
I have serious problems with washing or dressing	8%	6%	2%	4%	4%
I am unable to wash or dress	4%	2%	2%	4%	0%
COMMON ACTIVITIES (CS)					
I have no problem doing my usual activities	30%	18%	12%	22%	8%
I have minor problems doing my usual activities	22%	8%	14%	18%	4%
I have moderate problems doing my usual activities	26%	16%	10%	10%	16%
I have serious problems doing my usual activities	16%	16%	0%	6%	10%
I am unable to do my usual activities	6%	4%	2%	4%	2%
PAIN / DYSPHORIA (PD)					
I have no pain or discomfort at all	18%	8%	10%	14%	4%
I have little pain or discomfort	28%	20%	8%	16%	2%
I have moderate pain or discomfort	30%	18%	12%	16%	14%
I have severe pain or discomfort	10%	8%	2%	4%	6%
I have excessive pain or discomfort	14%	8%	6%	10%	4%
ANXIETY / SADNESS (ATH)					
I have no anxiety or sadness	8%	2%	6%	6%	2%
I have little anxiety or sadness	22%	14%	8%	12%	10%
I have moderate anxiety or sadness	20%	12%	8%	14%	6%
I have severe anxiety or sadness	16%	12%	4%	4%	12%
I have excessive anxiety or sadness	34%	22%	12%	24%	10%

Artwork / Figures

Figure 1. Distribution of the sample by gender.

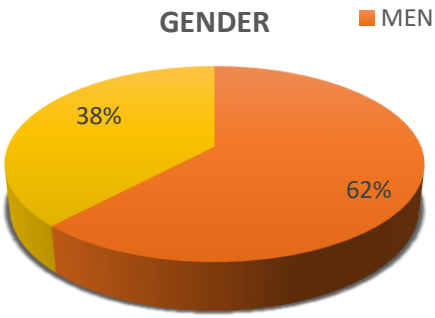

Figure 2. Distribution of the sample based on mobility problems following myocardial infraction.

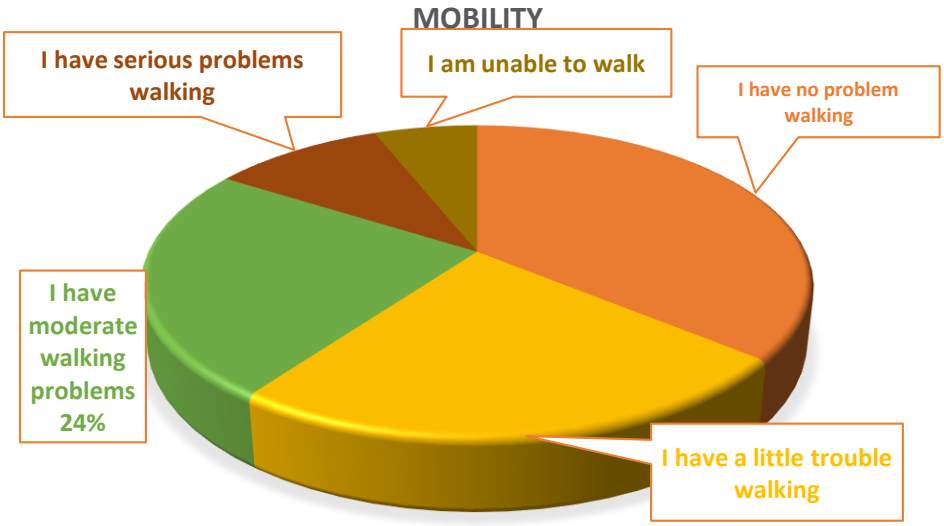

Figure 3. Distribution of the sample based on self-care after myocardial infarction.

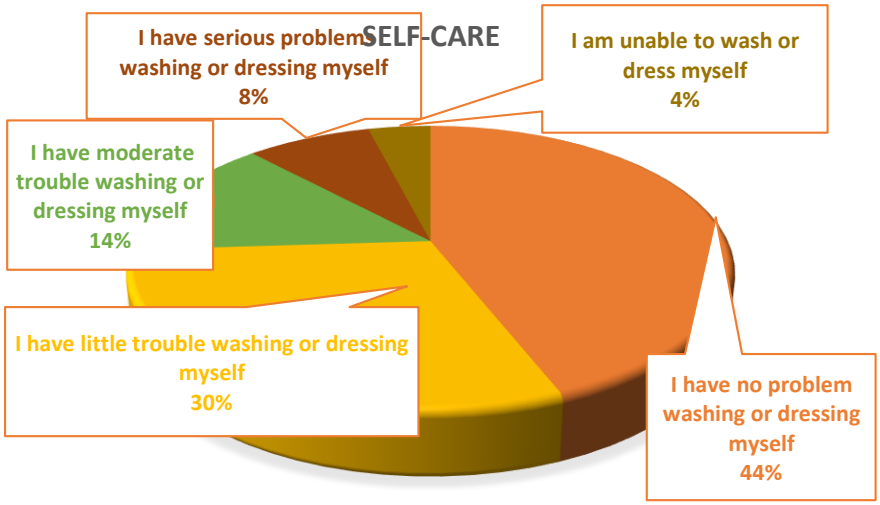

Figure 4. Distribution of the sample based on usual activities after myocardial infarction.

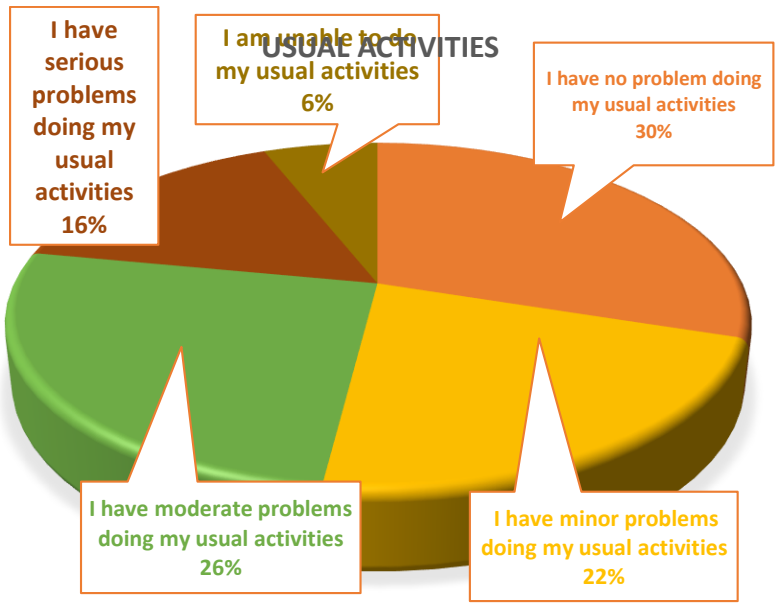

Figure 5. Sample distribution based on pain and discomfort following myocardial infarction.

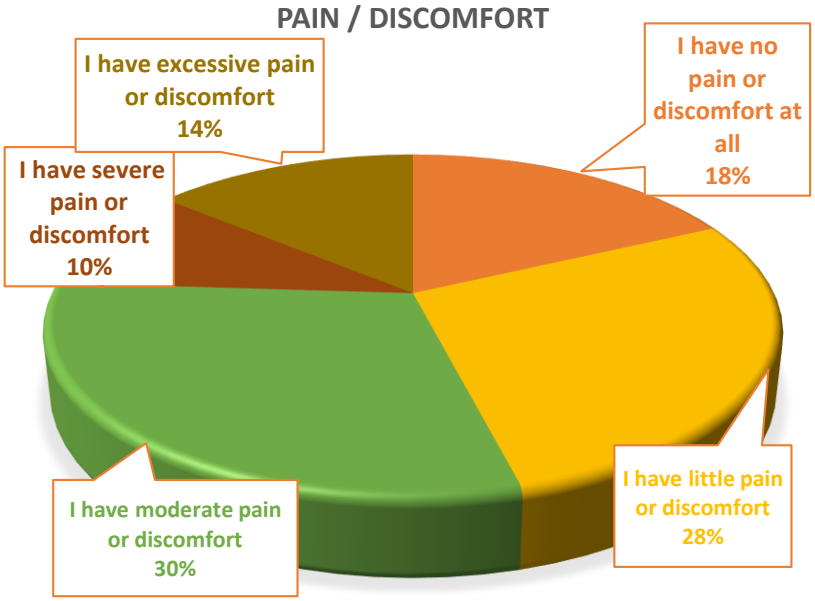

Figure 6. Distribution of the sample based on anxiety and sadness after myocardial infarction.