# The Comparison of Depression and Anxiety Levels in Patients with Acute Coronary Syndrome

## Akut Koroner Sendrom Hastalarında Depresyon ve Anksiyete Düzeylerinin Karşılaştırılması

Akut Koroner Sendromda Depresyon ve Anksiyete / Depression and Anxiety Levels in Acute Coronary Syndrome

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**Özet**

Amaç: Bu çalışmada akut koroner sendrom (AKS) tanısı ile yatırılan hastalardaki depresyon ve anksiyete düzeylerinin, ayaktan takip edilen stabil koroner arter hastaları ve koroner arter hastalığı olmayan kontrol grubunun depresyon ve anksiyete düzeylerinin karşılaştırılması amaçlanmıştır. Gereç ve Yöntem: Çalışmaya toplam 300 olgu dahil edilmiştir. İlk olarak tüm olgulara standardize edilmiş mini mental test uygulandı ve bu testten 23 puan ve üzerinde alan hastalar çalışmaya dahil edildi. Hastaların sosyodemografik bilgileri kaydedildikten sonra Geriyatrik Depresyon Ölçeği (GDÖ), Beck Depresyon Envanteri (BDE), Beck Anksiyete Ölçeği (BAÖ), Durumluk ve Sürekli Anksiyete Ölçekleri olmak üzere beş psikiyatrik ölçek uygulanarak depresyon ve anksiyete düzeyleri karşılaştırıldı. Bulgular: AKS grubunda tüm ortalama ölçek puanları diğer gruplardan anlamlı olarak daha yüksek saptandı (p<0.001). AKS grubunda erkek hastalarda kadın hastalara göre GDÖ, BDE ve BAÖ puanları anlamlı olarak daha yüksek saptandı (p<0.05). AKS'li hastalar ST elevasyonlu miyokard infarktüsü, ST elevasyonsuz miyokard infarktüsü (STEMİ) ve kararsız angina pektoris tanısı konulan hastalar olmak üzere alt gruplara ayrıldığında, STEMİ grubunda tüm test puanları daha yüksek olmasına rağmen istatistiksel olarak anlamlılık saptanmamıştır. AKS'da uygulanan tedavi ile depresyon ve anksiyete skorları arasında da anlamlı ilişki saptanmamıştır. AKS'li hastaların hastanede kalış süresi ile tüm ölçek skorları arasında anlamlı ilişki tespit edilmiştir (p<0,001). Tartışma: AKS hastalarında depresyon ve anksiyete düzeyleri mutlaka değerlendirilmelidir. Böylece hem hastaların hayat kaliteleri arttırılacak hem de yeni kardiyovasküler olay sayısının azalmasıyla mortalite ve morbidite oranları da azalacaktır.

**Anahtar Kelimeler**

Akut Koroner Sendrom; Depresyon; Anksiyete

**Abstract**

Aim: In this study we aimed to compare depression and anxiety levels of patients admitted for acute coronary syndrome (ACS) with patients followed for stable coronary artery disease in outpatient clinics and control group without coronary artery disease. Material and Method: Study population was composed of 300 patients. Firstly all patients underwent standardized mini mental test and patients whose test scores were under 23 were excluded and patients whose scores were 23 or higher were included in the study. After the demograhic characteristics of patients had been recorded all patients were administered the following scales: Geriatric Depression Scale( GDS), Beck Depression Inventory(BDI), Beck Anxiety Inventory(BAI), State and Trait Anxiety Inventory(STAI 1 and STAI 2). The scores obtained from these scales were compared between all three groups. Results: All test scores were significantly higher in ACS group (p<0.001).In ACS group GDS, BDI and BAI scores were higher in male patients compared to females (p<0.05). When ACS group was divided as ST elevation myocardial infarction (STEMI), Non ST elevation myocardial infarction and unstable angina pectoris the test scores were higher in STEMI subgroup but the relation was not statistically significant. The hospitalisation period length was found to be significantly related to all test scores in patients with ACS (p<0,001). Discussion: Depression and and levels of patients with ACS syndrome must be surely evaluated. This will help us both to improve life quality of these patients and decrease mortality and morbidity of these patients by diagnosing depression and anxiety disorders and treating them on time.

**Keywords**

Acute Coronary Syndrome; Depression; Anxiety

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## Introduction

The relation between cardiac dieases and pyschiatric disorders has been known for long years. The sudden cardiac death risk occurring after diagnosis of cardiac diseases or life threatening conditions related to cardiac diseases frequently causes anxiety and dysphoria and usually causes depression. For this reason psychiatric treatment approaches for patients diagnosed with cardiac diseases are quite important to increase the patient compliance, improve prognosis and reducing distress caused by psychiatric illness [1].

Major depression is particularly frequent among patients diagnosed with acute myocardial infarction (AMI). Moreover clinically important depressive symptoms are seen among patients not fully meeting major depression criteria also. The prevalance of depression among patients with AMI varies; the prevalance of depressive symptoms is reported to be 30-40% and that of major depression is reported to be 15-20% among these patients [2,3].

Despite of the frequency of depression and its negative effects on cardiac prognosis, unfortunately depression occurring after AMI is usually overlooked and thus remain untreated. Only 10% patients of all patients really having depression after AMI are diagnosed with depression [4-6].Many studies have showed that depression is both an important risk factor for AMI and predictor of bad prognosis after AMI [6].Depression developing after AMI is reported to increase recurrent MI and angina pectoris rates [8], impair patient compliance to treatment, increase rehospitalisation rates and hospitalisation period, admissions to medical centers and thus increase medical treatment expenditure [9-11].The onset of symptoms is an important trigger for anxiety in patients with coronary artery disease (CAD) and causes an increased risk for AMI and also causes a fear of sudden death in this group of patients. Furthermore anxiety causes an increase in symptoms such as dispnea, chest pain, dizzines, cold perspirating and palpitation. It is reported that 34% of patients with known CAD and applying to emergency units have panic disorder. On the other hand, panic disorder varies between 10% and 50% among patients with CAD. Sympatic nerve activation during panic attack is claimed to cause coronary vasospazm and thus panic disorder is claimed to be related to myocardial ischemia [12,13].

In this study we aimed to compare depression and anxiety levels of patients hospitalised with ACS diagnosis to depression and anxiety levels of patients being followed for stable CAD in outpatient cardiology clinics and patients not having CAD as control group.

## Material and Method

Totally 300 Patients were included; 100 patients admitted with ACS, 100 patients with stable CAD and 100 patients without CAD were chosen. The patients with ACS were selected among patients hospitalized for ACS and the patients in other two groups were selected among patients evaluated or followed in outpatient cardiology clinics. The patients with ACS were evaluated after their clinical stabilization during hospital stay and patients with stable CAD and patients without CAD were evaluated during their polyclinic visits. Patients whose Standardized Mini Mental Test scores were 23 or higher were included. Then geriatric depression scale (GDS), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), State and Trait Anxiety Inventory ( STAI form 1 and 2) were administered to all patients accompanied with doctors to measure their depression and anxiety levels after they been told about how to fill these forms. The scores provided from these scales were used to compare depression and anxiety levels of patient groups. The exclusion criteria were: 1-Patients who were not clinically stable enough for psychiatric evaluation, 2-Patients whose standardized mini mental test scores were under 23, 3-Patients who had been diagnosed with depression and anxiety disorder before and 4-Patients who had serious life threatening comorbid diseases. The study was approved by hospital Ethics Committee and patients gave their written informed consent.

### *Statistic*

Statistics were obtained using the redy-to-use program of SPSS version 13.0. Mann-Withney U test was used to compared two independent groups and Kruskal Wallis test for comparing more than two independent groups. Pearson chi-square test was used to compare cathegoric variables. Spearman correlation analyses was made to investigate relation between variables. Standard deviations were used with mean values as variable criterion and $p<0.05$ was accepted as statistical significance.

## Results

100 patients with ACS ( 25 female, 75 male, mean age 59.1±10.2), 100 patients with stable CAD ( 14 female, 86 male, mean age 59.6±8.9) and 100 patients without CAD (70 female, 30 male, mean age 53.7±8.2), totally 300 patients in 3 groups were included in the study.

Results obtained from aforementioned tests are summarized in Table 1. When all groups were compared mean GDS, BAI, STAI-1, STAI-2 and BDI scores were significantly higher in ACS group ($p<0.001$).

When ACS group was divided to subgroups there were 43 patients with ST elevation myocardial infarction (STEMI), there were 36 patients with non ST elevation myocardial infarction (NSTEMI) and there were 21 patients with unstable angina pectoris (USAP). When subgroups were compared in STEMI group all mean test scores were higher than the other subgroups but the difference was not statistically siginificant. No significant difference was found between 3 subgroups.(table 2).

In ACS group the mean GDS, BDI and BAI scores were found to be higher in male patients ($p< 0.05$). In ACS group 53 patient had history of hypertension (HT) and 47 patients had not. In this group hypertensive patients had higher BDI scores than non hypertensive patients (table 3) ($p< 0.05$). In stable CAD group there were 69 hypertensive patients and 31 non hypertensive patients and there was no difference between test scores of hypertensive patients and non hypertensive ones. In group without CAD, there were 62 patients with hypertension and GDS and BAI scores were found to be higher in hypertensive patients in this

Table 1. The mean test scores of all 3 groups

| | Patient number | Mean GDS score | Mean BAI score | Mean STAI-1 score | Mean STAI-2 score | Mean BDI score |
|---|---|---|---|---|---|---|
| Acute coronary syndrome | 100 | 12.07* | 17.70* | 44.58* | 48.42* | 14.16* |
| Stable coronary artery disease | 100 | 7.51* | 9.14* | 42.98* | 46.18* | 8.32* |
| Patients without coronary artery disease | 100 | 4.66* | 4.36* | 40.15* | 42.46* | 3.69* |

GDS; Geriatric Depression Scale, BAI; Beck Anxiety Inventory, BDI; Beck Depression Inventory, STAI; State and Trait Anxiety Inventory , *p<0.001

Table 2. The mean scores of ACS subgroups

| | Patient number | Mean GDS score | Mean BAI score | Mean STAI-1 score | Mean STAI-2 score | Mean BDI score |
|---|---|---|---|---|---|---|
| STEMI | 43 | 12.74 | 18.18 | 44.76 | 49.23 | 14.65 |
| NSTEMI | 36 | 12.13 | 17.05 | 44.16 | 47.58 | 14.77 |
| USAP | 21 | 10.57 | 17.8 | 44.90 | 48.19 | 12.09 |
| P value | | 0.309 | 0.913 | 0.479 | 0.525 | 0.452 |

GDS; Geriatric Depression Scale, BAI; Beck Anxiety Inventory, BDI; Beck Depression Inventory, STAI; State and Trait Anxiety Inventory

group. In ACS group there were 34 diabetic patients and in this group GDS and BAI scores were significantly higher. There were 33 patients with history of cardiac diseases such as previous myocardial infarction, coronary artery bypass grafth (CABG), percutan coronary intervention (PCI) or heart failure and 67 patients had none of these diseases in ACS group. The test scores did not differ between patients with history of cardiac diseases and patients with no history of cardiac diseases. (table 3). In stable CAD group 86 patients had at least one of the diseases mentioned above and only STAI-2 score was significantly higher in these patients ($p< 0.05$).

There were 23 patients with DM and 77 patients without DM in stable CAD group and the difference between the two groups was not statistically significant (table 3.).

When marital status of patients in ACS group was investigated we found that 88 patients were married, two were single and 10 patients were widowed. All test scores were higher in widowed patients but GDS, BAI and BDI scores were significantly higher in these patients ($p<0.05$). 11 patients in ACS group were found to live alone, in this group of patients GDS, BAI and BDI scores were significantly higher than scores of patients not living alone (table 3)($p <0.05$). On the other hand 7 patients in stable CAD group were found to live alone and similar to ACS group GDS, BAI and BDI scores of these patients were higher than patients not living alone. When patients without CAD were investigated about this relation, only 4 patients were found to live alone and only STAI-1 score was significantly higher in these patients.

The hospitalization period of patients with ACS was minimum 2 days, maximum 9 days and the mean period was 4.73 ± 1.61 days. We found that the longer the hospitalization period was the higher the test scores were. All test scores were significantly higher in patients with longer periods of hospital stay ($p<0.01$). When patients in ACS group were classified as patients undergoing coronary angiography and patients not undergoing this process, 64 patients were found to have undergone coronary angiography and no relation was found between test scores and coronary angiography process.

Table 3. The mean test scores of ACS patients according to their general characteristics

| | patient number | Mean GDS score | Mean BAI score | Mean STAI-1 score | Mean STAI-2 score | Mean BDI score |
|---|---|---|---|---|---|---|
| Male | 75 | 11.1 | 15.72 | 44.28 | 47.93 | 12.02 |
| Female | 25 | 11.96 | 23.64 | 45.48 | 49.88 | 20.56 |
| P value | | 0.014 | 0.002 | 0.330 | 0.093 | <0.001 |
| HT(+) | 53 | 12.94 | 19.39 | 45.18 | 48.52 | 16.58 |
| HT(-) | 47 | 11.08 | 15.78 | 43.89 | 48.29 | 11.42 |
| P value | | 0.13 | 0.07 | 0.39 | 0.97 | 0.007 |
| DM(+) | 34 | 13.85 | 20.11 | 44.47 | 48.67 | 15.79 |
| DM(-) | 66 | 11.15 | 16.45 | 44.63 | 48.28 | 13.31 |
| P value | | 0.03 | 0.04 | 0.98 | 0.76 | 0.05 |
| Smoking(+) | 44 | 10.97 | 15.04 | 44.65 | 48.40 | 11.95 |
| Smoking(-) | 56 | 12.92 | 19.78 | 44.51 | 48.42 | 15.89 |
| P value | | 0.15 | 0.02 | 0.94 | 0.99 | 0.05 |
| Alcohol(+) | 22 | 10.40 | 15.81 | 44.95 | 47.86 | 11.45 |
| Alcohol(-) | 78 | 12.53 | 18.23 | 44.47 | 48.57 | 13.92 |
| P value | | 0.15 | 0.43 | 0.94 | 0.44 | 0.12 |
| Cardiac history (+) | 33 | 12.48 | 19.84 | 45.54 | 48.42 | 15.72 |
| Cardiac history (-) | 67 | 11.86 | 16.64 | 44.10 | 48.41 | 13.38 |
| P value | | 0.61 | 0.15 | 0.22 | 0.77 | 0.22 |
| Married | 88 | 11.38 | 16.70 | 44.56 | 48.25 | 13.52 |
| Single | 2 | 15.0 | 22.00 | 35.50 | 38.50 | 12.50 |
| Widowed | 10 | 17.50 | 25.60 | 46.50 | 51.90 | 20.10 |
| P value | | 0.002 | 0.07 | 0.197 | 0.127 | 0.009 |
| Living alone | 11 | 16.54 | 23.63 | 45.09 | 48.45 | 17.90 |
| Not living alone | 89 | 11.52 | 16.96 | 44.51 | 48.29 | 13.69 |
| P value | | 0.005 | 0.029 | 0.350 | 0.782 | 0.042 |

GDÖ; Geriatric Depression Scale, BAI; Beck Anxiety Inventory, BDI; Beck Depression Inventory, STAI; State and Trait Anxiety Inventory, DM; Dyabetes Mellitüs, HT; Hypertension

## Discussion

In our study we primarily aimed to compare the depression and anxiety levels of patients hospitalized with ACS to those of patients with stable CAD and patients without CAD.

Studies using self-rating depression scales report that depressive symptom frequency is 30-40% and major depression frequency is 15-20% [2,3]. Similarly the frequency of major depression in patients followed in hospital after AMI and patients in post coronary surgery period is reported to be high [14].Jiang et al have reported that the frequency of major depression after acute coronary syndrome is 15%-23% and furthermore many patients have clinically important depressive symptoms which are not sufficient to diagnose major depression [15].In another study Drago et al reported the frequency of major depression episodes as 15% and rate of mild to moderate depression as 35% after myocardial infarctions [16].Some other studies have reported higher rates for depression [17,18].

Anxiety is reported to be frequent after acute myocardial infarction [19].Anxiety has been found out to increase cardiac complications by 2-4 times after AMI independent from depression and it has been showed that this effect continues during the period of 18 months after AMI[5].In another study the anxiety rates are reported as 44% and anxiety is mentioned to effect the phsycal and psychosocial healing after myocardial infarction [20].In our study similar to these studies we found that depression and anxiety levels of patients with acute coronary syndrome is higher than the other two groups. When we compared stable CAD group with non coronary patients the depression and anxiety levels of patients with stable CAD were higher than those of patients without CAD.

Some studies have showed that depression is more frequent in women when compared to men [21].The studies investigating the relation of gender and depression after AMI showed that depression rates are higher in women compared to men[22,23]. In our study the number of men were higher than women in ACS and stable CAD groups. In ACS group depression scores and anxiety levels determined by BDI were higher in men. This result is different from result of other studies. This may be caused by small number of women in ACS group.

A study investigating the relation of hypertension (HT) and dep-

ression after acute coronary syndrome showed that depression is related to hypertension [24].In our study there was HT was correlated with only BDI score in ACS group and HT was found not to be related to depression scores in stable CAD group. GDS and BAI scores were higher in diabetic patients compared to nondiabetics in the ACS group. In our study we could not find the expected effects of chronic diseases such as DM or HT on depression and anxiety levels of patients with ACS.

Living alone is claimed to increase the AMI risk due to insufficient social support, moreover living alone and lack of social support increase mortality in long term after AMI especially in men [25,26].In our study we investigated the effefcts of living alone on depression and anxiety levels of patients and we found that depression and anxiety scores of these patients were higher in ACS group with similar to other study results. In stable CAD group similarly depression related scores and BAI scores were higher in patients living alone.

The number of patients not living alone in our study is much more than number of patients living alone. This may be caused by the lower number of people living alone in our country when compared to other countries. In our country people who are not married, people who are divorced or widowed usually prefer to live with their other family members. For this reason the number of patients living alone remained low in our study and our results did not reflect the results of other studies carrried out worldwide.

Being married is accepted as protector factor about cardiovascular diseases [27].In our study we investigated the relation of marital status and depression and anxiety scores. We found out that all test scores were higher in widowed patients in ACS group and scores related to depression and BAI score were significantly higher in widowed patients compared to married ones.

In our study the depression and anxiety scores of patients in ACS group and thus their depression anxiety levels were found to be higher than those of patients in the other two groups. This result was thought to be primarily due to factors such as angina, dispnea and death fear that patients feels in acute phase of acute coronary syndromes. Besides we think that factors such as living alone, being widowed and partly diseases like HT and DM can be presipitating factors for developing depression and anxiety after acute coronary syndromes. But we could not find the expected effects of some factors on depression and anxiety levels of patients such as cardiovascular disease history, ACS subgroups, the treatment administered to patients for ACS, coronary angiography or angioplasty.

Patients in ACS group were chosen among hospitalized patients and the others were chosen among patients on outpatient follow. This may be a probable explanation for the higher depression and anxiety leves of patients with ACS. On the other hand the small number of female patients in ACS group, evaluating the patients with ACS after they had been just clinically stabilized and not following them in long terms may be restricted sides of our study.

In conclusion; patients admitted to coronary care units for ACS must be evaluated for their depression and anxiety levels during hospital stay and after externation and as an important aspect the depressive and anxious condition of the patient must not be thought as a temporary condition only due to coronary event patients experience.The diagnosis and treatment of depression and anxiety disorders promptly will help the patients return to their routine lives more easily and thus increase life quality. Furthermore it will decrease morbidity and mortality by decreasing future cardiovascular events.

### *Competing interests*

The authors declare that they have no competing interests.

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