



# Control of asthma, quality of life, anxiety and depression symptoms among Turkish patients with asthma

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## ABSTRACT

**Aim:** Anxiety and depression can affect patients with asthma. It has been shown that asthma-related quality of life has previously been associated with asthma control. The aims of the present study were to investigate the frequency of anxiety and depression symptoms among Turkish patients with asthma, and to evaluate the relation of anxiety and depression symptoms with asthma control and quality of life in these patients.

**Materials and Methods:** A total number of 174 patients regularly followed-up by the asthma clinics were included to the study. Since 27 patients had bronchiectasis and were receiving concomitant antidepressant therapy, 147 patients were requested to complete the ACT (Asthma Control Test), HAD (Hospital Anxiety Depression) questionnaire and asthma-specific quality of life questionnaire (AQLQ).

**Results:** Of all patients with asthma, 30.6% had anxiety symptoms and 45.6% had depression symptoms, while asthma was adequately controlled (ACT $\geq$ 20) in 49%. Patients with asthma and depression symptoms had significantly lower scores in total AQLQ and in all subgroups ( $p < 0.05$ ). Patients with adequately controlled asthma had higher quality of life and lower HAD anxiety and depression scores. A significant negative correlation was found between HAD anxiety and depression scores, and AQLQ and ACT scores ( $p < 0.001$ ).

**Conclusion:** The prevalence of anxiety and depression symptoms is elevated among Turkish patients with asthma. These patients have poorly controlled asthma and lower quality of life. The presence of anxiety and depression symptoms is negatively associated with asthma control and quality of life.

**Keywords:** quality of life, depression, anxiety, asthma

## INTRODUCTION

Bronchial asthma is a multifactorial and chronic inflammatory disease influenced by environmental, allergic, infectious and psychological factors. While the environmental, allergic and infectious contributors of asthma have been well-studied, studies investigating psychological factors have gained speed in the recent years (1). Recent studies indicated that, despite the use of appropriate agents to treat asthma, most patients still have ongoing symptoms and fail to achieve asthma control (2-4). Studies support that the patients' concomitant psychological disorders may play a role on uncontrolled asthma, and asthma control is negatively affected in the presence of anxiety and depression (5,6). A previous multi-central, multinational study (17 countries, 42697 patients) reported that the rate of mental disorders is elevated among asthmatics compared to the general population (1).

Similar to other chronic diseases, studies indicated that psychological factors are more closely associated with the health status and quality of life in asthma than the severity of the disease itself (7). Psychological well-being of asthma patients was considered as a continuation of adequately controlled disease (6). Patients with asthma and concomitant psychiatric disorders have more poorly controlled asthma, higher use of healthcare resources and increased number of polyclinic visits compared to the asthmatics without any psychiatric disorder (8).

The prevalence of asthma varies between 5.4-9.8% in Turkey (9). "Mental Health Profile of Turkey Study" is one of the the largest epidemiological studies in our country reported %18 mental illness throughout all their lives in the population in Turkey (10). A previous Turkish study reported a higher incidence of anxiety and depression among asthma patients compared to the control group, and when compared based on asthma severity, the incidence of depression in severe asthma group was found to be significantly different from all other groups. The authors suggested that the emotional

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status of asthma patients can be one of the most important factors contributing to asthma control (11,12). Two previous studies reported 34% and 65% of asthmatics have one or more psychiatric disorder, respectively (5,13). Mental health state affects quality of life in asthma (14). *Asthma is a chronic health condition that covers the entire life of the patient and causes significant mental and social problems in addition to physical symptoms. For this reason, it is very important to assess the quality of life in addition to symptoms in order to obtain complete information about the health status of the patients (15).*

As there are a limited number of Turkish studies investigating the relation of anxiety and depression symptoms with asthma control and quality of life, we aimed to investigate the relation of anxiety and depression symptoms with asthma control and quality of life among Turkish asthma patients by using HAD(Hospital Anxiety Depression-Turkish version) scale (16), Asthma Control Test (ACT-Turkish version) (17) and AQLQ (asthma specific quality of life-Turkish version) questionnaire (18). We assumed that depression and anxiety symptoms represent two significant independent risk factors for uncontrolled asthma and poor quality of life.

## **MATERIALS AND METHODS**

It is a cross-sectional study including asthmatic patients who were being followed-up by regular visits at the Asthma Polyclinics of Pulmonology Department of Uludag University Medical Faculty. A total number of 174 patients selected from the appointment list were included to the study group. Patients diagnosed with asthma based on GINA criteria (15) who had been regularly followed-up by asthma polyclinics for at least 1 year were included to the study. Patients with a smoking history of more than 10 packs/year and those with concomitant diseases leading to shortness of breath were excluded from the study. Demographical characteristics, anthropometric measurements and asthma history of all patients, who did not meet any exclusion criteria and agreed to participate in the study by signing the informed consent form, were recorded. A total number of 27 patients, who had bronchiectasis and/or were receiving antidepressant therapy, were excluded from the study. The remaining 147 patients completed ACT, AQLQ (Turkish version) and HAD (Turkish version) questionnaires. All patients underwent pulmonary function tests. The study was approved by the Ethics Committee of Uludag University.

### **Evaluation of Asthma Control**

In asthma control test (ACT) administered to the patients, a score of 25 was interpreted as completely controlled asthma, while scores of 20-24 indicated controlled asthma, 16-19 indicated partial control and scores equal to or lower than 15 indicated uncontrolled asthma. Scores of 20 points and above (control and complete control), and scores of 19 and below (partial control and uncontrolled) were combined for statistical analysis.

### **Quality of Life Assessment**

In AQLQ, individual scores for symptoms (12 questions), activity limitation (11 questions), emotional functioning (5 questions) and environmental exposure (4 questions) were calculated and total score was considered to be the mean score of all 32 questions. Each question is answered on a scale from one to seven (1=highest level of impairment and 7=no impairment). Domain scores were presented as the mean score per question.

### **Assessment of Emotional Status**

Emotional status was measured by the HAD scale. A cut-off value of 10 and above was considered for anxiety symptoms and a cut-off value of 7 and above was considered for depression. Patients with an anxiety score of 10 and above were considered as HAD-A(+), those with a lower score were considered as HAD-A(-), and patients with a depression score of 7 and above were considered as HAD-D(+) while those with lower scores were accepted as HAD-D(-). HAD scale have been validated for Turkish population (16).

### **Statistical Analysis**

Analysis was performed using SPSS for Windows 17.0 (Chicago, IL) package program. Continuous variables were presented as mean and standard deviation. Shapiro-Wilk test was used to evaluate normality of the continuous variables. Normally distributed continuous variables were compared between the two groups using the parametric independent samples t test, and Mann-Whitney U test was used to compare non-normally distributed continuous variables. Categorical variables were compared between the groups by Pearson Chi-square or Fisher's exact chi-square test, and the results were presented by cross-tables. Pearson correlation or Spearman correlation coefficients were used to

**Table 1:** Demographical characteristics, pulmonary function test results and mean scores of AQLQ, ACT, Anxiety and Depression Questionnaires of the patients

Gender (F/M)	112 (%76.2) - 35 (%23.8)
Age (Years)	43.9 ± 13.5
BMI (kg/m <sup>2</sup> )	27.3 ± 5.0
FVC %	91.2 ± 16.7
FEV1 %	87.6 ± 17.9
FEV1/FVC %	85.3 ± 9.1
ACT	18.6±4.9
AQLQ Total	4.4±1.2
AQLQ Symptoms	4.8±1.3
AQLQ Activity	4.1±1.2
AQLQ Emotional	4.6±1.5
AQLQ Environmental	3.7±1.7
Anxiety Score	8.0±4.4
Depression Score	6.8±4.4

AQLQ=Asthma Quality of Life Questionnaire, ACT:Asthma Control Test, FVC:Forced Vital Capacity, BMI: Body Mass Index, FEV1: Forced Expiratory Volume in the first second

**Table 2:** Relationship with clinical-laboratory properties and emotional status

	Anxiety		P value	Depression		P value
	(-)	(+)		(-)	(+)	
Age	45.40	42.81	0.529	44.47	43.58	0.946
FEV <sub>1</sub>	90.05	85.89	1.175	88.50	86.00	0.409
FVC	100.53	84.96	0.136	87.23	95.91	0.403
BMI	27.24	27.34	0.910	26.68	28.10	0.107
Asthma year	8.14	7.52	0.652	8.40	7.07	0.321

FVC:Forced Vital Capacity, BMI: Body Mass Index, FEV1: Forced Expiratory Volume in the first second

**Table 3:** Mean AQLQ Total and Subgroup Scores of HAD-A and HAD-D Positive and Negative Patients

AQLQ	HAD-A (+) N=45(%30.6)	HAD-A (-) N=102(%69.4)	P	HAD-D (+) N=67(%45.6)	HAD-D (-) N=80(%54.6)	P
Total	4.1±1.1	4.9±1.1	<0.001	3.7±1.1	4.6±1.1	<0.001
Symptoms	4.5±1.3	5.3±1.2	<0.001	4.1±1.3	5.1±1.2	<0.001
Activity	3.9±1.1	4.5±1.2	0.001	3.6±1.1	4.3±1.2	0.002
Emotional	4.0±1.5	5.4±1.2	<0.001	3.7±1.6	4.9±1.4	<0.001
Environmental	3.4±1.5	4.2±1.7	0.004	3.1±1.4	3.9±1.7	0.007

AQLQ=asthma quality of life questionnaire, HAD-A (-)=hospital anxiety questionnaire <10 points, HAD-A (+)=hospital anxiety questionnaire ≥10 points, HAD-D (-)=hospital depression questionnaire <7 points, HAD-D (+)=hospital depression questionnaire ≥7 points

analyze the correlations between continuous variables. Confidence interval for statistical significance was considered as 95%.

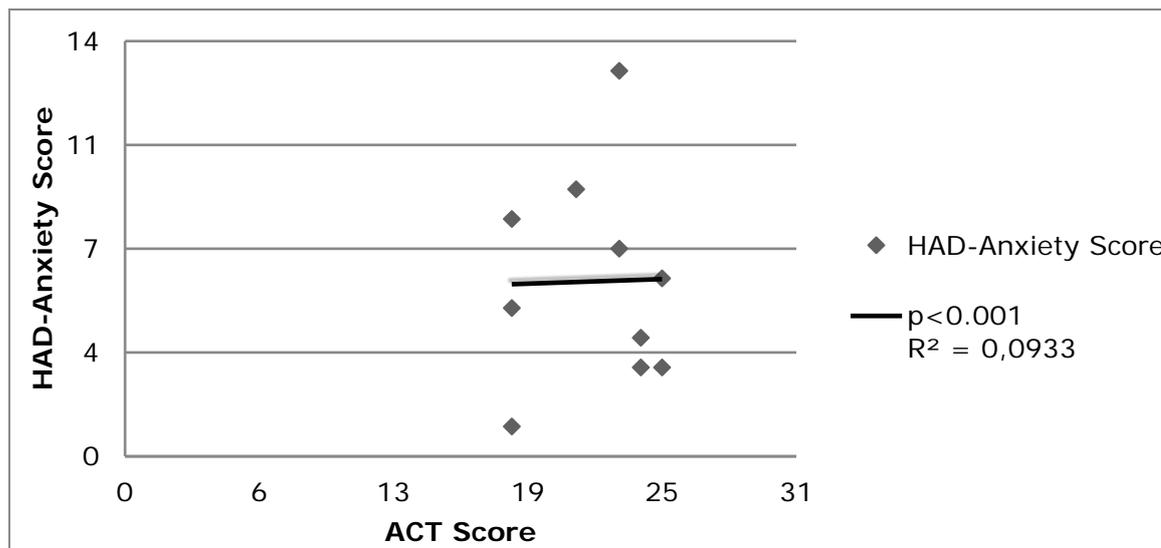
## RESULTS

**Table 1** shows the demographical characteristics and pulmonary function test results, and mean scores of AQLQ, ACT and HAD questionnaires of 147 patients included to the study. HAD-A score of 45 (30.6%) patients was ≥10 [HAD-A(+)], and HAD-D score of 67 (45.6%) patients was ≥7 [HAD-D(+)]. When patients with and without anxiety and depression symptoms were compared, mean age, BMI, pulmonary function test and asthma duration were found to be similar (**Table 2**). Patients with positive HAD-A and HAD-D results had statistically significantly lower AQLQ total score and all subgroup scores compared to the patients with negative HAD-A and HAD-D results (**Table 3**). In total, 49% of the patients had well-controlled asthma (ACT≥20). Comparison of patient groups with well- and poorly-controlled asthma indicated that the patients with well-controlled asthma had higher quality of life and lower mean scores of HAD anxiety and depression (**Table 4**). Significant correlations were found between HAD anxiety and depression scores, and AQLQ and ACT scores (p<0.001). **Figures 1a, b, c** and **d** illustrate the correlations between HAD anxiety and depression scores and AQLQ and ACT scores. In summary, anxiety and depression scores were significantly higher, quality of life scores lower in the uncontrolled asthma group and ACT and AQLQ scores were also lower in the anxiety and depression groups.

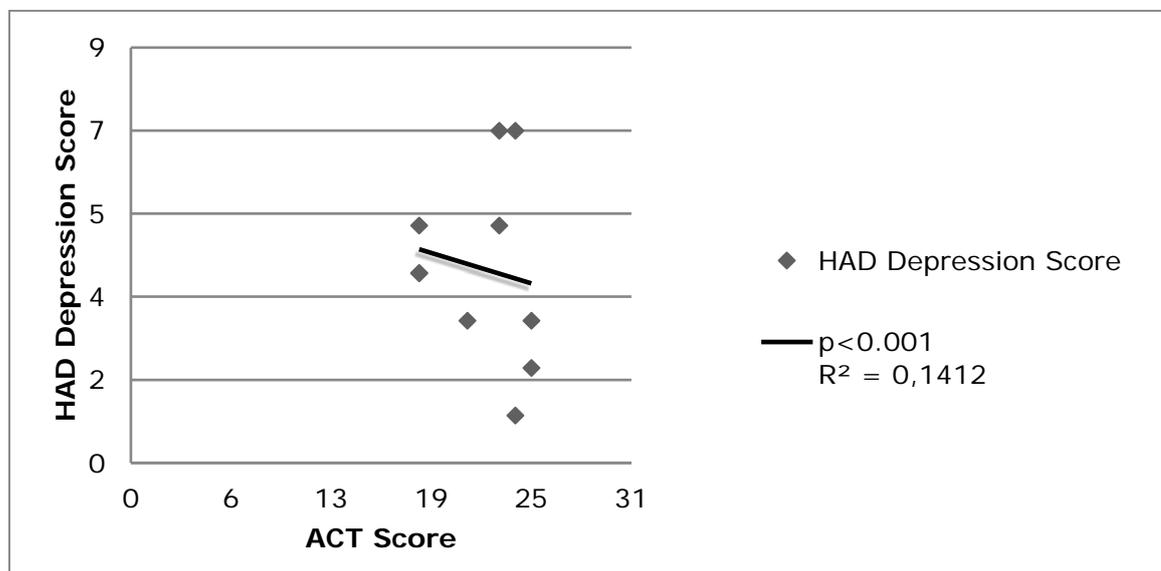
**Table 4:** The relationship between ACT score and HADS-A, HADS-D and AQLQ Scores

	Uncontrolled asthma (ACT<20) n=75(%51)	Controlled asthma (ACT≥20) n=72(%49)	P value
HADS-A	8.8±4.6	7.0±4.2	0.014
HADS-D	8.0±4.3	5.5±4.0	<0.0001
AQLQ			
Total	3.8±1.1	5.0±1.0	<0.0001
Symptoms	4.1±1.2	5.6±0.9	<0.0001
Activity	3.7±1.1	4.6±1.2	<0.0001
Emotional	4.0±1.6	5.2±1.3	<0.0001
Environmental	3.2±1.5	4.1±1.7	0.001

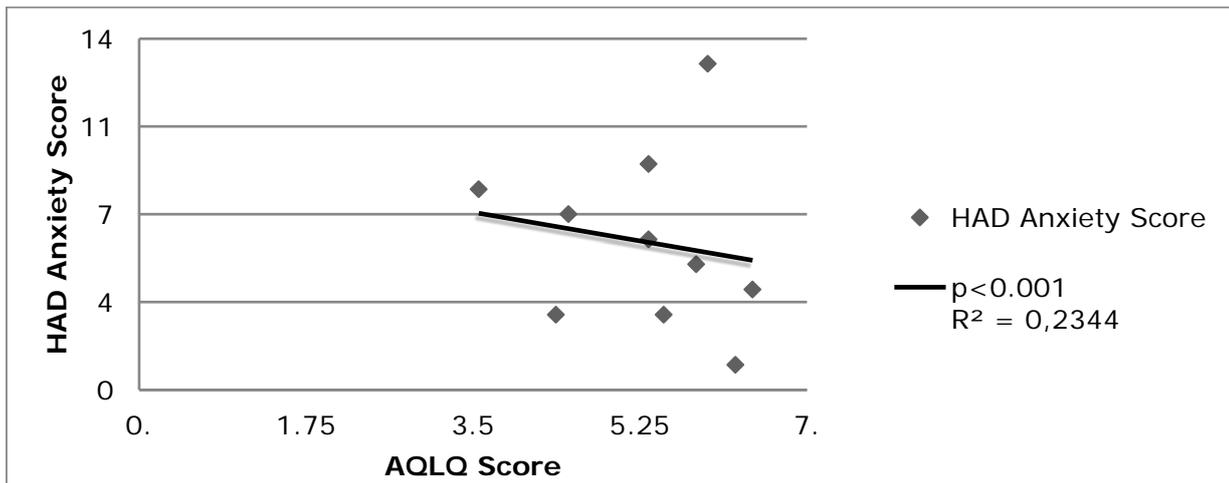
AQLQ=asthmaquality of life questionnaire, HAD-A=hospitalanxietyquestionnaire, HAD-D=hospitaldepressionquestionnaireACT:asthmacontrol test



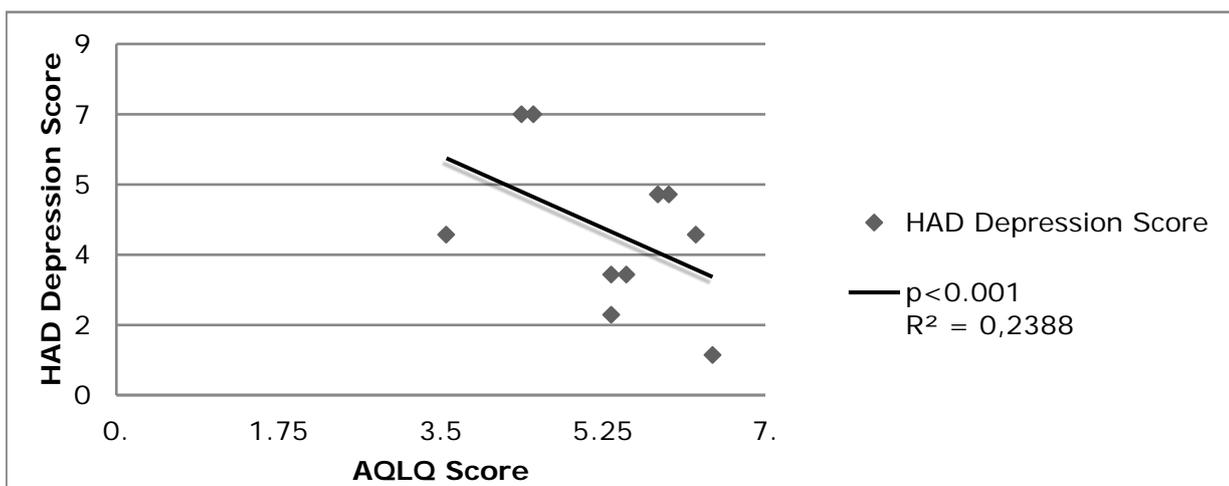
**Figure 1a:** The correlation between HAD anxiety scores and ACT



**Figure 1b:** The correlation between HAD depression score and ACT



**Figure 1c:** The correlation between HAD anxiety scores and AQLQ



**Figure 1d:** The correlation between HAD depression scores and AQLQ

## DISCUSSION

Our study indicated that there is a correlation between anxiety and depression symptoms status, and quality of life and asthma control in patients with stable asthma; thereby establishing a relation between the level of anxiety and depression symptoms and asthma control and quality of life. These findings are comparable to those previously reported from different countries (19). The prevalence of depression and anxiety symptoms among asthma patients varies as reported in the literature. While studies suggested an increase in the rate of emotional status impairment among Turkish adults with asthma, a very limited number of studies assessed the impact of the level of anxiety and depression symptoms on disease control and quality of life (11,12). While some authors reported an increased prevalence of depression (20-22), some others reported a higher anxiety prevalence among asthma patients (23,24). In the present study, the proportion of patients with symptoms of depression symptoms was higher than that of patients with symptoms of anxiety symptoms. While the rates of anxiety and depression symptoms were relatively higher than some previous studies, (22) they were found to be similar to the rates reported by some other studies (5,13). Nevertheless, symptoms of both depression and anxiety as determined by HAD-A and HAD-D scores were predictors of poor asthma control and decreased quality of life among patients with asthma.

In a previous study monitoring patients with stable asthma for 5 years, no significant changes were noted in HAD-A and HAD-D scores, while the changes in HAD scores were found to be correlated with the changes in AQLQ scores and the patients with lower baseline HAD scores later experienced a more sudden psychological impairment. HAD scores were suggested to be useful in predicting future psychological status of the patients (25). Anxiety and depression symptoms were shown to negatively influence the total and subgroup AQLQ scores of asthma patients. Anxiety and depression symptoms were both associated with worse quality of life, whereas the association between depression and poor asthma control was particularly highlighted (26). In another study, Mancuso (27) reported worse AQLQ scores in

patients with depressive symptoms. We have also shown in the present study that patients with positive HAD-A or HAD-D scores had worse quality of life and poorer asthma control.

Rimington (28) reported HAD-A and HAD-D positivity in 30% and 10% of their patients, respectively. In the present study, while the rate of anxiety was similar, the rate of depression was slightly higher than that reported by Rimington. It is possible that the rate found by Rimington was lower because his study included a socioeconomically and culturally isolated patient population living in London city of England.

The most important strength of this study is that the measurements of anxiety, depression symptoms and ACT scores were simultaneously obtained. We found a significant correlation between asthma control, quality of life and the symptoms of anxiety and depression. Patients with better asthma control and quality of life were less susceptible to anxiety or depression symptoms; thus, anxiety and depression symptoms may represent risk factors for asthma. Based on our findings, we believe that, apart from continuous medical therapy, the patients should be provided with healthcare education and psychological consultancy services. A previous study also suggested that intensive emotional factors such as excessive stress, sadness, fear, crying episodes and panic attack may exacerbate the symptoms of asthma, therefore the patients should be trained and provided with psychological support in addition to medical therapy. Patients with psychiatric disorders were reported to have poorer asthma control and decreased AQLQ scores. Accordingly, bronchodilator use was found to be more common among these patients irrespective of patients' age, gender or asthma severity (5).

There are some limitations of this study. Firstly, as this was a single-center study, the results may not be generalized to the whole Turkish population. Secondly, a single HAD scale was used to determine anxiety and depression symptoms. Other methods of measurement (such as Beck anxiety and depression scale) could have been used in conjunction, and the results could be compared. Anxiety and depression symptoms research only with a questionnaire without examination by a specialist psychiatrist. Thirdly, gender, education level, smoking status, comorbidities, age and BMI can affect anxiety and depressive symptoms. In our study multivariate regression analysis was not performed including these confounders. Finally, inherent to the cross-sectional study design, absence of a control group in the study, our ability to evaluate the exact causal relation between asthma control, quality of life and psychological disorder was limited.

In conclusion, the present study demonstrated that the prevalence of anxiety and depression symptoms is elevated among Turkish patients with asthma and these patients have poorly controlled asthma and worse quality of life. These findings confirm that anxiety and depression symptoms negatively influence asthma control and quality of life.

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