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Emergency department patients' clinical and demographic characteristics regarding Hospital Anxiety subscale

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ABSTRACT

Objective: To evaluate clinical and demographic characteristics of the emergency department (ED) patients using Hospital Anxiety and Depression Scale (HADS) which includes anxiety (HAD-A) subscale.

Materials and methods: In this cross-sectional study, all consecutive adult patients admitted to the community hospital-based ED in the study period were enrolled prospectively. HAD-A items were responded by the patients themselves. Demographic characteristics, history, and clinical findings were analyzed.

Results: Four hundred and ninety-eight consecutive ED patients with eligible conditions were enrolled. Mean age was 44.1 ± 16.5 (range 18–90) and 53.0% (n = 264) were female. The presence of pathological examination finding was significantly associated with a tendency to have a HAD-A score higher than 10 (p = .044). Presence of systemic disease was significantly associated with higher anxiety scores (t-test, p = .029). Patients presented with acute exacerbation of a chronic illness and those with psychological condition had significantly higher HAD-A scores (p = .014 and p = .008, respectively).

Conclusions: High acuity, presence of pathological finding, higher income, presence of a systemic disease, acute exacerbation of a chronic illness were significantly associated with higher anxiety scores.

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1. Introduction

Individual living his/her usual “healthy” life suddenly assumes the position of “ill person” once the body is involved in the disease. This new role induced by the disease not only inflicts the body but also modulates the human spirit and mind via its inherent and unique properties.^{1,2} The loss of health or the concrete sense of threat results in a considerable degree of stress hard to cope with, though substantial variations are seen from person to person.^{3,4} Stress exerted on the body and mind creates different reactions—mainly anxiety and depression—especially in individuals who sustain fragile coping potentials. Anxiety syndromes, including well-defined disorders and subthreshold entities, are very common in primary care and are associated with a severe psychosocial

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disability. The patients' anxiety levels and possibly anxiety disorder can be evaluated in emergency department (ED) population using a simple screening tool such that Hospital Anxiety and Depression Scale (HADS). It is a self-administered scale comprising anxiety (HAD-A) and depression (HAD-D) subscales with seven items each.⁵ It was devised by Zigmond and Snaith in 1983 to determine risks of depression and anxiety in a given patient and monitor changes in severity. Many researchers utilized HADS to investigate the incidences of anxiety and depression in hospital setting.^{6–8} The HADS is largely robust across gender and age groups.⁹

HAD-A subscale yields a scoring from items numbered 1, 3, 5, 7, 9, 11 and 13, while the others constitute a score for HAD-D. It has a score interval between zero and 21. Aydemir et al. conducted the validity and reliability studies in Turkish population.¹⁰ Numerous studies used 8 or 9 as a cutoff level,¹¹ although it is known that a score of 10 had the highest sensitivity and specificity (83.6% and 81.6%, respectively) for HAD-A in the Turkish population.¹⁰ In the present study, only HAD-A subscale was taken into account to screen patients for anxiety levels in ED patient population. It is important to evaluate anxiety levels of ED patients with a validated tool because in this way, the physicians could estimate the relation

of the patients' clinical characteristics with his/her anxiety status.

The objective of this study is to evaluate clinical and demographic properties of the patients with special regard to the validated anxiety screening tool HAD-A in emergency setting.

2. Materials and Methods

This cross-sectional study was performed in the community training hospital-based ED with an yearly patient volume of 350.000 patients. The study protocol was approved by the Institutional Review Board before recruitment of the patients (#2016/177, June 13th, 2016).

All consecutive adult patients evaluated with the five-tier triage system and ranked 2 to 5 (excluding only life-threatening resuscitative situations) admitted to the ED in the five days' period (10th July 2016 to 15th July 2016) were prospectively enrolled to the study. Patients with serious systemic diseases classified in ASA Grade III and IV, those who reported complaints lasting for longer than 24 h, those unable to communicate with the healthcare givers, illiterate patients, those diagnosed with psychosis and agitated behavior, pregnant and nursing patients and those declining to participate in the study were excluded from the analysis. Decisions with respect to recruitment of the patients were made real-time by the emergency physicians in charge of the patients in the ED.

Informed consent was obtained from all enrolled patients. The physician in charge of the patient recorded detailed data into the data sheets. Then separate sheets comprising HAD-A items were given to the patients to be filled in and they were requested to check the most appropriate answer for each question. HAD-A form was administered by the patients themselves.

3. Analysis

Data elicited from the study were analyzed via Statistical Package for Social Sciences for Windows 17.0, Chicago, SPSS Inc. Descriptive analyses regarding demographics, history, and clinical findings were performed. Means of parametric data were compared using independent samples *t*-test, categorical and ordinal data with chi-squared test. Analyses were based on 95% confidence intervals. *P* values below 0.05 were deemed statistically significant.

4. Results

A total of 2442 consecutive patients were admitted in the five-day study period with eligible conditions in the ED. Of these, 406 patients were excluded for being younger than 18 years old, 351 for presentation with symptoms lasting longer than 24 h, 120 for being classified as ASA Grade III or IV, 83 for being unable to communicate/cooperate, 229 for being illiterate, 19 for pregnancy, 457 for simple wound care, follow-up and/or parenteral administration of drug therapies, three for psychotic behavior, 253 for refusal of participation in the study, 23 for incomplete data (a total of 1944 excluded patients). Therefore, statistical analyses were performed on a total of 498 patients. Flow chart (CONSORT diagram) depicts the numbers and reasons of the included and excluded patients in the study (Fig. 1).

Mean age of the patients was 44.1 ± 16.5 (range 18–90) and 53.0% ($n = 264$) were female. Mean age of the female subjects did not differ significantly from males (43.5 vs 44.6, *t*-test, $p = .11$). The distribution and relationship of demographic characteristics of the patients with anxiety scores are summarized in Table 1. As can be seen, mean HAD-A scale score of the whole sample was 5.5 ± 3.8 (range 0–21) while median score is 5, and interquartile range is 4. Among all, 75 patients (15.0%) were found to have HAD-A scale scores greater than or equal to 10. Mean ages of the patients with

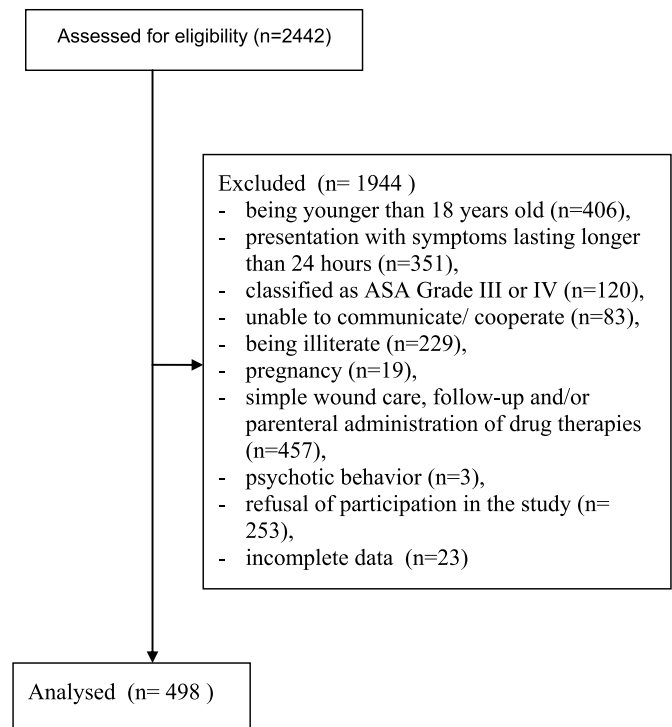


Fig. 1. Flow chart (CONSORT diagram) of the included and excluded patients in the study.

scores <10 and ≥ 10 did not differ significantly from each other (44.1 ± 16.2 and 43.6 ± 18.3 ; *t*-test, $p = .06$).

Mean HAD-A scale score of the female and male patients 5.7 ± 4.0 and 5.3 ± 3.6 , respectively (*t*-test, $p = .09$). Likewise, the percentages of those with scores below 10 were similar in both sexes (82.6% and 87.6%, respectively (Chi-squared = 2.077, $p = .14$).

Patients with private insurance ($n = 41$, 8.2%) had a mean HAD-A score as 6.5 ± 3.6 while those with no insurance (who has to pay for the healthcare service during the visit) ($n = 22$, 4.4%) had a mean HAD-A score = 4.7 ± 3.9 . State insurance coverage comprised 393 patients (78.9%) whose mean HAD-A score was 5.5 ± 3.8 (chi-squared = 5.2, $p = .15$). Patients' insurance status had no significant impact on the patients' HAD-A scores (ANOVA, $p = .14$).

The difference between married and single patients regarding the rates of HAD-A scores below and above 10 was not found significant (chi-squared = 1.6, $p = .20$). Mean HAD-A scores On the other hand, low [<4000 Turkish liras (TL)] monthly household income patients had significantly lower HAD-A scores than others (chi-squared = 43, $p = .036$) (Table 1).

The relationship of the patients' education status and HAD-A scores were shown in Table 1. Patients with low-level education (literate & primary school graduates) ($n = 169$, 34%) had a mean HAD-A score of 5.4 ± 3.7 while secondary & high school graduates ($n = 208$, 41.7%) had a mean score of 5.6 ± 4.0 , and University & doctorate level ($n = 115$, 23%) had a mean score of 5.6 ± 3.8 . Patients' educational level did not appear to have any significant effect on the patients' HAD-A scores (ANOVA, $p = .85$). Likewise, the rates of the patients below and above the cut-off point 10 did not differ significantly from each other regarding educational level (chi-squared = 1.9, $p = .38$).

Table 2 depicts the clinical characteristics of the patients related to HAD-A scores. Patients' triage categories seem to have an effect on anxiety status. Patients in the Triage Category 3 (the least serious conditions) had a mean HAD-A score of 4.6 ± 3.1 while Category 2 had 6.0 ± 4.2 and Category 1 had 7.7 ± 4.1 (ANOVA, $F = 21.5$,

Table 1
Patients' sociodemographic characteristics related to HAD-A scores.

Sociodemographic characteristics		Mean HAD-A Score \pm SD	T-test/ANOVA, p=	HAD-A Score <10 n (%)	HAD-A Score \geq 10 n (%)	Chi-squared (in trend) p=
Gender	Female (264, 53%)	5.7 \pm 4.0	(t-test) p = .09	218 (82.6%)	46 (17.4%)	0.14
	Male (234, 47%)	5.3 \pm 3.6		205 (87.6%)	29 (12.4%)	
Education status	Literate & primary (n = 169, 34%)	5.4 \pm 3.7	(ANOVA) p = .85	148 (87.5%)	21 (12.5%)	0.38
	Secondary & high school (n = 208, 41.7%)	5.6 \pm 4.0		175 (84.1%)	33 (15.9%)	
Insurance	University & doctorate (n = 115, 23%)	5.6 \pm 3.8	(ANOVA) p = .14	94 (81.7%)	21 (18.3%)	p = .15
	private insurance (n = 41, 8.2%)	6.5 \pm 3.6		31 (75.6%)	10 (24.4%)	
	paid service (n = 22, 4.4%)	4.7 \pm 3.9		20 (91%)	2 (9%)	
	State insurance (n = 393, 78.9%)	5.5 \pm 3.8		339 (86.2%)	54 (13.8%)	
Marital Status	Other (n = 42, 8.4%)	5.8 \pm 4.4	(t-test) p = .28	33 (78.5%)	9 (21.5%)	p = .20
	Married (n = 289)	5.5 \pm 3.7		251 (86.8%)	38 (13.2%)	
Household income	Single (n = 209)	5.6 \pm 4.0	(t-test) p = .16	172 (82.3%)	37 (17.7%)	p = .36
	<4000 TL (n = 388, 78%)	5.4 \pm 3.8		337 (86.9%)	51 (13.1%)	
	>4000 TL (n = 110, 22%)	6.1 \pm 3.8		86 (78.1%)	24 (21.9%)	

Table 2
Patients' clinical characteristics related to HAD-A scores.

Patient characteristics		Mean HAD-A Score \pm SD	HAD-A Score <10 n (%)	HAD-A Score \geq 10 n (%) ^a	
Presentation–chief complaint	De novo acute medical condition (n = 335, 67.2%)	5.2 \pm 3.7	289 (86.2%)	46 (13.8%)	p = .014
	Acute exacerbation of chronic medical illness (n = 80, 16%)	6.6 \pm 4.0	66 (82.3%)	14 (17.7%)	p = .12
	trauma-related (n = 76, 15.2%)	5.5 \pm 3.5	65 (85.6%)	11 (14.4%)	
	psychological condition (n = 7, 1.4%)	9.8 \pm 4.9	3 (42.8%)	4 (57.2%)	
Systemic disease	present (n = 171, 34.3%)	6.4 \pm 4.2	137 (80.2%)	34 (19.8%)	p = .035
	absent (n = 327, 65.7%)	5.1 \pm 3.5	286 (87.5%)	41 (12.5%)	t-test, p = .029
Disposition	discharged (n = 389, 78.1%)	5.3 \pm 3.7	337 (86.7%)	52 (13.3%)	p = .06
	admitted (n = 109, 21.9%)	6.4 \pm 3.9	86 (78.9%)	23 (21.1%)	t-test, p = .4
Triage category	1 (n = 72, 14.4%)	7.7 \pm 4.1	52 (72.3%)	20 (27.7%)	p = .0001
	2 (n = 169, 34%)	6.0 \pm 4.2	136 (80.4%)	33 (19.6%)	
	3 (n = 257, 51.6%)	4.6 \pm 3.1	235 (91.5%)	22 (8.5%)	

^a Chi-squared.

p = .000). The more acuity level was detected in a given patient, the higher HAD-A score was recorded. Likewise, patients in the Triage Category 3 had significantly lower rate of patients with HAD-A scores below the cut-off level (chi-squared for trend = 20.08, p < .0001) (Table 2).

In total, 335 patients (67.2%) presented to the ED with a chief complaint resulting from a “de novo” acute medical condition (mean HAD-A score = 5.2 \pm 3.7). Eighty patients (16%) were admitted due to acute exacerbation of a chronic illness (mean HAD-A score = 6.6 \pm 4.0), 76 (15.2%) with trauma-related condition (mean HAD-A score = 5.5 \pm 3.5), and only seven patients (1.4%) with psychological condition (mean HAD-A score = 9.8 \pm 4.9). Mean HAD-A scores were significantly different from each other (One-way ANOVA, F = 6.07, p < .001). Post-Hoc Tukey analysis disclosed that patients presented with de novo acute medical condition reported a significantly lower HAD-A score than those with acute exacerbation of a chronic illness (p = .014) and those with psychological condition had significantly higher HAD-A score than those with de novo acute medical condition (p = .008). Likewise, patients admitted due to psychological condition had significantly higher rate of HAD-A scores higher than 10 compared to the others (chi-squared = 10.5, p = .014) (Table 2).

A hundred and seventy-one patients (34.3%) had a known systemic disease. These patients had a mean HAD-A score of 6.4 \pm 4.2 while the others' mean score was 5.1 \pm 3.5 (t-test, p = .029). Presence of a systemic disease was significantly associated with higher anxiety scores (Table 2).

The majority (n = 389, 78.1%) of the patients were discharged from the ED, while 109 (21.9%) were admitted into the hospital. Mean HAD-A score of the discharged patients was 5.3 \pm 3.7 while mean score of the admitted patients was 6.4 \pm 3.9 (t-test, p = .4).

Admission to hospital did not have any significant effect on the rate of patients' HAD-A scores below and above the cut-off point 10 significantly (chi-squared = 3.4, p = .06) (Table 2).

Among all, 399 patients (80.1%) had at least one abnormal finding on physical examination. These patients had a mean HAD-A score of 5.7 \pm 3.8 while others' score averaged 4.9 \pm 3.8 (t-test, p = .278). In total, 332/399 (83.2%) of those with pathological finding vs. 91/99 (91.9%) of those without had a HAD-A score below 10 (chi-squared = 4.0, p = .044) (Table 2). The presence of at least one pathological examination finding was significantly associated with a tendency to have a HAD-A score higher than 10.

5. Discussion

There is no doubt that results of a psychometric tool such as HADS and/or its subscales have closely influenced by sociocultural characteristics, the circumstances under which a person responds to the survey, and many other factors. Thus one can postulate that substantially differing results can be yielded in different countries using the same diagnostic screening tool. The validity and reliability study by Aydemir et al. was performed in 136 Turkish in-patients compared with healthy controls.¹⁰ They concluded that the cut-off point of the HAD-A subscale is 10.

Phan et al. investigated anxiety status using HADS and Beck Anxiety Inventory (BAI) in patients with chronic obstructive pulmonary disease. HADS anxiety subscale (HADS-A) had a sensitivity and specificity as 71/81%; and BAI 89/62%, respectively. The authors recommended continued use of the HADS-A with cut-off \geq 8.¹² In the present sample, around one-seventh (15.0%) of the patients were found to have HAD-A scale scores greater than the cut-off value. The presence of pathological examination finding was

significantly associated with a tendency to have a HAD-A score higher than 10. Kuijpers et al. cited that in 83% of the patients who were transported by the ambulance services with cardiac causes and in whom no cardiac abnormality were found with a HADS score ≥ 8 , panic disorder and/or depression was considered.⁶

There are also other questionnaires devised to investigate anxiety levels and detect high-risk patients in the healthcare such as Cardiac Anxiety Questionnaire (CAQ), which was tailored to assess heart focused anxiety.¹³ The authors demonstrated that The CAQ is a robust instrument with validity to assess cardiac anxiety in patients hospitalized with coronary disease. The authors cited that recently admitted acute coronary syndrome patients had significantly higher scores than those with rheumatoid arthritis. Likewise, in the present study, patients presented with de novo acute medical condition reported a significantly lower HAD-A score than those with acute exacerbation of a chronic illness.

The present findings demonstrated that household income affects HAD-A scores of the patients in the ED. Although there is dearth of information on this issue in the literature, this is in accord with the report by Hassan et al. who cited that lower and middle socio economic status subjects had significantly higher anxiety scores when compared to upper socioeconomic class subjects.¹⁴ This is in contrast with the present results which demonstrated a relationship of household income with HAD-A scores in the ED setting.

Hassan et al. have recently conducted a prospective observational study using a translated questionnaire of HADS in Saudi Arabia.¹⁴ The dominant age group was those below 30 years of age and around one-fourth of the patients had anxiety in the sample of 257 patients. Married and divorced/widowed patients had higher (around twofold) rate of anxiety as compared to unmarried. This finding is in contrast with the present study in which married and single patients had similar percentages of HAD-A scores below and above 10.

In another recently published Middle Eastern observational study, Al Aseri et al. assessed the validity and reliability of HADS for psychiatric comorbidities in the emergency conditions.¹⁵ They concluded that HADS can be used effectively in the ED as an initial screening instrument for anxiety and depression.

Montazeri et al. tested the strength and accuracy of the HADS-Iranian version in patients with cancer and indicated that it is an acceptable, a valid and reliable test of psychological comorbidity among these patients in the ED.¹⁶ On the other hand, in a study from Brazil researchers used HADS to determine patients' anxiety status in a chest pain unit and found that up to 53.5% of the patients had possible anxiety causes leading to admission into the ED.¹⁷ Authors state that the HADS is an easily utilized screening device which can be incorporated into routine practice in the emergency care setting.

HADS has a considerable sensitivity and specificity as a screening tool for suspected anxiety and depression in the acute setting.

The findings of the present study showed that the emergency patients' triage categories had an effect on anxiety status. This finding is similar to the report by Montazeri et al. who wrote that patients with cancer in more advanced stages have significantly higher anxiety scores.¹⁶

Bjelland et al. indicated that a sensitivity and specificity for both HADS-A and HADS-D around 0.80 were found and these figures are very close to the corresponding figures reported by the General Health Questionnaire (GHQ). HADS and other commonly used tools had correlations between 0.49 and .83.¹¹

In the multicentric EUROASPIRE III study Pajak et al. used HADS in 8580 patients with coronary heart from 22 European countries and found that frequency of anxiety (HAD-A ≥ 8) varied from 12.0%

to 41.8% in males and from 21.5% to 63.7% in females. Those who were undereducated, elderly, female, and without any previous invasive procedures were involved in depression and anxiety more commonly.¹⁸

Although the present study did not comprise a direct analysis of HADS in regards of outcome, certain findings implicated a close relation of the score and clinical course of the patients. For example, the presence of pathological examination finding and/or systemic diseases was associated with higher anxiety scores. More specific associations would be highlighted via broader population-based studies on the topic.

5.1. Limitations

The present study is hampered by the single-center design for extrapolation of the results for the entire population. Additionally, chaotic environment of the ED may have affected the results of the anxiety interrogation.

6. Conclusion

HAD-A subscale has the ability to detect patients with anxiety in emergency setting. Higher acuity level, the presence of any pathological examination finding, higher monthly household income, presence of a systemic disease, presentation with acute exacerbation of a chronic illness were significantly associated with higher anxiety scores. Factors associated with increased tendency to have high scores should be evaluated further in broader, population-based studies.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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Authors' contributions

Study concept and design: Koyuncu and Karcioglu. Analysis and interpretation of data: Koyuncu and Karcioglu. Drafting of the manuscript: Koyuncu and Karcioglu. Critical revision of the manuscript for important intellectual content: Koyuncu and Karcioglu. Statistical analysis: Karcioglu.

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