

## Which factors affect anxiety level before upper gastrointestinal endoscopy?

### Üst gastrointestinal endoskopi işlemi öncesi anksiyete düzeyini etkileyen faktörler

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**Background and Aims:** High levels of anxiety prior to upper gastrointestinal endoscopy can adversely impact the procedure quality and patient safety. We aimed to evaluate the relationship between patient anxiety level before the procedure and patient characteristics among patients scheduled to undergo upper gastrointestinal endoscopy. **Materials and Methods:** Patients aged 18 and over who underwent a planned upper gastrointestinal system endoscopy due to dyspeptic complaints were included in the study. Data on patient characteristics and anxiety levels were collected using two forms (Patient Information Form and Beck Anxiety Inventory), which they were asked to complete before the procedure. After the procedure, endoscopy results and Helicobacter pylori status were recorded on a separate form for each patient. After all patients' data were collected, anxiety level and patient characteristics data were compared. **Results:** Three hundred and forty-six patients were included in the study. Pre-procedural anxiety levels of the patients were determined to be mild, moderate, and severe in 78.9%, 15.6%, and 5.5% of the patients, respectively. While the anxiety level was higher among female patients and patients with Helicobacter pylori positivity, no association was found between the anxiety level and age, body mass index, history of endoscopy, application of sedation, or endoscopic diagnosis. **Conclusions:** Patient safety and quality of the procedure must be ensured at the highest level during the gastrointestinal system endoscopy procedures. We found that detection of patient characteristics that can adversely affect these two factors, like high pre-procedural anxiety level, is one of the important components that would help reach this goal.

**Key words:** Gastrointestinal endoscopy, anxiety, anxiety scale

## INTRODUCTION

Upper gastrointestinal system (GIS) endoscopy is a safe and widely used procedure for diagnosis and treatment purposes. While the developments in the endoscopy systems increase the image quality, the most important component affecting the quality of the procedure is patient compliance. One of the most important factors that impact patient compliance is the patient's anxiety level before the procedure.

The possible diagnoses and the procedure itself cause an increase in the patient's anxiety level before the GIS endoscopy procedure. Through evaluations based on administration of anxiety inventories immediately before the GIS endoscopy procedures, patients' anxiety levels were found to be significantly higher than in the control group (1-5). High levels of anxiety before the procedure lead to low patient compliance and a difficult and uncomfortable procedure. As a result, the procedure may not be completed if performed without seda-

**Amaç:** Gastrointestinal sistem endoskopi işlemleri öncesinde hastaların anksiyete düzeyi artmaktadır. İşlem öncesi yüksek anksiyete düzeylerinin varlığı işlem kalitesi ve güvenliğini olumsuz yönde etkilemektedir. Biz bu çalışmada üst gastrointestinal sistem endoskopisi öncesi anksiyete düzeyinin hastaya ait özellikler ile ilişkisini değerlendirmeyi amaçladık. **Gereç ve Yöntem:** Dispeptik yakınmalar nedeni ile üst gastrointestinal sistem endoskopisi planlanan 18 yaş üstü hastalar çalışmaya alındı. İşlem öncesi doldurmaları istenen iki form (hasta bilgileri formu ve BECK Anksiyete Ölçeği) ile hasta özellikleri ve anksiyete düzeyleri belirlendi. İşlem sonrası endoskopi bulguları ve Helicobacter durumu her hasta için oluşturulan özel formlara kayıt edildi. Tüm hasta verileri toplandıktan sonra anksiyete düzeyleri ile hastaya ait veriler karşılaştırıldı. **Bulgular:** Toplam 346 hastanın değerlendirildiği çalışmamızda hastaların %78,9'unda hafif, %15,6 sında orta, %5,5'inde yüksek düzeyde işlem öncesi anksiyete varlığı saptandı. Anksiyete düzeyi kadın hastalarda ve Helicobacter pylori pozitif saptanan hastalarda daha yüksek iken; hasta yaşı, vücut kitle indeksi, endoskopi hikayesi, sedasyon uygulanma durumu ve endoskopi tanı ile anksiyete düzeyi arasında ilişki saptanmadı. **Sonuç:** Günümüzde kullanımı çok yaygınlaşmış olan gastrointestinal sistem endoskopi işlemlerinde hasta güvenliği ve işlem kalitesi en üst düzeyde tutulmalıdır. İşlem öncesi yüksek anksiyete düzeyi gibi bu iki faktörü olumsuz yönde etkileyebilecek hastaya ait özelliklerin belirlenmesi bu amaca hizmet edecek önemli bileşenlerden biri olarak karşımıza çıkmaktadır.

**Anahtar kelimeler:** Gastrointestinal endoskopi, anksiyete, anksiyete skalası

tion, or if sedation is used, there may be a need for higher doses of sedatives and thus an increased risk for sedative-related complications (6-8).

To ensure the quality and safety of the procedure in upper GIS endoscopy, it is important to know the patient anxiety level and the effective factors. In this study, we aimed to evaluate the relationship between patient anxiety level before the procedure and patient characteristics among patients scheduled to undergo an upper GIS endoscopy.

## MATERIALS AND METHODS

This study was conducted prospectively, and the protocol was approved by the Research Ethical Committee of Baskent University Faculty of Medicine in Ankara, Turkey. Written, informed consent was obtained from each of the participants.

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## Patients

Patients aged over 18, who presented to the adult gastroenterology clinic of our hospital with dyspeptic complaints (epigastric pain, heartburn, flatulence, early satiety) and were ordered to undergo an elective upper GIS endoscopy, were included in the study. Patients who refused the upper GIS endoscopy procedure, who required an immediate endoscopy procedure, who had a prescheduled therapeutic endoscopy, who had a history of a prior gastric operation, who could not or did not want to complete the study forms, for whom endoscopy was scheduled for reasons other than dyspepsia (i.e., preparation for transplant or exploration for the cause of anemia), who did not wish to participate in the study, who were currently taking anxiolytic or antidepressant drugs, and hospital inpatients were excluded from the study. Additionally, patients who used antibiotics within the past month for any reason or proton pump inhibitors within the past 2 weeks were also excluded.

Patients fulfilling the study criteria were grouped based on their age as geriatric ( $\geq 65$  years) or young ( $< 65$  years). As it might have impacted the level of anxiety, patients undergoing the procedure between 8:30 am and 10:30 am were included in the study. The patients were asked to complete two forms in addition to the informed consent form before the procedure.

## Forms

**1- Patient Information Form:** Data on patient identification, age, height, weight, continuous medication, medication within the past month, history of antibiotics and proton pump inhibitor use, and history of prior upper GIS endoscopy were collected using this form.

**2- Beck Anxiety Inventory:** The Beck Anxiety Inventory is an easy-to-use measure of the severity of anxiety in adults. It consists of 21 items, each rated on a Likert-type scale, from 0 to 3, and can be self-administered. Instructions for filling out the form are written on top of the page. The total score is obtained by summing the score of all of the items. Scores can range from 0 to 63, and there is a correlation between the level of the score and severity of anxiety. Anxiety is categorized as mild (0-21 points), moderate (22-35 points), or severe (36-63 points).

This inventory has been proven valid and reliable. It shows the severity of anxiety experienced in the previous week (including the day of administration). It is commonly used in the general population and in populations other than psychiatry. It is easy to use, and can be administered by researchers outside the field of psychology. The scale has been proven valid in Turkey, and thus was used to assess the short-term anxiety symptoms of patients in this study.

## Upper gastrointestinal system endoscopy

Patients included in the study underwent upper GIS endos-

copy for diagnostic purposes. The procedure was performed by gastroenterology fellows with a minimum of two years of endoscopy experience, using Olympus GIF Q 240 endoscope (Olympus, Keymed, United Kingdom). Patients were evaluated for *Helicobacter pylori* (*H. pylori*) infections with a rapid urease test, using Pronto Dry, in the endoscopy unit. Based on the endoscopy findings, the patients were separated into two groups: organic dyspepsia (upper GIS cancers, gastric or duodenal ulcer, mucosal erosions, reflux and nonreflux esophagitis, hiatal hernia) and functional dyspepsia (no lesions detected that would explain symptoms occurring in the upper GIS).

## Statistics

In our study evaluating pre-procedural anxiety, the distribution of the anxiety scores was evaluated using the One-Sample Kolmogorov-Smirnov test. Since the distribution of data was non-normal, Mann-Whitney U test was used to compare the anxiety level across age, gender, sedation, history of endoscopy, and *H. pylori* positivity groups. Chi-square test was used to evaluate the distribution frequency of the patients in these groups across levels of anxiety. Body mass index (BMI) of the patients in the mild, moderate, and severe anxiety groups was compared using the one-way ANOVA test.

## RESULTS

Three hundred and forty-six patients were included in the study between January and October 2006. There were 124 (35.8%) males and 222 (64.2%) females. The mean BMI was  $26.40 \pm 4.48$  kg/m<sup>2</sup>. The mean age of the participants was  $40.52 \pm 14.52$  years, 58 (16.8%) of whom were in the geriatric age group. 194 (56.1%) of the patients had undergone at least one upper GIS endoscopy. Sedation was not administered to 46 (13.3%) of the patients included in the study due to patient refusal of sedatives. *H. pylori* positivity was detected via a rapid urease test in 46% of the patients (Table 1). The mean anxiety score of the patients on the Beck Anxiety Inventory was  $13.51 \pm 10.97$ . Mild anxiety was detected in 273 (78.9%), moderate anxiety in 54 (15.6%), and severe anxiety in 19 (5.5%) patients (Table 2).

In terms of the anxiety score, the geriatric group's scores were not different than those of the young group ( $p=0.364$ ). Within the geriatric group, mild, moderate, and severe anxi-

**Table 1.** General characteristics of the patients

Gender (n) (M/F)	124/222
BMI (mean) kg/m <sup>2</sup>	26.40 $\pm$ 4.48
Age (years)	40.52 $\pm$ 14.52
History of endoscopy (n)	194
Sedation (n) (present/absent)	300/46
Positive <i>Helicobacter pylori</i> (n)	159

**Table 2.** Pre-procedural anxiety level according to patient characteristics

		Severity of Anxiety			p
		Mild	Moderate	Severe	
Patient n (%)		273 (78.9)	54 (15.6)	19 (5.5)	-
Age group	Young n (%)	229 (79.5)	43 (14.9)	16 (5.6)	0.742
	Geriatric n (%)	44 (75.9)	11 (19)	3 (5.2)	
Gender	Female n (%)	163 (73.4)	42 (18.9)	17 (7.7)	<b>0.002</b>
	Male n (%)	110 (88.7)	12 (9.7)	2 (1.6)	
Sedation	Present n (%)	232 (77.3)	49 (16.3)	19 (6.3)	0.112
	Absent n (%)	41 (89.1)	5 (10.9)	0 (0)	
History of endoscopy	Present n (%)	149 (76.8)	32 (16.5)	13 (6.7)	0.439
	Absent n (%)	124 (81.6)	22 (14.5)	6 (3.9)	
Endoscopic diagnosis	Functional n (%)	155 (79.9)	31 (16)	8 (4.1)	0.45
	Organic n (%)	118 (77.6)	23 (15.1)	11 (7.2)	
<i>Helicobacter pylori</i>	Positive n (%)	116 (73.0)	33 (20.8)	10 (6.3)	<b>0.036</b>
	Negative n (%)	157 (84)	21 (11.2)	9 (4.8)	

ety were detected in 44, 11, and 3 patients, respectively. There was no significant difference across the age groups ( $p=0.742$ ) (Table 2).

When the anxiety level before endoscopy was compared between genders, women were detected to have a significantly higher anxiety score than men ( $p<0.001$ ). Regarding the gender distribution across the anxiety level groups, 74% of women had mild, 18.9% had moderate and 7.7% had severe anxiety. Among men, these ratios were 88.7%, 9.7%, and 1.6%, respectively. Compared to men, anxiety level was significantly higher among women ( $p=0.002$ ) (Table 2).

The mean BMI distribution did not show a significant difference across the anxiety level groups ( $p=0.074$ ). Post-hoc analysis comparing the mean BMI across anxiety level groups of two also failed to yield a significant difference (Table 3).

Regarding the patients who underwent upper GIS endoscopy procedure who preferred to receive or not to receive sedatives, there was no significant difference between the two groups in terms of anxiety scores before the procedure ( $p=0.076$ ). The distribution of mild, moderate and severe anxiety among the patients who were sedated was 77.3%, 16.3% and 6.3%, respectively. Of the patients who were not sedated, these values were 89.1% and 10.9% for mild and moderate anxiety, respectively; no patients in the non-sedated group had severe anxiety. There was no significant difference between the groups ( $p=0.112$ ) (Table 2).

Of the patients, 56.1% had undergone upper GIS endoscopy at least once. When the anxiety levels of patients with and without history of upper GIS endoscopy were compared, no difference was found between the groups ( $p=0.608$ ). The anxiety level distribution of patients based on history of endoscopy is displayed in Table 2 ( $p=0.439$ ).

When the patients were grouped based on their endoscopy findings as organic or functional dyspepsia, no difference in

anxiety scores before the procedure was detected ( $p=0.6$ ). Anxiety level distribution according to endoscopic diagnoses is shown in Table 2 ( $p=0.450$ ).

Evaluation of the relationship between *H. pylori* and anxiety level before the procedure demonstrated that patients with *H. pylori* positivity had a higher level of anxiety ( $p=0.036$ ) (Table 2).

## DISCUSSION

Patients scheduled to undergo GIS endoscopy experience an increase in their anxiety level, independent of the type of procedure (3-5, 9-15). However much the possible diagnoses-related concerns lead to increased anxiety, the actual causes are the concerns regarding the procedure itself. What leads to these concerns are the anticipated discomfort during the procedure, possible injuries due to the procedure, and fear of the procedure (6, 7). High levels of anxiety prior to the procedure can adversely impact the procedure by decreasing patient compatibility, thus making the procedure hard to perform for the health service provider and uncomfortable for the patient; it can even preclude completion of the procedure (6-8). If the procedure is performed with sedation, the sedative dose is increased when the anxiety levels are high, and this can lead to increase in the cardiopulmonary complication risks, especially in the elderly patients (6-8,16-19).

Spielberger (20) defines anxiety as an emotional state that encapsulates tension, nervousness, anger, and uneasiness. This

**Table 3.** Pre-procedural anxiety level and mean body mass index

		BMI (kg/m <sup>2</sup> )*
Anxiety level	Mild	26.31±4.06
	Moderate	26.06±4.84
	Severe	28.65±7.84

\*P=0.074 BMI: Body mass index

condition stimulates and activates the autonomous nervous system. Clinical representation of this condition is the increase in blood pressure and tachycardia before endoscopy. During the procedure, this condition presents itself as decreased tolerance for the procedure and a need for higher dose of sedatives (6-8,11,21).

Factors affecting anxiety and the level of anxiety before the procedure have been studied through different perspectives in various studies. Whether the procedure is upper or lower GIS endoscopy, it has been determined that the patients do have a higher level of anxiety before the procedure and that this anxiety is independent of the type of procedure (10,15).

A common finding of the studies that have investigated the factors impacting anxiety formation in patients before GIS endoscopy is that women experience more anxiety (10,12,14). In a study by Jones et al. (10), it was reported that use of sedation for the procedure, along with the female gender, lead to a moderate increase in patient anxiety. This finding may be related to fear of not waking up after the procedure. Similar to other studies, female gender was a leading factor impacting the anxiety level before the procedure in our study as well. Between the patients who were or were not administered sedation, we did not find a difference in anxiety levels before the procedure. In addition, the other patient characteristics that might impact the anxiety level, like age, BMI, and history of endoscopy, were not related to the anxiety level before the procedure.

The other parameters that were evaluated in our study were endoscopic findings (functional and organic) and *H. pylori* status. Psychosomatic disorders are thought to have a substantial contribution to functional dyspepsia development, the pathogenesis of which is not completely explained yet. Using

this as a reference point, it could be reasoned that anxiety-inducing interventions like endoscopy may lead to higher levels of anxiety among these patients compared to organic dyspepsia patients. Haug et al.'s (22) study on this matter showed that functional dyspepsia patients were more anxious than duodenal ulcer patients. However, other studies did not support this finding, in line with our study findings (23,24). In Addolorato et al.'s (25) study of 1641 patients evaluating the relation of anxiety and depression with GIS diseases, it was observed that *H. pylori* infection was significantly associated with presence of anxiety. There is no strong evidence explaining this relationship. However, it would not be inappropriate to evaluate the relationship between emotional state and detection of high levels of *H. pylori* IgG antibodies in Alzheimer's patient, as increasing attention is being given to discussions related to the *H. pylori* effect on cognitive functions through its adverse impact on nerve fibers due to stimulating humoral and cellular immunity (26,27). When examining the *H. pylori* positivity distribution across levels of anxiety in our study, it was observed that *H. pylori* positivity was more prevalent in moderate and severely anxious patients in our study as well ( $p=0.036$ ).

In conclusion, in our study, we evaluated the patient characteristics that might impact the severity of anxiety before the procedure among patients who were scheduled to undergo GIS endoscopy. As a result, in line with the findings of most of the other studies on this matter, we demonstrated that female gender is a risk factor for higher levels of anxiety before the procedure. Additionally, our findings showed that presence of *H. pylori* is also a risk factor for higher levels of anxiety. The relationship between anxiety and *H. pylori* remains to be further explained in future studies.

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