



## Is there any somatosensory amplification in patients with irritable bowel syndrome?

### İrritabl barsak sendromlu hastalarda Somatik abartılı algılama var mı?

Ibs and somatosensory amplification

Önder Tuğal<sup>1</sup>, Yarkin Özenli<sup>1</sup>, Cengiz Cengisiz<sup>2</sup>, Kenan Topal<sup>3</sup>, Burçak Taşdoğan<sup>4</sup>, Banu Kara<sup>4</sup>, Ceyhan Can<sup>1</sup>  
<sup>1</sup>Department of Psychiatry, Adana Numune Training and Research Hospital, <sup>2</sup>Kozan State Hospital, <sup>3</sup>Department of Family Medicine, Adana Numune Training and Research Hospital, <sup>4</sup>Department of Gastroenterology, Adana Numune Training and Research Hospital, Adana, Turkey

#### Öz

Amaç: Uzunca bir süre bir çeşit somatizasyon bozukluğu olduğu düşünülen iritabl barsak sendromu (IBS), günümüzde işlevsel gastrointestinal hastalıklar içinde yer alan bir hastalıktır. İrritabl barsak sendromunun altında yatan etiyolojik düzenek tam anlaşılmamasına rağmen beyin-barsak ekseninin bir bozukluğu olduğu düşünülmektedir. Bu çalışmada amaç psikiyatri polikliniğine konsültasyon ile çeşitli polikliniklerden gelen hastalarda ve bir grup IBS hastasında depresyon, anksiyete ve bedensel duyularını abartılı algılama belirtilerini değerlendirmek ve karşılaştırmaktır. Gereç ve Yöntem: Çalışmaya psikiyatri polikliniğine gastroenteroloji konsültasyonu ile gelen IBS'li 158 hasta, diğer polikliniklerden (Noroloji, genel cerrahi ve acil) konsültasyonla gelen 79 hasta ve kontrol grubu olarak 55 sağlıklı gönüllü olmak üzere toplam 292 kişi katılmıştır. Bedensel duyularını abartılı algılamayı ölçmek için Bedensel Duyularını Abartma Ölçeği (BDAÖ) kullanılmıştır. Ayrıca anksiyete ve depresyon belirtilerini incelemek için Hastane Anksiyete ve Depresyon ölçeği (HAD) hasta grubuna verilmiştir. Bulgular: IBS grubunda BDAÖ ölçümleri, diğer polikliniklerden gelen hastalar ve kontrol grubu ile One-way ANOVA testi ile karşılaştırıldığında fark istatistiksel olarak anlamlı yüksek bulunmuştur. IBS hastaları ile diğer polikliniklerden gelen hastaların HAD-A ve HAD-D alt ölçek verileri arasında istatistiksel olarak anlamlı fark bulunmamıştır ( $p>0.05$ ). Tartışma: Psikiyatri kliniğine konsültasyonla gelen hastalarda beden duyularını abartılı algılama eğilimi olduğu gösterilmiştir. Özellikle IBS hastaları gibi konsültasyon gruplarında beden duyularını daha fazla abartılı algılama saptanmıştır.

#### Anahtar Kelimeler

İrritabl Barsak Sendromu; Beden Duyularını Abartma; Depresyon; Anksiyete

#### Abstract

Aim: Irritable bowel syndrome, once thought to be a type of somatization, is now regarded as a disorder taking its place among functional gastrointestinal diseases. Even though the etiologic mechanism underlying irritable bowel syndrome is not precisely understood, it is thought to be a disorder of the brain-bowel axis. The aim of this study is to compare and evaluate the depression, anxiety symptoms, and the amplification of physical symptoms in a group of Irritable Bowel Syndrome patients and patients referred from other clinics who consulted to the Department of Psychiatry. Material and Method: The study group consists of 292 cases in total: 158 patients with Irritable Bowel Syndrome (IBS) and referred to the department of psychiatry, 79 patients coming from Other Clinics (Neurology, General Surgery, and Emergency) for Consultation (OCC), and a control group of 55 healthy volunteers. The Somatosensory Amplification Scale (SSAS) was used to measure the exaggerated physical perception of somatosenses. For establishing the symptoms of anxiety and depression, the Hospital Anxiety and Depression Scale (HAD) was applied only to the patient groups. Results: When compared to the OCC patient group and the control group, the SSAS scores of the IBS patient group were found to be statistically higher and significant by one-way ANOVA test ( $F:43.141$ ,  $p=0.000$ ). The difference of HAD-A and HAD-D subscale results between the IBS and OCC groups was not found to be statistically significant ( $p>0.05$ ). Discussion: It was shown that the patients referred to the department of psychiatry for consultation would probably have exaggerated perception of somatosenses; in particular, some consultation groups such as those with IBS perceived more amplification of somatosenses.

#### Keywords

Irritable Bowel Syndrome; Somatosensory Amplification; Depression; Anxiety

DOI: 10.4328/JCAM.4937

Received: 02.05.2017 Accepted: 01.05.2017 Printed: 01.12.2017 J Clin Anal Med 2017;8(suppl 4): 251-5

Corresponding Author: Yarkin Özenli, ANEAH Seyhan Araştırma ve Uygulama Merkezi Kurttepe Mah. Süleyman Demirel Bulvarı Çukurova, Adana, 01170, Türkiye. T.: +905334274800 F.: +90 3223550315 E-Mail: ozyarkin@gmail.com

## Introduction

Somatization is identified as a physical response, and correspondingly a behavior searching for medical aid under psychosocial stress. The idea of somatosensory amplification has been suggested as a central predisposing factor to explain somatization. Accordingly, somatic individuals tend to perceive normal physical sensation intensely, detrimentally, and irritatingly [1]. Excessive perception of physical sensation is a way of perceiving normal or light physical indications as a catastrophe. Barsky et al. [2, 3] suggested somatosensory amplification hypothesis to explain this situation. In a general population, while the ratio of no organic pathology detection in outpatients visiting the internal medicine department with physical complaints was 2.6%, this ratio rose to 22% [4, 5] in primary health care studies. It is known that these patients generally have been sent to the department of psychiatry for consultation [5]. It is known that there is a close relationship between the existence of chronic pain and somatization findings [6,7]. There are psychodynamic interpretations to explain the etiology of psychosomatic diseases that remain valid today. Firstly the body communicates with the environment. Body language is the first means of communication that evolved from ontogenetic development, much earlier than verbal narrative. When there is a problem that the person cannot cope with in the cognitive field, he returns to the path known from the ontogenetic development process [8]. Another psychodynamic theory is that there is a correlation between increased bodily symptoms and high neuroticism personality traits (dependency, low self-esteem, diffidence, introversion, vulnerability, etc.). It is known that these people focus more on physical senses. People with high levels of neuroticism may have difficulty coping with life events. This can create a feeling of weakness. Bodily symptoms may be an expression of desperation [9].

In published studies, somatization findings have been determined in 12% of chronic pain patients and in 17% of patients having Irritable Bowel Syndrome (IBS) [7,10,11]. In a survey carried out with undergraduate students, a positive relationship between the existence of chronic pain and illness and somatization findings has been found [12].

IBS is a functional bowel disease, not attributable to an organic etiology, appearing in periods when emotional tension is high, especially with accompanying stomachache and changes in defecation habits such as diarrhea and constipation. The prevalence of the disorder among adults is between 3-22%, and it is known to be seen at least twice as much in women [7].

In DSM classification, as well as in DSM-V, the disorders accompanied by pain and other somatic complaints have been associated with somatoform disorders. Somatic symptomatic disorders are mentioned in the DSM-V, such as fibromyalgia syndrome, chronic fatigue syndrome, and IBS. These are the illness groups that are admitted to other internal clinics, and are frequently seen and difficult to treat. In all these illnesses, pain, exhaustion, fatigue, intestine problems, distress, and concentration difficulty are the common findings. There is a tendency to collect these illnesses under the title of Functional Somatic Syndrome (FSS) and this has been emphasized in prominent journals [13, 14, 15]. In the studies carried out, it is thought that patients with FSS have shown similarities in behavior, cog-

nitive, and emotional patterns. In one study, it was pointed out that the patients in this group had somatosensory amplification composed of similarities in cognitive, emotional findings, and personal characteristics [16].

The aim of this study was to compare and evaluate the depression, anxiety symptoms, and the amplification of physical symptoms in a group of IBS patients and patients referred from other clinics who were consulted to the Department of Psychiatry. Also, the groups were compared to the healthy control group with regard to the somatosensory amplification data.

## Material and Method

The study group consists of 292 cases in total: 158 patients with Irritable Bowel Syndrome (IBS) who were consulted to the department of psychiatry, 79 patients coming from Other Clinics (Neurology, General Surgery, and Emergency) for Consultation (OCC), and a control group of 55 healthy volunteers. The most common complaints of the IBS group were abdominal pain, abdominal discomfort, and disruption in the habit of defecation. The definition of IBS has been determined by two gastroenterologists according to the Roman III definition system. The OCC patient group, 51 from neurology, 16 from the department of chest diseases, and others from the emergency room, was consulted to the department of psychiatry. The patients referred to the study were determined to have (a) nonspecific symptoms of shortness of breath, cough, feeling of globus hystericus for the department of chest diseases and (b) syncope of a non-convulsive nature, headache, and neck and muscle pain for the emergency room group. Because no findings were found suggesting the organicity of symptoms in the examinations and tests of the patients, a psychiatric consultation was requested. The study is a cross-sectional study designed for collecting qualitative and quantitative data. Information about the study was given to the all patients and control group participants and their written consents were obtained. The study was carried out in the Departments of Psychiatry at Adana Numune Training and Research Hospital and Kozan State Hospital. The Socio-demographic Data Form and Somatosensory Amplification Scale (SSAS) were applied to the patient and the control groups. A diagnostic interview was applied to all participants in the patient groups by a psychiatrist. Additionally, the Hospital Anxiety and Depression Scale was administered only to the patient groups.

## Instruments

**Socio-demographic Data Form:** This form assesses age, sex, marital status, educational status, occupation, socio-economic level, medical and psychiatric illnesses, alcohol and drug addiction, and regular medicine use.

**SSAS:** The Somatosensory Amplification Scale evaluates sensitivity to mild bodily sensations that are unpleasant and disturbing but are non-pathological. This self-evaluating scale developed by Barsky et al. consists of 10 items that are estimated on a five-point scale ranging from 1 ('not at all') to 5 ('extremely') [3]. The statements describe physical discomforts that do not indicate a disease. Somatosensory amplification is a useful construct in assessing perceptual styles of patients with psychosomatic illness. By summing up the scores, a total amplification score is obtained. The validity and reliability study of the

Turkish version was conducted by Güleç et al. [17].

Hospital Anxiety and Depression Scale (HADS): HADS is not used for diagnosing the patients with physical illness and those who apply to the primary health care services, but it is used for identifying the anxiety and the depression levels in a short span of time and for determining the risk group. Of the 14 questions, odd numbers measure anxiety and even numbers measure depression. Answers are graded between 0-3, quadruplet Likert-type responses. The lowest possible grade for either subscale is 0 and the highest grade is 21. The cutoff score in the Turkish HAD form for the anxiety subscale (HAD-A) was determined to be 10, and the cutoff score for the depression subscale (HAD-D) was determined to be 7. The scale was developed by Zigmond and Snaith in 1983 [18], and its reliability and validity study was carried out by Aydemir et al. [19].

### Statistical Analysis

The compatibility of the data obtained from the study to the normal distribution was analyzed by Smirnov/Shapiro-Wilk tests. The identificatory statistics were summarized in terms of mean  $\pm$  standard or percentage depending on the distribution formation of the numeric data. On the other hand, categorical data was summarized in terms of number and percentage. Pearson chi-square statistics, one of the cross table statistics, was used for the relation between categorical variabilities. In comparing the two groups in terms of numerical variabilities depending upon the distribution formation of the data, and in comparing the mean of the parametrical independent two groups, Independent sample t-test was used. One-way ANOVA and Scheffe post hoc tests were used in the analysis of the comparison of the IBS patient group, OCC patient group, and control group. The conditions in which P value was  $<0.05$  were accepted as statistically significant. In the analysis of data, SPSS 17.0 statistical packaged software was used.

### Results

The age range of the IBS patients participating in the study was 18-64, and the mean  $\pm$  standard deviation (mean  $\pm$  SD) was  $34.60 \pm 8.13$ ; the age range of the OCC group was 18-52, and mean  $\pm$  SD was  $32.13 \pm 8.43$ ; and the age range of the healthy control group was 19-63, and mean  $\pm$  SD was  $32.98 \pm 10.00$ . The difference by one-way ANOVA was not statistically significant [F:2.415,  $p=0.091$ ]. As the other socio-demographic data were categorical data, statistical analysis was done with the chi-square ( $\chi^2$ ) test. The difference among the groups participating in the study in terms of gender, education, socio-economic level, marital status, and occupational status was not statistically significant: ( $\chi^2=3.606$ ,  $p=0.536$ ;  $\chi^2=13.498$ ,  $p=0.096$ ;  $\chi^2=1.513$ ,  $p=0.822$ ;  $\chi^2=8.351$ ,  $p=0.213$ ,  $\chi^2=6.711$ ,  $p=0.392$ ). No alcohol and drug addiction were found in any participants of the patient and control groups. Also, no participant had regular medicine intake in the patient groups. All the socio-demographic data and statistical analysis are given in Table 1.

According to the SSAS data of the IBS patient group, the OCC patient group, and the control group, the difference

was found statistically significant by the one-way ANOVA test (F: 43.141,  $p=0.000$ ). The difference between the groups was determined by applying the Scheffe post hoc test (IBS patient group vs. OCC patient group, IBS patient group vs. control group). The SSAS mean score of the IBS patient group was higher compared to the SSAS mean score of the OCC patient group. The difference was statistically significant between these two groups, determined by applying the Scheffe post hoc test.

The results of the HAD-A scale and HAD-D scale of the IBS patient and OCC groups were analyzed with the student t-test and the difference was not statistically significant (Table 2).

At the end of the psychiatric interviews, while no psychiatric diagnosis was made in 73 participants in the IBS patient group, minor depression in 39 participants, anxiety disorder in 27 participants, and somatoform disorder in 19 participants were diagnosed. While no psychiatric diagnosis was made in 34 participants in the OCC patient group, minor depression in 21 participants, anxiety disorder in 21 participants, and somatoform disorder in 8 participants were diagnosed. No intergroup difference was statistically significant regarding sickness diagnosis ( $\chi^2=0.213$ ,  $p=0.679$ ).

### Discussion

It is known that patients with medical conditions who are consulted to the departments of psychiatry might have somatosensory amplification [2, 3, 4]. In comparison to the healthy group, somatosensory amplification was found high in both patient groups coming to our polyclinic and undergoing psy-

Table 1. Demographic characteristics of three groups.

|                             | IBS Group        |      | OCC Group        |      | Healthy control   |      | Statistical Test |       |
|-----------------------------|------------------|------|------------------|------|-------------------|------|------------------|-------|
|                             | n:158            |      | n:79             |      | n:55              |      | $\chi^2$         | p     |
|                             | n %              |      | n %              |      | n %               |      |                  |       |
| Age (Years) (mean $\pm$ SD) | 34.60 $\pm$ 7.92 |      | 32.13 $\pm$ 8.43 |      | 32.98 $\pm$ 10.00 |      | F=2.415          | 0.091 |
| Gender                      |                  |      |                  |      |                   |      |                  |       |
| Men                         | 40               | 25.3 | 19               | 24.0 | 10                | 18.2 | $\chi^2=3.606$   | 0.536 |
| Women                       | 118              | 74.7 | 60               | 76.0 | 45                | 81.8 |                  |       |
| Education                   |                  |      |                  |      |                   |      |                  |       |
| Elementary                  | 26               | 16.6 | 5                | 6.3  | 6                 | 10.9 |                  |       |
| Middle                      | 92               | 58.2 | 40               | 50.6 | 28                | 50.9 | $\chi^2=13.498$  | 0.096 |
| High                        | 20               | 12.6 | 21               | 26.6 | 9                 | 16.4 |                  |       |
| Graduate                    | 20               | 12.6 | 13               | 16.5 | 12                | 21.8 |                  |       |
| Income                      |                  |      |                  |      |                   |      |                  |       |
| Low-middle                  | 128              | 81.0 | 64               | 81.0 | 48                | 87.2 | $\chi^2=1.513$   | 0.822 |
| High                        | 30               | 19.0 | 15               | 19.0 | 7                 | 12.8 |                  |       |
| Marital Status              |                  |      |                  |      |                   |      |                  |       |
| Single                      | 23               | 14.6 | 21               | 26.6 | 15                | 27.2 |                  |       |
| Married                     | 121              | 76.6 | 54               | 68.4 | 37                | 67.3 | $\chi^2=8.351$   | 0.213 |
| Divorce-other               | 14               | 8.9  | 4                | 5.1  | 3                 | 5.5  |                  |       |
| Occupational Status         |                  |      |                  |      |                   |      |                  |       |
| Non-working,                |                  |      |                  |      |                   |      |                  |       |
| Housewife                   | 118              | 74.7 | 64               | 81.0 | 45                | 81.8 | $\chi^2=6.711$   | 0.392 |
| Working                     | 40               | 25.3 | 15               | 19.0 | 10                | 18.2 |                  |       |

IBS: Irritable bowel syndrome

OCC: Patients coming from other polyclinics with consultation

Table 2. Psychological characteristics of three groups

|          | IBS Group                |      | OCC Group   |      | Healthy control         | Statistical Test       |       |
|----------|--------------------------|------|-------------|------|-------------------------|------------------------|-------|
|          | n                        | %    | n           | %    | n:55                    | F                      | p     |
| SSAS     | 36.15±8.13 <sup>ab</sup> |      | 29.77±7.37* |      | 25.52±7.87 <sup>a</sup> | 43.141                 | 0.000 |
| HAD-A    | 11.48±4.29               |      | 11.56±4.41  |      |                         |                        | 0.882 |
| HAD-D    | 9.41±4.12                |      | 9.87±4.55   |      |                         |                        | 0.455 |
| Disorder |                          |      |             |      |                         |                        |       |
| +        | 85                       | 53.8 | 45          | 57.0 |                         | x <sup>2</sup> = 0.213 | 0.644 |
| --       | 73                       | 46.2 | 34          | 43.0 |                         |                        |       |

IBS: Irritable bowel syndrome

OCC: Patients coming from other polyclinics with consultation

One-Way Anova

Post Hoc Scheffe test: \*IBS patient group vs OCC patient group, <sup>a</sup>IBS patient group vs Control group).

chiatric consultation. Another important point of this study is that IBS patients were found to have statistically significant higher somatosensory amplification than the OCC patients. In patients having functional gastrointestinal complaints, it is not adequately understood how motility response differs from healthy individuals, and whether this situation stems from an inadequacy in the autonomic nervous system or somatosensory amplification. On the other hand, it is suggested that both central and peripheric mechanisms take part in the etiopathogenesis. Current hypotheses include motility variations, visceral hypersensitivity, inflammation/infection, changes in the brain and intestine systems, and genetic and psychosocial factors [20, 21, 22]. Limbic and prefrontal zones are referred to as emotional zones. The emotional variations originated in these zones reach the intestines by means of the autonomic nervous system [23]. In addition, gastrointestinal motility variation occurs due to psychological stress, having characteristics of emphasizing the psychopathological importance of the variations in the brain and the intestine axis modulation [24, 25]. It is thought that the intensive somatosensory amplification that takes place in IBS patients is a result of the cognitive and emotional factors in which the limbic system takes part.

Another finding of our study is that the depression and anxiety results of IBS patients and OCC patients were found to be alike. However, in both patient groups results were determined to be higher than the average anxiety breakpoint of 10/11. Similar results for depression were obtained. The population of the patients sent to the department of psychiatry by other polyclinics showed the characteristics of the existence of a psychiatric illness (anxiety disorders and depression) anticipated by a clinician. However, in some studies, despite the high anxiety and depression scores in IBS patients, when these patients were given a diary to take notes, much lower anxiety and depression scores were seen in their diaries [26, 27]. These researchers commented that it is not sufficient to limit the IBS patients only to psychosomatic explanations.

The important result of this study is that IBS patients have higher somatosensory amplification results than the OCC patients coming from other polyclinics for consultation and that there is also a difference between these two groups in terms of other psychiatric symptomatology, which make us think that this finding is compatible with the literature mentioned above.

Duruk et al. observed in their study that the patients having fibromyalgia were different in means of somatosensory amplification when compared to the healthy controls and to the patients having chronic medical disorders referred to the psychiatry polyclinic for consultation. These researchers stated that this result might indicate that Fibromyalgia Syndrome be evaluated under the Functional Somatic Syndrome (FSS) classification. They emphasized the necessity of different implementations in the modalities for patients in this classification (Irritable Bowel Syndrome, Fibromyalgia Syndrome, and Chronic Fatigue Syndrome) [28]. Our study verifies the necessity of evaluating IBS under the FSS title.

One of the advantages of our study is that the IBS group was selected with regard to age, gender, education, and socio-economic level, with similar characteristics to the OCC and control groups. Furthermore, in addition to making an assessment and applying scales in the study, having a psychiatric interview was another advantage. However, a disadvantage was that our findings were not supported by neurocognitive tests, neuroimaging, or biological markers.

In summary, somatosensory amplification has been found high in the patients consulted to the department of psychiatry when compared with healthy controls. High somatosensory amplification findings were determined in IBS patients. It was revealed that psychiatric symptomatology in IBS patients is not only restricted to anxiety and depression. When all these findings are evaluated under the title of the Functional Somatic Syndrome for IBS patients, it is clear that a multi-disciplinary approach that includes a psychiatric treatment is needed.

### Competing interests

The authors declare that they have no competing interests.

### References

- Güleç H, Sayar K, Güleç MY. Somatosensory Amplification Scale Reliability and Validity of Turkish Form. *Düşünen Adam* 2007; 20:16-24.
- Barsky AJ. Amplification, somatization, and the somatoform disorders *Psychosomatics* 1999;33:28-34.
- Barsky AJ, Wyshak G, Klerman GL. The Somatosensory Amplification Scale and its relationship to hypochondriasis. *J Psychiatry Res* 1990;24:323-34.
- Bass C, Peveler R, House A. Somatoform disorders: severe psychiatric illness neglected by psychiatrists. *Br J Psychiatry* 2001;178:11-4.
- Rezaki M, Kaplan I, Üçok Özgen G. A field research on Psychiatric Problems in Basic Health Services *Türk Psikiyatri Dergisi* 1995; 6:3-11.
- Okifuji A, Turk DC, Sherman JJ. Evaluation of the relationship between depression and fibromyalgia syndrome: Why aren't all patients depressed? *J Rheumatol* 2000; 27:212-9.
- Norton GR, Norton PJ, Asmundson GJ, et al. Neurotic butterflies in my stomach: the role of anxiety, anxiety sensitivity, and depression in functional gastrointestinal disorders. *J Psychosom Res* 1999; 47:233-40.
- Koptagel-İlal G. Somatizasyonu nasıl anlamalıyız? *Psikodinamik değerlendirme. Türkiye Klinikleri Psikiyatri Dergisi* 1999;1:27-33.
- Lipowski ZJ. Somatization: Medicine's unsolved problem. *Psychosomatic* 1987; 28: 294-5.
- Fishbain DA, Cole B, Cutler RB, et al. Chronic pain and the measurement of personality: do states influence traits? *Pain Med* 2006; 7:471-2.
- Hollifield MA. Somatoform Disorder. *HI Kaplan, BJ Sadock [Eds.], Comprehensive Textbook of Psychiatry, eight ed., Baltimore, Lippincott Williams & Wilkins, 2004, p.1800-29.*
- Özenli Y, Yoldaşcan E, Topal K. Prevalence and associated risk factors of somatization disorder among Turkish students. *Anatolian J of Psychiatry* 2009; 10: 131-6.
- Mayou R, Kirmayer LJ, Simon G, Kroenke K, Sharpe M. Somatoform disorder: time for new approach in DSM-V. *Am J Psychiatry* 2005; 162: 847-55.
- Wessely S, Nimnuan C, Sharpe M. Functional somatic syndromes: one or many? *Lancet* 1999; 354:936-9.
- Mayou R, Farmer A. ABC psychological medicine: Functional somatic symptoms and syndrome. *BMJ* 2002; 325:265-8.
- Rief W, Broadbent. Explaining medically unexplained symptoms-models and

mechanisms. *Clin Psychol Rev* 2007; 27:821-41.

17. Gulec H, Sayar K. Reliability and validity of the Turkish form of the Somatosensory Amplification Scale. *Psychiatry Clin Neurosci* 2007; 61:25-30.

18. Zigmund AS, Sanith R. The Hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* 1983; 67:361-70.

19. Aydemir Ö, Güvenir T, Küey L, Kültür S. Hospital Anxiety and Depression Scale Study of Reliability and Validity of Turkish Form. *Türk Psikiyatri Dergisi* 1997;8: 280-7.

20. Gros DF, Antony MM, McCabe RE, Swinson RP. Frequency and severity of the symptoms irritable bowel syndrome across the anxiety disorder and depression. *J Anxiety Disord* 2009; 23: 290-6.

21. North CS, Hong BA, Alpers DH. Relationship of functional gastrointestinal disorders and psychiatric disorder: implications for treatment. *World J Gastroenterol* 2007; 13: 2020-7.

22. Bueno L. Gastrointestinal pharmacology: Irritable Bowel Syndrome. *Cur Opin Pharmacol* 2005;5:583-7.

23. Mayer EA. The neurobiology of stress and gastrointestinal disease. *Gut* 2000; 47: 861-9.

24. Mayer EA, Naliboff BD, Chang L, Coutinho SV. Stress and irritable bowel syndrome. *Am J Physiol Gastrointest Liver* 2001; 280:519-24.

25. Mayer EA, Naliboff BD, Chang L. Basic pathophysiologic mechanisms in irritable bowel syndrome. *Dig Dis* 2001; 19: 212-8.

26. Van Oudenhove L, Vanderberghe J, Geerraerts B, et al. Relationship between anxiety and gastric sensorimotor function in functional dyspepsia. *Psychosom Med* 2007; 69:455-63.

27. Burton C, Weller D, Sharpe M. Functional somatic symptoms and psychological states: an electronic diary study. *Psychosom Med* 2007; 71: 77-83.

28. Duruk B, Berk HÖ, Ketenci A. Are fibromyalgia and failed back surgery syndromes actually "functional somatic syndromes" in terms of their symptomatological, familial and psychological characteristics? A comparative study with chronic medical illness and healthy controls. *Ağrı* 2015; 27: 123 – 31.

**How to cite this article:**

Tuğal Ö, Özenli Y, Cengisiz C, Topal K, Taşdoğan B, Kara B, Can C. Is There Any Somatosensory Amplification in Patients with Irritable Bowel Syndrome? *J Clin Anal Med* 2017;8(suppl 4): 251-5.