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The Examination of Variations in the Pain Characteristics of Women with Overactive Bladder Syndrome

Aşırı Aktif Mesane Sendromlu Kadınların Ağrı Karakteristiklerindeki Değişimlerin İncelenmesi

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Abstract

Objective: To evaluate the pain characteristics of women with overactive bladder (OAB) for investigating the role of central sensitization in OAB pathophysiology.
Materials and Methods: Women with OAB over the age of 18 years and healthy volunteers made up the participants in the current study. Pain intensity and quality were analysed with the Short Form of the McGill Pain Questionnaire (SF-MPQ). The Self-Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) was used to assess the presence of neuropathic pain. Pain threshold was evaluated with algometer. The Pressure Pain Threshold measurement was determined as the primary outcome measure of the present study. The Overactive Bladder Awareness Tool (OAB-V8), short forms of the Incontinence Impact Questionnaire-7 (IIQ-7) and Urogenital Distress Inventory-6 (UDI-6) were used to evaluate OAB symptoms. Nottingham Health Profile (NHP) questionnaire was used to reveal quality of life and general health status.
Results: According to algometric measurements, OAB patients had lower pain thresholds in 19 anatomical points ($p<0.05$). A significant strong correlation was observed between the SF-MPQ, and IIQ7 ($r=0.666$), OAB-V8 ($r=0.640$), and LANSS ($r=0.610$), whereas there was a significant moderate correlation with UDI6 ($r=0.576$) ($p<0.001$). According to SF-MPQ, the median sensory sub-scale value was 6.5 cm, the affective sub-scale value was 2 cm and the total value was 9 cm with a pain intensity of 4.6 cm. In the healthy controls, the median of all these values were found to be zero ($p=0.001$).
Conclusion: This study demonstrated a decrease in pain thresholds of OAB patients and an increase in the intensity of sensory and affective characteristics of pain. These results support that central sensitization predisposes to pain syndromes in the pathophysiology of OAB.
Keywords: overactive bladder, pain severity, pain threshold, quality of life, symptom severity

Özet

Amaç: Aşırı aktif mesane (AAM) patofizyolojisinde santral sensitizasyonun rolünü araştırmak amacıyla AAM'si olan kadınların ağrı özelliklerini incelemek.
Gereçler ve Yöntemler: Bu çalışmanın katılımcılarını 18 yaş üstü AAM'li kadınlar ve sağlıklı gönüllüler oluşturmuştur. Çalışmaya katılan kadınların ağrı şiddeti ve niteliğini değerlendirmek için Kısa form McGill Ağrı Anketi (KF-MAA), nöropatik ağrı varlığını sorgulamak için Self-Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) anketi, ağrı eşik seviyesini belirlemek için Algometre cihazı kullanıldı. Çalışmaya dahil edilen kadınların AAM semptomları ile alt üriner sistem semptomlarını değerlendirmek için Aşırı Aktif Mesane Değerlendirme Formu (OABV8), İnkontinans Etki Soru Formu (IIQ7) ve Ürogenital Distres Envanteri (UDI6) kullanıldı. Yaşam kalitesi ve genel sağlık durumunun ortaya konulmasında Nottingham Sağlık Profili (NSP) soru formu kullanılmıştır.
Bulgular: Algometrik ölçümlere göre, AAM hastaları 19 anatomik noktada daha düşük ağrı eşiğine sahipti ($p<0,05$). KF-MAA ile IIQ7 ($r=0,666$), OAB-V8 ($r=0,640$) ve LANSS ($r=0,610$) arasında istatistiksel olarak anlamlı olacak şekilde güçlü bir korelasyon bulunurken, UDI6 ($r=0,576$) ile yine istatistiksel olarak anlamlı olacak şekilde orta düzeyde bir korelasyon vardı. KF-MPQ'ya göre, duyusal alt ölçek değeri medyanı 6,5 cm, algısal alt ölçek değeri 2 cm ve toplam değer 9 cm olup ağrı yoğunluğu 4,6 cm'dir. Sağlıklı kontrollerde tüm bu değerlerin ortancası sıfır bulunmuştur ($p=0,001$).
Sonuç: Bu çalışma, AAM hastalarının ağrı eşiklerinin düştüğünü ve ağrının duyusal ve algısal özelliklerine ait şiddetinde bir artış olduğunu göstermiştir. Bu sonuçlar, santral sensitizasyonun AAM patofizyolojisinde ağrı sendromlarına yatkınlık oluşturduğunu destekler niteliktedir.
Anahtar kelimeler: aşırı aktif mesane, ağrı şiddeti, ağrı eşiği, yaşam kalitesi, semptom şiddeti

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Introduction

Current hypotheses suggest that overactive bladder (OAB) develops as a result of disabled inhibitory mechanisms due to sensitized afferent nerves leading to contractions similar to primitive voiding reflexes. Another hypothesis suggests that the intercellular connections between detrusor myocytes increase and the spontaneous stimulation of these cells results in OAB [1]. Despite the fact that none of these hypotheses completely explains the pathophysiology of OAB syndrome, some writers have proposed that sensory hypersensitivity may play a role in OAB [2,3]. According to a study, up to 40% of the OAB-afflicted women who took part associated the urge brought on by the symptoms with pain, pressure, or discomfort rather than the fear of incontinence, a symptom that significantly reduced patients with OAB syndrome's quality of life and led to admission to medical facilities [3-5].

Central sensitization has been suggested to be the underlying cause of chronic pain syndromes [6,7]. Central sensitization is a state of increased neuronal hyperexcitability in response to peripheral stimuli. Primary hyperalgesia, secondary hyperalgesia, reflected pain, and allodynia are observed in cases where the supraspinal and spinal levels are responsible [8]. Patients with central sensitization experience pain perception changes and decreased pain threshold, which leads to psychosocial effects and deterioration in the quality of life [6,7].

Although pain is not considered a feature of OAB, the mechanisms underlying pain perception and afferent hypersensitivity are thought to contribute to the clinical manifestations of OAB [9]. Given that central sensitization is one of the pathophysiological processes driving OAB, it should be kept in mind that these individuals may suffer symptoms similar to those of chronic pain syndromes [10]. Studies on the issue showed that compared to healthy women, women with OAB experienced much more pain from bladder symptoms [4,9]. However, there is no study that compared patients with OAB to healthy controls to examine changes in general pain perception and pain threshold.

The aim of our study was to examine the differences between pain characteristics and quality of life in women with OAB and healthy controls.

Materials and Methods

The research was done from October 2018 to March 2019. Prior to conducting the current prospective study, Başkent University Medical and Health Sciences Research Board and Ethics Committee provided its consent (Decision date: 09.19.2018 and no: KA18/281-18/75). The study was carried out in conformity with the guidelines outlined in the Helsinki Declaration. Informed consent was obtained from women who agreed to take part in the study.

Women with OAB and healthy volunteers with similar age and body mass index made up the participants in the current study. Women over the age of 18, who were diagnosed to have OAB by a urologist in line with the ICS were included. Patients with any metabolic (obesity, diabetes mellitus, constipation, etc), orthopedic, neurological, hormonal, or psychiatric conditions, pregnancy or lactation, urinary tract infections, stress urinary incontinence, and skin lesions that may interfere with pain threshold assessments were also excluded from the research. The major outcome measure for the current study was the Pressure Pain Threshold assessment. 56 women (28 women with OAB and 28 healthy controls) were examined in total. Healthy controls were selected from relatives of women with OAB. Exclusion criteria were applied in both groups. The power analysis was used to establish the sample size with a 95% power and 0.05 margin of error. The sample size was determined using the Erdem et al. reference research as a guide [11].

Anthropometric and sociodemographic data such as age, height, weight, body mass index, education level and smoking habits were collected for the study. All women filled out a questionnaire that included questions regarding clinical information, such as obstetric history, the length of time that lower urinary tract symptoms had persisted, smoking status, and constipation.

Pain Quality

To evaluate pain, the Turkish version of the short form of the McGill Pain Questionnaire (SF-MPQ) was employed which has three sections in its condensed version [12]. The main component of the SF-MPQ initial section 15 descriptive adjectives (sensory, affective) for the pain sensation are included in the questionnaire's. According to SF-MPQ; sensory characteristics of pain are: throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burnbing, aching, heavy, tender, splitting, affective characteristics of pain are: Tiring-exhausting, sickening, fearful, punishing-cruel. The goal of the second section, which consists of five words from "no pain" to "unbearable agony," is to assess the degree of the patient's suffering. A visual analog scale is employed to gauge the patient's current level of pain in the third part [13].

Pain Threshold

The pressure pain threshold was assessed using an "Algometer." The algometer (Commander JTECH TM Salt Lake City, Utah) utilized in this research was made up of a metal piston with a rubber disc 1 cm in diameter attached to a dial that measures pressure in pounds (Lb). In order to evaluate the pain threshold where the pain was thought to be reflected in the patients, two different anatomic regions in the lower abdominal region, symphysis pubis superior and anteromedial and inferomedial of the anterior superior of the spina iliac, were measured bilaterally in the supine position [14]. The general pain threshold was measured bilaterally at 9 sensitive points defined as fibromyalgia (occiput, trapezius, supraspinatus, lower cervical, costochondral, lateral epicondyle, gluteus, trochanter major, medial pillow of knee joint). First, the process was explained to the participants, and then the probe of the algometer was perpendicularly placed to the skin and the participants were asked to notify as soon as they felt pain with no endurance following the application of pressure. The pressure was measured when it was expressed by the participant. Measurements were repeated three times with resting intervals of 15-20 seconds and the mean values were recorded [15].

Neuropathic Pain Assessment

Neuropathic pain was assessed using the Self-Leeds Assessment of Neuropathic Symptoms and Signs questionnaire (LANSS). Two components make up the LANSS questionnaire, which is graded out of a possible 24 points. Nociceptive pain was defined as pain that is not neuropathic, with a total score of 12 points or less [16].

Urinary System Symptom Assessment

The Turkish validated Overactive Bladder Awareness tool (OAB-V8) was applied to evaluate OAB symptoms, which is a short, easily applicable, and understandable form specific to OAB syndrome [17,18]. Patients with a total score of 8 or above are thought to have OAB syndrome, and the final score ranges between 0 and 40. The intensity of the symptoms and their impact on quality of life were further assessed using the short forms of the Urogenital Distress Inventory (UDI-6) and Incontinence Impact Questionnaire (IIQ-7). Scores range from 0 (the patient is not at all bothered by this symptom) to 100 (the patient is very uncomfortable with this symptom). IIQ-7 and UDI-6 combined scores are rated on a scale of 100. Higher total scores from these surveys imply that patients have a worse quality of life [19,20].

Quality of Life

The Nottingham Health Profile (NHP) was used to measure quality of life. This questionnaire assesses the subject's present health conditions and how much they interfere with daily life. It is a survey of general life satisfaction. Six health-related subscales are included in the 38-item questionnaire: energy (3 items), pain (8 items), emotional reactions (9 items), sleep (5 items), social isolation (5 items), and physical activity (8 items). Question responses are either "Yes" or "No." Each part receives a score between 0 and 100. For each section, the best health status is represented by the number 0, while the worst health state is represented by the number 100 [21,22].

Statistical Analysis

Statistical analysis was performed by the SPSS Windows version 24.0 program. The Mann-Whitney U test was used to compare the non-normally distributed variables across two different groups, and the Shapiro-Wilk test was performed to determine whether the data were appropriate for a normal distribution. The Spearman correlation coefficient was used to assess the relationship between the numerical variables. Number and percentage (%) were included in descriptive statistics for categorical variables, whereas mean, standard deviation, and median were included for numerical data (minimum-maximum). P<0.05 was considered as statistically significant.

Results

The mean ages were 38.89 years vs 37.54 years and the mean BMIs were 28.74 kg/m2 vs 27.19 kg/m2, in women with OAB (n=28) and controls, respectively (p>0.05). In patients, the mean time with OAB was 4.54 ± 3.79 years. Educational status was also similar among the groups (p>0.05) **(Table 1).**

The mean values of the algometric measurements for pain threshold exihibited significant differences between the groups in the left lateral epicondyle, right lateral epicondyle, left knee medial, right knee medial pillow, right trapezius, right occiput, right supraspinatus, left trapezius, left supraspinatus, left gluteus, right gluteus, symphysis pubis, right spina iliaca anterior superior (SIAS) anteromedial, right SIAS inferomedial, left SIAS inferomedial, left costochondral, right costochondral, left trochanter major, and right trochanter major, implying that women with OAB have lower pain thresholds (p<0.05). However, the measurements were similar in the left SIAS anteromedial, right lower cervical, left lower cervical, and left occiput sites (p>0.05) **(Table 2).**

The total mean scores for pain (p=0.001), sleep (p=0.003), social isolation (p=0.046), physical activity (p=0.001), energy (p=0.001), and the total mean scores of parts 1 and 2 (p=0.001) all significant differences with regard to NHP, implying that the intensity of sensory and affective characteristics of pain was higher in women with OAB. The total mean scores of the emotional reactions were found similar (p>0.05) **(Table 3).**

The comparison of pain characteristics, lower urinary tract symptom bother and quality of life among the groups are shown in Table 4. In women with OAB, the median value of the sensory subscale of the SF-MPQ was 6.5, the emotional subscale was 2, and the total value was 9, with a pain intensity of 4.6 cm. In the healthy controls, it was found that the median of all these values were 0 (p=0.001). The results of the LANSS questionnaire revealed that neuropathic pain was present in women with OAB, with mean scores of 10.86 ± 6.49 compared to 0.21 ± 0.63 in healthy controls. The total mean scores of the IIQ-7, UDI-6 and OAB-V8 were all significantly higher in women with OAB **(Table 4).**

Regarding the correlations between pain intensity and pain quality with the severity of symptoms in women with OAB; the total mean scores of the SF-MPQ showed strong correlations

Table 1. Demographics of women with OAB and healthy controls

	OAB (n=28)		Control (n=28)		P
	Mean±SD	Median (min-max)	Mean±SD	Median (min-max)	
Age (years)	38.89±10.87	37 (21-63)	37.54±9.29	35 (26-65)	0.517
BMI (kg/m^2)	28.74 ± 4.97	29.42 (20.35 -39.85)	27.19 ± 6.23	25.53 (20.31-44.6)	0.125
	N (%)		N (%)		P
Education n (%)					0.104
*Primary	11 (39.3)		4 (14.3)		
*High school	5 (17.9)		8 (28.6)		
* University	12 (42.9)		16 (57.1)		

OAB: Overactive bladder; BMI: Body massindex; n: number; SD: Standart deviation; P<0.05 is accepted as statistically significant

Table 2. Comparison of algometric measurement points according to the groups

	OAB (n=28)		Control (n=28)		P
	Mean±SD	Median (min-max)	Mean±SD	Median (min-max)	
Symphysis pubis	4.52 ± 0.91	4.66 (2.96 -6.16)	5.41 ± 1.49	5.66 (2.4 -8.2)	0.017*
Right SIAS anteromedial	4.57 ± 1.37	4.27 (2.16 -6.83)	5.67 ± 1.35	5.88 (2.86 -7.96)	0.009*
Right SIAS inferomedial	4.93 ± 1.3	4.71 (2.43 -7.1)	5.66 ± 1.3	5.88 (2.96 -7.76)	0.047*
Left SIAS anteromedial	4.88 ± 1.22	4.83 (3 -8.2)	5.57 ± 1.38	5.31 (3.23 -8.2)	0.061
Left SIAS inferomedial	4.27 ± 1.15	4.23 (2 -6.43)	5.42 ± 1.39	5.2 (3.23 -7.86)	0.003*
Right lower cervical	3.76 ± 1.24	3.73 (1.1 -6)	3.43 ± 0.98	3.38 (1.63 -5.46)	0.248
Left lower cervical	3.46 ± 0.92	3.68 (1.36 -4.8)	3.42 ± 1.02	3.51 (1.6 -5.26)	0.799
Right costachondral	4.25 ± 1.03	4.38 (2.5 -6.53)	5.44 ± 1.21	5.31 (1.86 -7.43)	0.001*
Left costachondral	4.19 ± 0.91	4.1 (2.03 -6.23)	5.57 ± 1.37	5.8 (2.6 -8.16)	0.001*
Right lateral epicondylitis	5.4 ± 1.79	5.2 (3.03 -8.2)	7.42 ± 1.04	7.85 (4.63 -8.2)	0.001*
Left lateral epicondylitis	5.54 ± 1.55	5.03 (2.63 -8.2)	7.39 ± 1.32	8.07 (3.76 -8.2)	0.001*
Right knee medial pillow	5.12 ± 1.41	4.83 (3.12 -8.2)	6.92 ± 1.14	7.23 (3.86 -8.2)	0.001*
Left knee medial pillow	5.16 ± 1.47	5.17 (3.05 -8.2)	6.99 ± 0.98	6.93 (4.43 -8.2)	0.001*
Right occiput	5.27 ± 1.31	4.86 (3.5 -8.1)	6.04 ± 1.22	6.25 (3.6 -8.2)	0.022*
Left occiput	5.5 ± 1.15	5.25 (3.4 -8)	5.51 ± 1.3	5.57 (2.93 -7.7)	0.731
Right trapezius	5.63 ± 1.28	5.13 (3.66 -8.2)	6.67 ± 1.44	6.86 (3.26 -8.2)	0.005*
Left trapezius	5.9 ± 0.97	5.73 (4.2 -7.83)	6.61 ± 1.45	7.03 (2.66 -8.2)	0.007*
Right supraspinatus	6.44 ± 1.23	6.75 (3.76 -8.2)	7.39 ± 1.04	7.95 (4.33 -8.2)	0.003*
Left supraspinatus	5.83 ± 1.58	5.93 (2 -8.2)	7.02 ± 1.45	7.62 (4 -8.2)	0.003*
Right gluteus	6.05 ± 1.24	6 (3.43 -8.2)	7.1 ± 1.49	8.08 (3.63 -8.2)	0.002*
Left gluteus	5.78 ± 1.28	5.56 (3.1 -8.2)	7.19 ± 1.27	7.76 (4.2 -8.2)	0.001*
Right thoracanter major	6.3 ± 1.32	6.66 (3.96 -8.2)	7.42 ± 0.92	7.97 (5.4 -8.2)	0.001*
Left thoracanter major	5.9 ± 1.44	6.1 (2.1 -8.2)	7.48 ± 1.06	8 (4.26 -8.2)	0.001*

OAB: Overactive bladder; SD: Standard deviation; SIAS: spina iliaca anterior superior; P<0.05 is accepted as statistically significant

Table 3. Comparison of Nottingham Health Profile Questionnaire according to the groups

	OAB (n=28)		Control (n=28)		
NHP	**Mean±SD**	**Median (min-max)**	**Mean±SD**	**Median (min-max)**	**P**
Pain	20.51±23.91	13.85 (0-100)	4.87 ± 11.25	0 (0-37.53)	0.001*
Emotionalreaction	22.08±20.25	20.09 (0-80.77)	14.25 ± 21.16	3.54 (0-87.99)	0.064
Sleeping	40.11±26.93	39.83 (0-100)	18.83 ± 28.51	0 (0-77.63)	0.003*
Socialisolation	24.98±24.17	22.01 (0-80.64)	14.89 ± 24.24	0 (0-79.87)	0.046*
Physicalmobility	19.72±13.27	21.36 (0-43.68)	3.98 ± 7.6	0 (0-22.74)	0.001*
Energy	50.6±35.08	62 (0-100)	21.74 ± 31.94	0 (0-100)	0.001*
Total of part 1	174.95±84.92	155.97 (12.57-395.35)	78.07 ± 84.83	45.8 (0-321.37)	0.001*
Total of part 2	2.14±1.9	2 (0-6)	0.46 ± 0.84	0 (0-3)	0.001*

OAB: Overactive bladder; SD: Standart deviation; NHP: Nottingham Health Profile; P<0.05 is accepted as statistically significant

Table 4. Comparison of pain characteristics, lower urinary tract symptom bother and quality of life among the groups

	OAB (n=28)		Control (n=28)		
	Mean±SD	**Median (min-max)**	**Mean±SD**	**Median (min-max)**	**P**
SF-MPQ sensory	6.71 ± 4.78	6.5 (0 -21)	0.21 ± 0.57	0 (0 -2)	0.001*
SF-MPQ affective	3.11 ± 3.36	2 (0 -11)	0.18 ± 0.55	0 (0 -2)	0.001*
SF-MPQ total	9.82 ± 7.17	9 (0 -28)	0.36 ± 0.73	0 (0 -2)	0.001*
SF-MPQ pain intensity (cm)	4.59 ± 2.47	4.6 (0 -10)	0.6 ± 1.06	0 (0 -3.3)	0.001*
LANSS	10.86 ± 6.49	12 (0 -24)	0.21 ± 0.63	0 (0 -3)	0.001*
IIQ-7	65.98 ± 20.85	64.28 (28.57 -100)	0.68 ± 2.5	0 (0 -9.52)	0.001*
UDI-6	62.69 ± 20.67	61.11 (33.33 -94.44)	7.93 ± 7	11.11 (0 -22.22)	0.001*
OAB-V8	25.11 ± 7.1	24.5 (13 -37)	2.57 ± 1.99	2.5 (0 -6)	0.001*

OAB: Overactive bladder; IIQ-7: Incontinence Impact Questionnaire-7; UDI-6: Urogenital Distress Inventory-6; OAB-V8: The Overactive Bladder Awareness Tool; LANSS: Self-Leeds Assessment of Neuropathic Symptoms and Signs; SF-MPQ: Short –form McGill Pain Questionnaire; SD: Standard deviation; cm: centimeter; sig: significant; z: Mann-Whitney U test; P<0.05 is accepted as statistically significant

with the IIQ-7 (r=0.733), OAB-V8 (r=0.684), LANSS (r=0.689) (p=0.000), and UDI-6 (r=0.626) (p=0.000). The sensory subscale scores of the SF-MPQ's showed strong and positive correlations with the IIQ-7 (r=0.666), OAB-V8 (r=0.640), and LANSS (r=0.610) (p=0.000), and significant moderate correlations with the UDI-6 (r=0.576) (p=0.000). Additionally, the pain intensity subscale scores of the SF-MPQ's were found to have positive moderate correlations with the IIQ-7 (r=0.505), UDI-6 (r=0.536) and OAB-V8 (r=0.544), and a strong and positive correlation with the total scores of the LANSS (r=0.654) (p=0.000) **(Table 5).**

Discussion

In the present study, the effects of OAB on pain and quality of life were investigated, and it was also investigated whether these effects differed from healthy controls. The research has been argued that OAB lowers women's quality of life because of physical and interpersonal issues. However, no prior study has looked into the factors affecting how people perceive pain and how their pain thresholds change. The findings of the current study have shown that, in comparison to healthy controls, patients

Table 5. The correlations between pain intensity, pain quality, and OAB symptom severity

		IIQ-7	UDI-6	OAB-V8	LANSS	SF-MPQ sensory	SF-MPQ affective	SF-MPQ total	SF-MPQ pain intensity(lf)	SF-MPQpain intensity(cm)
IIQ-7	correlation coefficient									
	sig. (2-tailed)									
	N									
UDI-6	correlation coefficient	.917**								
	sig. (2-tailed)	.000								
	N	56								
OAB-V8	correlation coefficient	.943**	.924**							
	sig. (2-tailed)	.000	.000							
	N	56	56							
LANSS	correlation coefficient	.817**	.842**	.803**						
	sig. (2-tailed)	.000	.000	.000						
	N	56	56	56						
SF-MPQ sensory	correlation coefficient	.666**	.576**	.640**	.610**					
	sig. (2-tailed)	.000	.000	.000	.000					
	N	56	56	56	56					
SF-MPQ affective	correlation coefficient	.692**	.579**	.615**	.679**	.687**				
	sig. (2-tailed)	.000	.000	.000	.000	.000				
	N	56	56	56	56	56				
SF-MPQ total	correlation coefficient	.733**	.626**	.684**	.689**	.956**	.870**			
	sig. (2-tailed)	.000	.000	.000	.000	.000	.000			
	N	56	56	56	56	56	56			
SF-MPQ pain intensity(lf)	correlation coefficient	.505**	.536**	.544**	.654**	.618**	.435**	.593**		
	sig. (2-tailed)	.000	.000	.000	.000	.000	0.001	.000		
	N	56	56	56	56	56	56	56		
SF-MPQ pain intensity (cm)	correlation coefficient	.709**	.679**	.713**	.794**	.826**	.686**	.837**	.872**	
	sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	
	N	56	56	56	56	56	56	56	56	

OAB: Overactive bladder; IIQ-7: Incontinence Impact Questionnaire-7; UDI-6: Urogenital Distress Inventory-6 ; OAB-V8: 8-item overactive bladder questionnaire; LANSS: Self-Leeds Assessment of Neuropathic Symptoms. and Signs; SF-MPQ: Short –form McGill Pain Questionnaire; lf: long form; cm: centimeter; sig: significant; **correlation is significant at the 0.01 level (2-tailed)

with OAB have lower pain thresholds and lower quality of life.

Central sensitization, which results from the inability to regulate increased afferent fiber sensitivity due to OAB, is thought to be one of the potential mechanisms contributing to the pathophysiology of OAB. This condition is claimed to cause both bladder sensitivity and increased susceptibility to pain syndromes in patients [9,23-26]. Reynolds et al. discovered that a sizable percentage of patients also had widespread body pain and OAB, which they attributed to central sensitization. Furthermore, patients had several concomitant central sensitivity syndromes, according to Reynold et al. The authors also highlighted the need of considering comorbidity when analyzing comorbid central sensitization symptoms in OAB patients [25]. Chung et al. suggested that OAB syndrome was associated with an increased rate in women and men with fibromyalgia compared to those without the diagnosis of fibromyalgia, which also supported our hypothesis (OR 3.39, 95% CI 1.82–6.31) [27]. Similar to these studies, the pain thresholds in women with OAB were significantly lower than healthy controls in the present study. Thus, our results indicate that central sensitization, a feature that has an important effect on pain threshold in OAB pathophysiology, is the source of decreased pain threshold.

To the best of our knowledge, there is no study evaluating the alterations in pain threshold in OAB patients. These patients have pelvic pain, discomfort, and pressure along with urinary urgency [28]. The patients' pain thresholds were assessed using the anatomical localizations of the sensitive regions identified as having fibromyalgia as well as the anatomical localizations of the pelvis. In our study, it was found that anatomical regions, including the pelvis superior of the symphysis pubis, the anteromedial and inferomedial of the spina iliaca anterior superior, and at 18 sensitive points, were classified as fibromyalgia when the pain threshold measurements from OAB patients and healthy controls were compared. These findings show that pain severity, including both emotional and sensory aspects, is related with the severity of OAB symptoms.

Although women with OAB seemed to have worse results than healthy controls in terms of the emotional reactions subscale of the NSP in this study, no statistically significant difference was found. In a study by Ikeda et al., it was reported that the social isolation caused by OAB in women leads to stress and predisposes people to anxiety and depression [29]. Although our result, which we have revealed with our study, seems contradictory with the literature, it is quite meaningful in terms of proving the low pain threshold that occurs due to central sensitization, which plays a role in the pathophysiology of OAB, without emotional symptoms that are highly effective on the pain threshold.

In a study of the characteristics of somatic syndrome and chronic pain in women with OAB, Reynolds et al. found that 54% of the 116 OAB patients reported experiencing pain, pressure, or discomfort in relation to urgency sense. They also found a high positive correlation between the intensity of the pain, OAB symptoms, and somatic symptoms [9]. Additionally, according to Clements et al., pain and discomfort, rather than urine incontinence, were the primary issues that 40% of OAB patients encountered [5]. Like Reynolds et al. and Clemens et al., we discovered a positive correlation between the OAB symptoms and pain intensity in the current study. Additionally, it has been discovered that OAB patients' pain thresholds and pain characteristics deteriorate as their symptoms get worse and have a greater impact on their lives. Since central sensitization, one of the pathophysiological processes of OAB, enhances these patients' vulnerability to chronic pain it is believed to be the primary cause of the problem.

When the groups were compared in terms of pain threshold measurements, although it was numerically lower in women with OAB than healthy controls in all anatomical localizations, the lack of statistically significant difference in measurements made in some localizations can be considered as the limitation of our study. This result may have arisen due to the multifactorial and socioculturally affected nature of pain, but we tried to minimize this sociocultural effect, since we included both the women with OAB and the healthy controls we compared them with from the patients and their relatives who applied to the same hospital. In addition, the lack of a quantitative assessment for pain evaluation in the study methodology and the absence of a second evaluator in algometer measurements are other limitations. However, due to the subjective nature of pain, the literature is quite limited in terms of quantitative measurements. Considering that no treatment intervention was performed on the patients in our study, we think that the possibility of bias in the measurement results is low.

Conclusion

The current study showed that OAB may lower women's pain thresholds, lower their quality of life, and raise their pain's sensory and emotional aspects. These findings support the hypothesis that, despite how OAB affects emotional state, central sensitization is vulnerable to pain syndromes in the pathophysiology of OAB. Additionally, it was shown that among OAB patients, the intensity of pain rose in lockstep with the intensity of symptoms. Current findings highlight the possibility that individuals with OAB may be prone to pain syndromes as well as symptoms of the lower urinary tract; as a result, doctors should take this into account when examining patients. Given the findings, it is crucial to incorporate pain management techniques into the treatment plans. Additional research with bigger sample sizes is required.

Ethics Committee Approval: Ethics committee approval was received for this study from Başkent University Medical and Health Sciences Research Board a nd Ethics Committee (Decision date: 09.19.2018 and no: KA18/281-18/75).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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