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Investigation of the Relationship of Urinary Incontinence Symptoms with Activities of Daily Living in Individuals with Multiple Sclerosis

Üriner İnkontinans Semptomlarının Multipl Sklerozlu Bireylerde Günlük Yaşam Aktiviteleri ile İlişkisinin Araştırılması

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ÖZ

Amaç: Üriner inkontinans (Üİ), Multipl Skleroz (MS) hastalarında yaygın görülen ve günlük aktiviteleri olumsuz etkileyen bir semptomdur. Bu çalışmada MS tanılı bireylerde Üİ şikayetleri ile günlük yaşam aktivitelerini gerçekleştirme becerisi arasındaki ilişkinin araştırılması amaçlanmıştır.
Araçlar ve Yöntem: Çalışmaya MS tanılı ve Üİ'ye sahip, yaş ortalaması 42.06±1.42 olan 45 katılımcı dahil edildi. Katılımcı verileri çevrimiçi bir platform olan Google Forms aracılığıyla toplandı. Uluslararası İdrar Kaçırma Konsültasyon Sorgulaması-Kısa Form (ICIQ-SF) Üİ şikayetlerini, İnkontinans Etki Sorgulaması (IIQ-7) anketi ise günlük yaşam aktiviteleri üzerindeki etkiyi değerlendirmek için kullanıldı. ICIQ-SF ile IIQ-7 fiziksel aktivite, sosyal aktivite, sosyal ilişkiler ve duygusal sağlık alt skorları ve total skoru arasındaki ilişkiyi değerlendirmek için Spearman korelasyon analizi yapıldı.
Bulgular: Katılımcıların %26.7'si günde 8 kereden fazla idrara çıkmaktaydı. Mesane günlüğü hakkında bilgi sahibi olmayan bireylerin oranı %75.6 ve işemeye başlamakta zorluk çekenlerin oranı ise %44.4'tü. ICIQ-SF ile IIQ-7 fiziksel aktivite ve sosyal aktivite alt boyutları ile total skoru arasında güçlü ilişki bulurken (sırasıyla rho=0.64, p<0.001; rho=0.53, p<0.001; rho=0.56, p<0.001), sosyal ilişkiler ve duygusal sağlık alt boyutları arasında orta derecede ilişki bulundu (sırasıyla rho=0.45, p=0.002; rho=0.38, p=0.009).
Sonuç: Üİ semptomlarının MS'li bireylerin günlük aktiviteleri üzerindeki olumsuz etkileri göz önüne alındığında, Üİ için kapsamlı bir değerlendirme yapılarak MS'lilerin, Üİ'nin şiddetine, tipine ve sıklığına göre uyarlanmış bir rehabilitasyon programına dahil edilmesi önemlidir.

Anahtar Kelimeler: aktivite; nörolojik bozukluk; üriner disfonksiyon

ABSTRACT

Purpose: Urinary incontinence (UI) is a common symptom for people with Multiple Sclerosis (MS) that negatively impacts daily activities. This study aimed to investigate the relationship between UI symptoms and the ability to perform daily activities in individuals diagnosed with MS.
Materials and Methods: The study included 45 participants diagnosed with MS and UI, with a mean age of 42.06±1.42. Participant data were collected through an online platform, Google Forms. The International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) was used to assess UI symptoms, while the Incontinence Impact Questionnaire (IIQ-7) was used to evaluate the impact on daily life activities. Spearman correlation analysis was performed to assess the relationship between the ICIQ-SF and IIQ-7 subscales (physical activity, social activity, social relationships, and emotional health) and the total score
Results: 26.7% of the participants urinated more than 8 times a day. The proportion of individuals who were unaware of bladder diaries was 75.6%, and 44.4% had difficulty initiating urination. A strong correlation was found between the ICIQ-SF and IIQ-7 physical activity, social activity subscales, and total score (rho=0.64, p<0.001; rho=0.53, p<0.001; rho=0.56, p<0.001). A moderate correlation was found between the social relationships and emotional health subscales (rho=0.45, p=0.002; rho=0.38, p=0.009).
Conclusion: Considering the negative impact of UI symptoms on the daily activities of individuals with MS, it is important to conduct a comprehensive assessment of UI and include individuals with MS in a tailored rehabilitation program based on the severity, type, and frequency of UI.

Keywords: daily tasks; neurological disorder; urinary dysfunction

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INTRODUCTION

Multiple sclerosis (MS) is a chronic inflammatory disease characterized by progressive neuronal loss and demyelination in the central nervous system (CNS).[1] Although the course of the disease is highly variable, it is one of the most common causes of neurological disability.[2] MS typically presents in young adulthood, between the ages of 20 and 40, with females being affected two to three times more frequently than males. The global prevalence of MS varies between countries, with an estimated rate of 33 per 100.000 individuals.[3]

Clinical symptoms of MS vary based on the location of the lesions that occur in the CNS and may differ from individual to individual.[4] MS affects brain structures and may lead to symptoms in the lower urinary tract through the involvement of the spinal pathways that control sphincters. It is estimated that 80-90% of patients with MS will experience lower urinary tract dysfunction throughout their disease.[5] Urinary incontinence is one of the most frequently encountered symptoms of MS and has a negative effect on a patient's life.[6]

Urinary incontinence is the involuntary urination or loss of bladder control.[7] Stress urinary incontinence is defined as the involuntary leakage of urine during physical activity or exertion. Urge urinary incontinence is characterized by the involuntary loss of urine associated with an immediate need to urinate. Mixed urinary incontinence is diagnosed when there is a complaint of urine loss related to urgency and stress.[8,9] Over 80% of MS patients experience lower urinary tract dysfunction, with incontinence being observed in 37-72% of cases. Incontinence can negatively affect social relationships, emotional and psychological well-being, and daily activities, and contribute to feelings of shame and low self-esteem. Due to these negative effects, UI is considered a social problem as well as a medical problem and triggers many factors affecting participation in daily life.[10] Studies have shown that individuals with urinary incontinence see themselves as strange or different from others due to feelings such as being constantly wet, discomfort due to being wet, and fear of wetting themselves in public, and accordingly, they avoid going out, significantly limit activities such as transportation, physical activity, eating and drinking, clothing selection, fear of going too far from home, do not want to use public transportation and avoid sexual intercourse.[11,12] Despite all these negative effects on daily life, urinary incontinence is hidden by people who experience it for reasons such as thinking that it is a normal side effect of having children and aging, being embarrassed to talk about the condition or believing that the condition is untreatable.[13] It has also been found that the stigma associated with UI in the community is significantly higher than other stigmatized diseases such as depression and cancer. Both the high rate of stigmatization and the concealment of symptoms make it valuable to evaluate the impact of urinary incontinence on the activities of daily living of MS patients. In this context, the aim of our study is to investigate the relationship between urinary incontinence symptoms and activities of daily living in MS patients with urinary incontinence and to reveal the seriousness of this issue.

MATERIALS and METHODS

Study Design

This is a cross-sectional study approved by the Ethics Committee of Fenerbahçe University (dated 20.07.2022 and numbered 21.2022fbu) and conducted according to the Helsinki Declaration. Informed consent was obtained from all participants.

Participants

The sample size in the study was calculated as 34 with a 95% confidence interval and 90% power using the 'Sample Size Calculator' program, based on the information that the rate of individuals with urinary incontinence in MS patients is 3.2%.[14] Accordingly forty-five subjects (age: 42.06±1.42 years, BMI: 23.55±0.66 kg/m^2) who met the inclusion criteria between June 2022 and September 2022 were included in the study. Individuals with MS included in the study were reached through announcements made to the clinics via Google Forms links.The inclusion criteria were patients aged 20-65 years with a definitive diagnosis of MS with urinary incontinence who have urinary disorders (no change in bladder emptying method or medication use) and The Expanded Disability Status Scale score less than or equal to 5.5. The exclusion criteria were congenital urological disorders, bladder cancer, MS exacerbation in the last month, neurological disease accompanying MS, prior bladder surgery, indwelling urinary catheter, pregnancy, prostate-related problems, and difficulty answering the questionnaire due to language or cognitive limitations.

Outcome Measures

Measurements were applied online via Google Forms. Informed consent was obtained from each study participant, and they were required to answer all the questions. Data about the participants' sociodemographic and clinical information were collected and the participants responded to the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) and Incontinence Impact Questionnaire (IIQ-7).

Sociodemographic and Clinical Information

Sociodemographic information such as gender, age, body mass index (BMI), educational status, marital status of the participants and clinical information such as MS onset age, MS disease duration (years), type of MS, fear of urinary incontinence, frequency of urination, difficulty starting urine, and keeping a bladder diary was collected with the information form.

International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF)

The Turkish-validated version of the ICIQ-SF was used for evaluating the symptoms of urinary incontinence.[15] ICIQ-SF includes 4 questions about the frequency of urinary incontinence, amount of urinary leakage, severity, and impact of urinary incontinence on daily life. The responses are summed (questions one, two and three) to achieve a total score ranging from 0 to 21 where higher scores indicate greater severity.[16]

Incontinence Impact Questionnaire (IIQ-7)

The Turkish-validated version of IIQ-7 to assess the impact of patients' activities of daily living was used.[17] This questionnaire is used to assess the impact of urinary and bowel incontinence in 4 fields: physical activity, social relationships, travel, and emotional health. The scoring is made between 0-3 points (0 = not at all to 3 = greatly) and the total score ranges from 0 to 100 where higher scores show greater impact.[18]

Statistical Analysis

The Statistical Package for the Social Sciences software (v22; SPSS, Chicago, IL) was used for analysing the data. The distributions of the variables studied were determined using skewness, kurtosis values, Q-Q plots, Box Plots, and histograms, along with the Shapiro-Wilks test. In the statistical analysis of the study, the variables considered *defined* with their mean, standard deviation, and percentage values. The correlation between variables was assessed using Spearman correlation analysis to test the relationship between the scales. *Spearman's correlation analysis was used to determine the relationship between the participants' IIQ-7 physical activity, IIQ-7 social activity, IIQ-7 social relationship, IIQ-7 emotional health subscores, IIQ-7 total score and ICIQ-SF. The strength of the correlation was evaluated as poor (0-0.3), moderate (0.3-0.5), or strong (0.5-0.7).* Statistical significance was accepted as $p<0.05$. In all analyses, $p<0.05$ was considered statistically significant.

RESULTS

Ninety-four subjects with MS who were followed at the neurology clinic were invited to participate. Forty-nine subjects did not meet the eligibility criteria. Therefore, a total of 45 patients with MS who have urinary incontinence were included.

The sociodemographic characteristics of the participants are summarized in Table 1. The sample of this study included 5 males (%11.1) and 40 females (%88.9) with a mean age of 42.06±1.42 years. The average BMI was 23.55±0.66.

The clinical characteristics of the participants are shown in Table 2. The mean MS onset age was 25.64±7.80 and the mean duration of the disease was 16.13±9.39. 53.3% of the participants were diagnosed with relapsing-remitting MS. 26.7% of the participants urinated higher than 8 times a day and 75.6% of them did not have information about bladder diary and education. Starting urination was difficult for 44.4% of the participants.

Table 1. Demographic characteristics of the participants.

Characteristics, N=45	
Sex (F/M), n (%)	40 (88.9) / 5 (11.1)
Age (year), mean (SD)	42.06 (1.42)
BMI (kg/m2), mean (SD)	23.55 (0.66)
Marital status, n (%)	
Married	27 (60)
Single	17 (37.8)
Other	1 (2.2)
Education, n (%)	
Primary school	2 (4.4)
Middle school	2 (4.4)
High school	8 (17.8)
Bachelor's degree	27 (60)
Masters/Doctorate	6 (13.3)

SD: standard deviation, F: female, M: male, BMI: body mass index

Table 2. Clinical characteristics of the participants.

Characteristics, N=45	
MS onset age, mean (SD)	25.64 (7.80)
MS disease duration, mean (SD)	16.13 (9.39)
MS type, n (%)	
Benign MS	6 (13.3)
Relapsing-remitting MS	24 (53.3)
Primary progressive MS	3 (6.7)
Secondary progressive MS	8 (17.8)
Progressive relapsing MS	4 (8.9)
Frequency of urination, n (%)	
3-4 times a day	5 (11.1)
5-6 times a day	17 (37.8)
7-8 times a day	11 (24.4)
>8 times a day	12 (26.7)
Bladder diary and education, n (%)	
Has knowledge	11 (24.4)
No information	34 (75.6)
Starting urination, n (%)	
Difficulty	20 (44.4)
Effortless	25 (55.6)
ICIQ-SF score, mean (SD)	9.68 (4.42)
IIQ-7 subscores and total score, mean (SD)	
IIQ-7 Physical activity	3.86 (1.54)
IIQ-7 Social activity	5.04 (2.01)
IIQ-7 Social relationship	2.62 (1.02)
IIQ-7 Emotional health	5.04 (1,96)
IIQ-7 Total score	45.22 (27.45)

SD: standard deviation, MS: multiple sclerosis, BMI: body mass index; ICIQ-SF: International Consultation on Incontinence Questionnaire-Short Form, IIQ-7: Incontinence Impact Questionnaire-7

The correlation between ICIQ-SF and IIQ-7 physical activity, social activity, socia relationships and emotional health subscores and total score was demonstrated in Table 3. While there were strong correlation between ICIQ-SF and IIQ-7 physical activity, social activity and total scores (rho=0.64, p<0.001; rho=0.53, p<0.001; rho=0.56, p<0.001, respectively), there were moderate correlation between IIQ-7 social relationship and IIQ-7 emotional health (rho=0.45, p=0.002; rho=0.38, p=0.009, respectively).

DISCUSSION

This study's goal was to determine the correlation between urinary incontinence symptoms and activities of daily living in individuals with MS. The main finding of the study demonstrated that there is a negative impact of urinary incontinence symptoms on daily life activities in individuals with MS.

When the literature was reviewed, negative effects on social relationships, emotional states, and domestic and professional life were found in individuals with MS who reported urinary incontinence symptoms. The presence of urinary incontinence was associated with a significant deterioration in daily living activity, and it was determined that the increase in symptom severity has a strong relationship inversely proportional to the decline in daily living activities.[19] In a study conducted to determine the effects of urinary incontinence in individuals diagnosed with MS and in which 403 individuals participated, it was observed that the rate of urinary incontinence remained at approximately 35%. However, those who experienced incontinence stated that their symptoms negatively affected their activities of daily living and reduced their quality of life, and that these effects were directly proportional to the severity of the symptoms.[20] Another study in which incontinence was evaluated in terms of functionality, disability and quality of life in male and female patients with MS also found that incontinence affects daily life by causing a decrease in lower limb functionality.[21] Similarly, it was concluded that a treatment program aimed at decongesting urinary incontinence symptoms in 35 women contributed to a significant improvement in individuals' daily living activities, and the link between daily living activity and urinary incontinence was revealed from different directions.[22] In light of these findings, it can be said that the main result of our study supports the findings of the literature.

Table 3. Correlation between ICIQ-SF and IIQ-7 scores.

	IIQ-7 Physical activity	**IIQ-7 Social activity**	**IIQ-7 Social relationships**	**IIQ-7 Emotional health**	**IIQ-7 Total score**
ICIQ-SF	rho =0.64 p <0.001	rho= 0.53 p <0.001	rho=0.45 p= 0.002	rho=0.38 p=0.009	rho=0.56** p <0.001

ICIQ-SF: International Consultation on Incontinence Questionnaire-Short Form, IIQ-7: Incontinence Impact Questionnaire-7

It is known that the incidence of MS is higher in females.[23] In our study, it was observed that the majority of the study population (n=95) and the participants (n=45) were women. It can be stated that approximately 89% of our participants were women, which also aligns with existing information indicating a higher prevalence of urinary incontinence symptoms in women.[24,25] The fact that male participants diagnosed with MS showed a decrease of one-third in the incidence of urinary incontinence symptoms when questioned also supported this information. In addition, it was observed that more than half of our participants were diagnosed with Relapsing-Remitting MS consistent with the literature that this is the most common type of MS.

Bladder training is defined as any intervention that encourages individuals to extend the time between bladder emptying to regain their ability to hold urine. The bladder diary, which is considered a useful tool in the assessment and management of patients with symptoms of bladder emptying or storage dysfunction, is one of the components of bladder training, as indicated by various national and international organizations.[26,28] When expressed proportionally, it is seen that bladder training results in a significant reduction of urinary incontinence symptoms and attacks by as much as 70%.[29] In our study, we attempted to measure the level of knowledge and awareness about 'bladder diary and bladder training' with the question, 'Are you knowledgeable about bladder diary and bladder training?' It was observed that approximately 76% of the participants answered 'no' to this question. A study by Menoux et al. included 31 patients and evaluated the reproducibility of the bladder diary, which is an important component of bladder training in MS, and concluded that there are question marks about the applicability of the bladder diary in individuals with MS. Based on this literature and the results of our study, it is thought that more research is needed to provide information about bladder education and the use of bladder diaries, especially for individuals diagnosed with MS.[30]

In our study, individuals diagnosed with MS and experiencing urinary incontinence, with an average habit of going to the toilet 5-6 times a day. According to the ICIQ-SF responses, the number of individuals who leaked urine or experienced severe urine leakage was very low. However, more than half of the participants answered 'yes' to the question, 'Do you fear urine leakage?' Therefore, it was concluded that the fear of urine leakage was much higher, independent of the actual occurrence of urine leakage.

Urinary incontinence affects one in four women; it is a symptom that negatively affects many aspects of life, associated with loss of self-confidence, high depression, social isolation, social embarrassment, fear of incontinence in public, and intense anxiety about the possibility of others learning about it. Although the incidence of incontinence is 70% with increasing age, only 25% of individuals affected by incontinence seek or receive treatment, and nearly half (48%) of women who report incontinence experience intense anxiety that their symptoms will worsen in the future, the presence of incontinence or the fear of experiencing incontinence. It is seen that it creates a high psychological effect in the person, pushes the person to think about the bad results of the symptoms and drags the person to intense stress. In our study, it was thought that the fear of urinary incontinence was higher than the existing symptoms due to these reasons.[31]

The results of the IIQ-7 showed that urinary incontinence affected individuals more in terms of travel and social activities rather than minor household tasks or physical activities such as walking, swimming, and exercise. However, it is noteworthy that while a strong correlation was observed between urinary incontinence symptoms and the physical and social activity subscale of the IIQ-7 questionnaire, the correlation between the social relationship and emotional health subscale remained moderate. These findings indicate that although the participants' physical and social activities were restricted due to the symptoms they experienced, they were also trying to maintain their emotional and social relationships. We also think that this difference in severity in correlations may be related to our participants' ability to manage urinary incontinence correctly. In a study, approximately half of the women with urinary incontinence stated that they did not find this condition very disturbing and therefore did not seek treatment, which may indicate that the women in our study may have similarly low levels of discomfort and may have developed coping strategies by accepting their condition.[32] This information in the literature may explain why the correlation between urinary incontinence symptoms and social relationship and emotional health subscales remained at a moderate level in our study. Despite all this, your urinary incontinence symptoms:, "Has it affected your mental health?" and "Has it caused you to feel a sense of frustration (disappointment)?"; many respondents answered ‘very much’, indicating that urinary incontinence has a significant impact on an individual's mental health. Furthermore, in response to questions about exercise status and frequency, it was determined that more than half of the patients engaged in regular exercise, typically 2-3 days a week.

As the presence of incontinence symptoms is mentioned above, it is stated that experiencing incontinence may affect participation in physical activity or exercise, especially since it restricts social life and is psychologically impressive, studies have also shown that increasing physical activity reduces the frequency of urinary incontinence symptoms. Pilates, yoga, Tai chi and basic exercises are also known to be particularly beneficial in dealing with urinary incontinence symptoms.[33,35] In this respect, it is important for individuals with a diagnosis of MS included in our study to express regular exercise habits.

When examining the relationship between exercise and the impact of incontinence, it was observed that participants who claimed that urinary leakage hindered their ability to exercise had higher scores on the IIQ-7, indicating a more significant impact. However, due to the insufficient number of data points, a clear relationship between exercise and the severity of incontinence impact could not be established. It is recommended to conduct further evaluations with a larger number of participants to gain more insights into this matter.

Study Limitations

The most important limitation of our study is the small number of participants. In addition, the instruments used were all self-report. In particular, it is recommended to examine the relationship between exercise habits and incontinence impact scale results and to reveal studies that can provide important outputs for the effects of bladder training and the use of bladder diary in individuals with MS, with studies involving more participants. and it is thought that directing the studies will be of great benefit.

Conclusion

Our study, which aimed to determine the effects of urinary incontinence on activities of daily living in individuals with MS, aimed to contribute to the literature in this direction by questioning different markers such as bladder diary, bladder training and exercise status. At the same time, the symptoms and management of urinary incontinence were also examined from the perspective of a physiotherapist and it was thought that a pelvic floor rehabilitation program to be planned individually with detailed evaluation, as well as pharmacological and/or surgical methods to improve the functional consequences of these symptoms and the quality of life of the individual, would produce beneficial results for individuals with MS.

Conflict of Interest

The authors declare that there is not any conflict of interest regarding the publication of this manuscript.

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Ethics Committee Permission

This study was approved by Fenerbahçe University Ethics Committee (dated 20.07.2022 and numbered 21.2022fbu).

Authors’ Contributions

Concept/Design: AT, EG, AA, DKC, NY. Data Collection and/or Processing: AT, EG, AA, DKC, NY. Data analysis and interpretation: AT, EG, AA, DKC, NY. Literature Search: AT, EG, AA, DKC. Drafting manuscript: AT, EG. Critical revision of manuscript: AT.

REFERENCES

1. Haki M, Al-Biati HA, Al-Tameemi ZS, Ali IS, Al-Hussaniy HA. Review of multiple sclerosis: Epidemiology, etiology, pathophysiology, and treatment. Medicine (Baltimore). 2024;103(8):e37297.

2. Kodosaki E, Watkins WJ, Loveless S, et al. Combination protein biomarkers predict multiple sclerosis diagnosis and outcomes. J Neuroinflammation. 2024;21 (1):52.
3. Belbasis L, Bellou V, Evangelou E, Ioannidis JP, Tzoulaki I. Environmental risk factors and multiple sclerosis: an umbrella review of systematic reviews and meta-analyses. Lancet Neurol. 2015;14(3):263-273.
4. Amatya B, Khan F, Galea M. Rehabilitation for people with multiple sclerosis: an overview of Cochrane Reviews. Cochrane Database Syst Rev. 2019;1(1): CD012732.
5. Zecca C, Riccitelli GC, Disanto G, et al. Urinary incontinence in multiple sclerosis: prevalence, severity and impact on patients' quality of life. Eur J Neurol. 2016;23(7):1228-1234.
6. Mubaraki AA, Alnemari MA, Aljuaid SO, Altalhi FM, Alamri YM, Altowairqi SO. The Prevalence and Impact of Urinary Incontinence on Multiple Sclerosis Patients in Taif City, Saudi Arabia. Cureus. 2024;16(3): e57010.
7. Irwin GM. Urinary Incontinence. Prim Care. 2019;46(2):233-242.
8. Leslie SW, Tran LN, Puckett Y. Urinary Incontinence. In: StatPearls. Treasure Island (FL): StatPearls Publishing; August 11, 2024.
9. Mohamed-Ahmed R, Taithongchai A, da Silva AS, Robinson D, Cardozo L. Treating and Managing Urinary Incontinence: Evolving and Potential Multicomponent Medical and Lifestyle Interventions. Res Rep Urol. 2023;15(2023):193-203.
10. Farrés-Godayol P, Jerez-Roig J, Minobes-Molina E, et al. Urinary Incontinence and Its Association with Physical and Psycho-Cognitive Factors: A Cross-Sectional Study in Older People Living in Nursing Homes. Int J Environ Res Public Health. 2022;19(3): 1500.
11. Boylu İ, Dağlar, G. Kadınlarda üriner inkontinans ve damgalanma.Cumhuriyet univ sağlık bilim. enst.derg. 2020;5(2):109-114.
12. Kadıoğlu M, Kızılkaya Beji N. Üriner İnkontinans Tedavisinde Önerilen Yaşam Biçimi Uygulamalarına Güncel Yaklaşım. HSP. 2016;3(3):201-207.
13. Abu Raddaha AH, Nasr EH. Kegel Exercise Training Program among Women with Urinary Incontinence. Healthcare (Basel). 2022;10(12):2359.
14. Jacob L, Tanislav C, Kostev K. Multiple Sclerosis and Incidence of Urinary and Fecal Incontinence in Almost 9,000 Patients Followed Up for up to 10 Years in Germany. Neuroepidemiology. 2021;55(2):92-99.
15. Eyigor S, Karapolat H, Akkoc Y, Yesil H, Ekmekci O. Multipl sklerozlu ve üriner bozuklukları olan hastalarda yaşam kalitesi: İnkontinans Yaşam Kalitesi Ölçeği'nin Türkçe versiyonunun güvenilirliği ve geçerliliği. J Rehabil Res Dev. 2010;47(1):67-71.
16. Çetinel B, Özkan B, Can G. ICIQ-SF Türkçe versiyonunun geçerlilik çalışması. Turk. J. Urol. 2004; 30(3):332-338.
17. Avery K, Donovan J, Peters TJ, Shaw C, Gotoh M, Abrams P. ICIQ: a brief and robust measure for evaluating the symptoms and impact of urinary incontinence. Neurourol Urodyn. 2004;23(4):322-330.
18. Cam C, Sakalli M, Ay P, Cam M, Karateke A. Validation of the short forms of the incontinence impact questionnaire (IIQ-7) and the urogenital distress inventory (UDI-6) in a Turkish population. Neurourol Urodyn. 2007;26(1):129-133.
19. Åström Y, Asklund I, Lindam A, Sjöström M. Quality of life in women with urinary incontinence seeking care using e-health. BMC Womens Health. 2021;21(1):337.
20. Zecca, C., Riccitelli, G. C., Disanto, et al. Urinary incontinence in multiple sclerosis: prevalence, severity and impact on patients' quality of life. Eur. J. Neurol. 2016;23(7):1228-1234.
21. Abakay H, Doğan H, Yetkin MF, Güç A, Talay Çaliş H, Demir Çaltekin M. The effects of incontinence on functionality, disability, and quality of life in male and female patients with multiple sclerosis. Mult Scler Relat Disord. 2022;66:104010.
22. Lúcio AC, Perissinoto MC, Natalin RA, Prudente A, Damasceno BP, D'ancona CA. A comparative study of pelvic floor muscle training in women with multiple sclerosis: its impact on lower urinary tract symptoms and quality of life. Clinics (Sao Paulo). 2011;66(9): 1563-1568.
23. Ysrraelit MC, Correale J. Impact of sex hormones on immune function and multiple sclerosis development. Immunology. 2019;156(1):9-22.
24. Frigerio M, Barba M, Cola A, et al. Quality of Life, Psychological Wellbeing, and Sexuality in Women with Urinary Incontinence-Where Are We Now: A Narrative Review. Medicina (Kaunas). 2022;58(4): 525.
25. Aoki Y, Brown HW, Brubaker L, Cornu JN, Daly JO, Cartwright R. Urinary incontinence in women. Nat Rev Dis Primers. 2017;3(1):1-20.
26. Li M, Chen H, Yin P, et al. Identification and Clinical Validation of Key Extracellular Proteins as the Potential Biomarkers in Relapsing-Remitting Multiple Sclerosis. Front Immunol. 2021;12:753929.
27. Nambiar AK, Arlandis S, Bø K, et al. European Association of Urology Guidelines on the Diagnosis and Management of Female Non-neurogenic Lower Urinary Tract Symptoms. Part 1: Diagnostics, Overactive Bladder, Stress Urinary Incontinence, and Mixed Urinary Incontinence. Eur Urol. 2022;82(1):49-59.
28. Abrams P, Andersson KE, Apostolidis A, et al. 6th International Consultation on Incontinence. Recommendations of the International Scientific Committee: Evaluatıon And Treatment Of Urınary Incontınence, Pelvıc Organ Prolapse And Faecal Incontınence. Neurourol Urodyn. 2018;37(7):2271-2272.
29. Vecchio, M., Chiaramonte, R., & DI Benedetto, P. Management of bladder dysfunction in multiple sclerosis: a systematic review and meta-analysis of studies regarding bladder rehabilitation. Eur J Phys Rehabil Med. 2022;58(3):387-396.
30. Menoux D, Chesnel C, Charlanes A, et al. Reproductibilité du calendrier mictionnel chez les patients atteints de sclérose en plaques. Étude prospective monocentrique [Reproducibility of bladder diary in patients with multiple sclerosis]. Prog Urol. 2018;28(7):387-395.
31. Hansson Vikström, N., Wasteson, E., Lindam, A., & Samuelsson, E. Anxiety and depression in women with urinary incontinence using E-health. IUJ. 2021;32(1):103-109.
32. Kayalı Demir N, Yılmaz T. Menopoz Döneminde Olan Kadınlarda Üriner İnkontinans. Kashed. Kasım 2022;8(3):169-178.
33. Kannan P, Hsu WH, Suen WT, Chan LM, Assor A, Ho CM. Yoga and Pilates compared to pelvic floor muscle training for urinary incontinence in elderly women: A randomised controlled pilot trial. Complement Ther Clin Pract. 2022;46:101502.
34. Lee HY, Rhee Y, Choi KS. Urinary incontinence and the association with depression, stress, and self-esteem in older Korean Women. Sci Rep. 2021;11(1):9054.
35. Joseph C, Srivastava K, Ochuba O, et al. Stress Urinary Incontinence Among Young Nulliparous Female Athletes. Cureus. 2021;13(9):e17986