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The Effect of Lower Urinary Tract Symptoms on Quality of Life and Complementary Therapies for Patients with Multiple Sclerosis

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Abstract: Multiple sclerosis patients face many physiological, psychological, and social problems depending on the type and course of the disease. One of the physiological problems is lower urinary tract symptoms (LUTS). Problems such as urinary incontinence, frequent urination, sudden urination, inability to urinate, inability to empty the bladder completely affect the daily life of the patients. These patients may avoid social interaction because of frequent urination and incontinence. Patients with multiple sclerosis refrain from shopping, meeting with friends, and other social activities due to urinary problems. In addition, they also restrict their fluid intake because they urinate frequently. Urinary tract infections associated with low fluid intake and inability to urinate are more common in multiple sclerosis patients than in the normal population. These problems restrict the patient's life and negatively affect their quality of life. These complaints can be minimized by bladder training, pelvic floor muscle exercises, nerve stimulation, or use of urinary catheter in order to eliminate these problems and improve the quality of life of the patients. While bladder training prolongs the urination intervals of patients, pelvic floor muscle exercises reduce urinary incontinence by strengthening the muscles. Neuromodulation reduces these problems by suppressing nerve impulses. Catheters are important for patients who cannot urinate or have urinary incontinence. Urinary incontinence, retention, and urinary infection can be reduced by using catheters.

Keywords: Multiple sclerosis; Lower urinary tract symptoms; Complementary applications; Quality of life

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1. Introduction

Multiple sclerosis (MS) is a disease affecting young people and it causes sequelae due to neurological deficits because the disease affects the central nervous system. This disease affects women at a rate of approximately 2–3/1. Balance problems, visual problems, tingling, numbness, fatigue, spasticity, tremor, mood changes, paresthesia, sexual problems, heat intolerance, speech difficulties, bladder problems, and bowel problems are observed in MS patients depending on the progress of the disease [1]. Among these symptoms, lower urinary tract symptoms (LUTS) have been reported to affect up to 97.6% of patients [2], and these symptoms affect the quality of life of the patients [3].

2. Symptoms

The International Continence Society (ICS) defines LUTS as symptoms that occur when the bladder,

prostate, urethra or the associated pelvic floor, pelvic organ, or lower ureter cannot be stimulated. These symptoms are classified as storage (increased number of urination, frequent urination during the day, nocturia, polyuria, sensory symptoms related to the bladder, urinary incontinence, and overactive bladder), voiding (delay in urination, dysuria, stranguria, intermittent urination, and urinary retention) and post-urination (feeling of not being able to empty the urine completely, desire to urinate again, incontinence after urination, pain, and urinary system infections) [4]. Patients diagnosed with multiple sclerosis face many social, physiological, and psychological problems. Among these, lower urinary tract symptoms are one of the major problems affecting the lives of patients. The urinary problems are caused by myelin sheath damage of the nerves that control micturition. The frequency of LUTS may vary according to the duration of the disease. In a study, it was found that the incidence of LUTS increased up to 97.6% in patients with a disease duration of 10 or more years [2,3]. The frequency and type of LUTS in MS patients vary. The most common symptoms include urge to urinate, frequent urination, urge incontinence, stress incontinence, dysuria, and mixed-type incontinence. Urinary problems in MS patients sometimes occur as the first symptom of the disease. Regarding LUTS, voiding problems were observed in 24%, storage symptoms in 41% and both voiding and storage symptoms in 35% of the patients [5]. In the study conducted by Wang *et al.* [6], frequent urination, urge incontinence, stress incontinence, pauses, feeling of incomplete bladder emptying, dysuria, and mixed type incontinence were observed respectively. In the same study, it was found that the severity of urological symptoms were related to EDSS (Expanded Disability Status Scale) [6]. However, complications related to LUTS may also develop, which include urinary infection and urolithiasis [7]. Detrusor overactivity is the most common bladder problem in MS patients. Detrusor dyssynergia, detrusor hypocontractility, and low bladder compliance have also been observed [6]. Although the exact time of onset of urinary symptoms has not been determined, the frequency of urinary symptoms increase with the progression and course of disease. MS plaques may be found in any part of the central nervous system. Lesions observed in the cortical region (medial prefrontal cortex, insula, and pons) causes excessive detrusor activity [8]. Afferent stimuli from the bladder are processed in the periaqueductal grey matter. The periaqueductal grey matter suppresses the pontine micturition center during bladder storage. The pontine micturition center is connected to the spinal cord and stimulates the smooth muscles to contract the bladder. Conscious voiding control is carried out by the hypothalamus, which controls the activity of the middle frontal cortex and periaqueductal grey matter. Axonal loss leads to failure of cortex, brainstem, and spinal cord functions and increase in neurological deficits [9].

3. LUTS and their relationship with quality of life

MS affects the lives of patients physiologically, psychologically, and socially. LUTS significantly affect a person's life but it is not widely discussed. In MS patients, nocturia causes interruption of sleep at night, decreased sleep quality, tiredness the next day, and low energy [10]. LUTS observed in MS also affects the quality of life of patients as it improves when LUTS are resolved [5]. In the study conducted by Kahalaf *et al.*, a relationship was found between physical health, mental health, physical function, pain, general health, social function, emotional health, motivation, and lower urinary tract symptoms. When the people with the lowest quality of life were analyzed, it was found that they had urge incontinence and urge problems [11]. When the results of the study were analyzed, it was shown that LUTS affected both physical functions and emotional status of the patients. Lucio *et al.* found that urinary problems in women diagnosed with MS decreased and their quality of life improved with pelvic floor muscle exercise [12]. LUTS also affects the sexual life in MS patients. Erectile dysfunction, sexual reluctance, and dissatisfaction with sexual intercourse have been observed in MS patients. It has been found that sexual life worsens as LUTS increase in male MS patients [2]. Conditions including detrusor overactivity, inadequacy of detrusor activity, and detrusor sphincter dyssynergia lead to erectile dysfunction in men. The quality of sexual life is lower in MS

patients with erectile dysfunction compared with patients without erectile dysfunction [13]. In a study, sexual satisfaction of men with detrusor overactivity was found to be significantly lower than those with normal detrusor activity. In the same study, the sexual function of women (level of sexual arousal, vaginal lubrication, orgasm), involuntary detrusor contraction, and the highest detrusor contraction levels were found to be lower than those with normal detrusor activity [14]. It has been reported that many factors including pain, fatigue, alcohol consumption, and cognitive status play a role in the occurrence of depression in MS patients. However, changes in brain pathology, genetic factors, psychosocial status, and immune systems have been shown to be involved in its etiology [15]. It has been reported that LUTS is associated with anxiety, depression, and stress [3]. In a study by Khalaf *et al.* [11], it was found that the most common comorbid conditions in MS patients were depression and anxiety. In the same study, it was found that the rate of depression was higher in patients with urge incontinence compared with those who did not have this problem or had minimal problems [11]. Depression rates were found to be significantly higher in patients with erectile dysfunction [13]. There are studies showing that depression and anxiety levels do not change in patients with detrusor overactivity compared to those with normal detrusor activity [14]. It has been reported that the severity of anxiety increases in MS patients after diagnosis compared to the pre-disease period [16]. Fatigue and other symptoms, comorbid disease, anxiety medications, childhood trauma, and self-esteem, self-efficacy, and stress coping issues are conditions that cause depression [17]. When these studies are considered, it was revealed that there are many physiological and psychological conditions that trigger depression in MS patients. Although there are studies suggesting that LUDS may be one of them, studies on this subject showed different results. Overactive bladder also affects MS patients socially. People with overactive bladder limit their activities, are affected psychosocially, and they also limit their social life, thus their quality of life is affected. Frequent urination, urge to urinate, and nocturia are the main problems that affect quality of life related to incontinence [18]. Dysfunctions in MS patients affects the daily activities of the patients. After a ten-year follow-up, it was observed that those with mild and moderate MS became dependent in individual and instrumental activities of daily living. Among them, those with moderate MS were found to have increased limitations in all daily activities at the end of ten years, except for feeding and cleaning. At the end of ten years, those with mild MS were found to have increased dependence on urination and all instrumental and individual activities of daily living. It was revealed that those with severe MS became dependent in all individual activities of daily living at the end of ten years. It was found that those with severe MS were dependent on instrumental activities of daily living both at the beginning and at the end of ten years. At the end of ten years, it was found that activities such as participating in collective activities, working life, washing dishes, preparing food, washing dishes, walking outside, and driving a car were restricted [19].

4. Complementary practices for lower urinary system symptoms

There are various treatment modalities for overactive bladder in MS. The first ones are behavioral treatment methods. These behavioral treatment methods include Pelvic floor muscle training, bladder training, and fluid intake management. PFMT were created by Arnold Kegel and were initially applied in patients with urinary incontinence. The basic principle of PFMT is to create an inhibition effect by contracting the detrusor muscles. However, the patient should have the ability to contract the pelvic floor muscles [20]. These muscle exercises should increase strength, endurance, and function in a coordinated manner [21]. PFMT increases endurance in MS patients, reduces urinary incontinence, nocturia, and pad use, and facilitates voiding [22]. PFMT can be used alone or in combination with other techniques. In the study conducted by Walker and Mohillo-Fernandez, it was found that PFMT resulted in a decrease in LUTS of MS patients at the end of 12 weeks and improved quality of life [23]. The severity of frequent urination and urinary incontinence is inversely proportional to the quality of life [24]. Bladder training starts with the

person holding urine for 30 minutes. This time is increased by half an hour every 4–5 days and the voiding intervals are increased up to 3–4 hours [25]. Bladder training decreases the number of urinations, incontinence, and sudden urination in patients with an overactive bladder, and therefore improves their quality of life [26]. In the study conducted by Yoon *et al.*, it was found that bladder training resulted in a decrease of frequency of urination and increase in the volume of urination [27]. Bladder training can be used alone or with other pharmacological or non-pharmacological methods. Bladder training alone can reduce urination frequency, nocturia, and sudden urination symptoms. However, bladder training is more effective when used with tolterodine. However, while bladder training has no side effects, at least one side effect occurs in patients who were prescribed tolterodine alone or in combination with bladder training [28]. In women with overactive bladder, bladder training reduces the frequency of urination, urinary incontinence, and sudden urination, and improves the quality of life altogether [29]. For patients with MS, electrical stimulation is also used in addition to pharmacological treatment to treat the overactive bladder. It is used especially in patients with an overactive bladder, detrusor sphincter dyssynergia, and neural lower urinary tract dysfunction [30-33]. Electrical stimulation methods include pudendal, intravesical, posterior tibial nerve stimulation, and cutaneous neuromodulation [33]. Sacral neuromodulation of S3–S4 is usually applied, and its purpose is to suppress the impulses going to the bladder or to decrease the transmission of impulses from the bladder to the spinal cord. In posterior tibial nerve stimulation, L4-S3 fibers depolarize the afferent nerves in the lumbar and sacral regions and suppress bladder activity [34]. Sacral neuromodulation reduces the urge to urinate, frequency of urination, and the number of pads used in MS patients with storage and mixed problems. Besides, it decreases intermittent catheterization and residual amount and increases the volume of spontaneous voiding [5]. In a study by Kabay *et al.* [35], it was shown that a 12-week posterior tibial nerve stimulation decreased urge to urinate, urinary incontinence, nocturia, daily urination frequency, and pad use in patients. In the same study, an increase in detrusor contraction and maximum detrusor pressure was also observed [35]. Percutaneous tibial nerve stimulation is effective in treating urinary issues and improving the quality of life of the patients. Percutaneous tibial nerve stimulation reduces urination frequency and urinary incontinence in patients with an overactive bladder and improves their quality of life [36]. LUTS in patients with MS causes urinary tract infection. In a study by Nikseresht *et al.* [37], the rate of infection was found to be significantly higher in patients with problems such as urinary retention, urinary incontinence, frequent urination, and sudden urination compared to those without these problems [37]. Treatment or management of urinary problems is important to prevent infections. One way to reduce or eliminate LUTS is through intermittent or indwelling catheterization. Twelve per cent of MS patients use a clean intermittent catheter, indwelling catheter, or suprapubic catheter. The most commonly used one is the clean intermittent catheter. The use of catheters is more common in patients with urinary incontinence. Catheters may have a positive, negative, or no effect on the quality of life of patients [38]. 81.2% of catheter users use intermittent catheters, 42.8% use permanent catheters, and 7.7% use suprapubic catheters. Catheter use is higher in patients with overactive bladder who have problems like frequent urination, sudden urination, urinary incontinence, and nocturia. Despite the use of urinary catheter, urinary leakage occurs in 24% of patients. The feeling of discomfort due to urinary incontinence is related to the catheter used. 54% of patients using intermittent catheters experience difficulties in voiding compared to 18.8% of permanent catheter users and 8.5% of suprapubic catheter users [39]. Urinary infections in patients results in economic effects and lead to renal diseases. Measures have been developed to protect patients from these infections. These measures include taking urine cultures of patients for protection against urinary infections, use of silicone catheter, insertion of the catheter according to aseptic technique, fixation of the bag to the thigh, keeping the urine bag under the bladder, and avoiding contact with the floor and removal of the catheter as soon as possible [40]. Washing the urethral meatus with soap and water, using a closed drainage system, irrigation only in case of obstruction, and monthly replacement of the catheter are recommended, but there

is no conclusive evidence on this issue. The use of antibacterials in the drainage bag has no effect, and there are different opinions regarding the separation of patients with catheter-related infections. Training of personnel who will insert catheters and caregivers is important for the prevention of infection [41]. Apart from these methods, other methods such as intravesical stimulation, pudendal nerve stimulation, saphenous nerve stimulation, and transcutaneous nerve stimulation can be used (42). Overactive bladder and other bladder issues significantly affect the lives of patients. There are many pharmacological and non-pharmacological methods than can be applied to eliminate urinary problems in MS patients and to prevent the development of complications. In some cases, more than one of these treatment methods are used at the same time to reduce the symptoms and improve the quality of life of the patients. In order to reduce the urinary problems of patients and the economic effects, and improve the quality of life, nurses should explain the condition of patients. It is important that patients can benefit from methods other than medication for the elimination of urinary problems to improve their quality of life.

5. Conclusion

LUTS in patients with MS significantly affect the quality of life of patients. Complementary practices should be utilized to relieve these symptoms and improve the quality of life of patients. These complementary practices include bladder training, pelvic floor muscle exercises, neuromodulation, urinary catheterization, and other methods. The use of these methods alone or in combination with pharmacological treatment helps to increase the quality of life of patients and reduce economic losses.

Disclosure statement

The authors declare no conflict of interest.

Author contributions

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Literature review, manuscript writing – SÖ, ÜP

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