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RESEARCH ARTICLE

Lower Urinary Tract Symptoms in Women with Hip Osteoarthritis: Associations with Disability and Physical Activity Levels

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Abstract

Objective: To investigate the prevalence of lower urinary tract symptoms (LUTS) in women with hip osteoarthritis (OA) and to examine the relationship between LUTS, disability, and physical activity levels.

Materials and Methods: This cross-sectional study included 40 female patients diagnosed with hip OA. LUTS were assessed using the Bristol Female Lower Urinary Tract Symptoms (BFLUTS) questionnaire. Hip OA–related disability was evaluated using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and physical activity levels were measured with the International Physical Activity Questionnaire–Short Form (IPAQ-SF). Participants were categorized as having low, moderate, or high physical activity levels according to IPAQ-SF scores.

Results: The median total BFLUTS score was 12 [0, 24]. Filling symptoms were highly prevalent, including nocturia (75%), urgency (60%), and urinary frequency (52.5%). Urge incontinence was reported by 50% of participants. WOMAC total scores were positively correlated with incontinence ($r = 0.592$, $p < 0.001$), quality of life ($r = 0.518$, $p = 0.001$), and total BFLUTS scores ($r = 0.435$, $p = 0.005$). IPAQ-SF total scores were negatively correlated with incontinence ($r = -0.378$, $p = 0.016$) and total BFLUTS scores ($r = -0.362$, $p = 0.022$). Participants with low physical activity had significantly higher incontinence and total BFLUTS scores ($p < 0.05$).

Conclusion: LUTS are highly prevalent in women with hip OA and are associated with greater functional disability and lower physical activity levels. These findings underscore the importance of the systematic assessment and management of LUTS in this population.

Keywords: disability, hip osteoarthritis, lower urinary tract symptoms, physical activity

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INTRODUCTION

Hip osteoarthritis (OA) is a chronic, non-inflammatory condition characterized by the progressive degeneration of articular cartilage. The global prevalence of hip OA is estimated to be 8.5%, with severe and symptomatic cases reported more frequently among women (1,2). At the global level, OA—particularly when affecting the hip and knee joints—can restrict participation in daily life activities, reduce physical activity levels, and lead to long-term functional impairments that may result in loss of independence (3).

Lower urinary tract symptoms (LUTS) encompass a wide range of clinical manifestations, including storage symptoms (e.g., urinary frequency, nocturia, urgency), voiding symptoms (e.g., weak stream, straining, intermittency), and post-micturition symptoms (e.g., incomplete emptying) (4). Among women, LUTS not only cause physical discomfort but are also associated with significant psychosocial consequences, including social isolation and a notable reduction in quality of life (5).

Movement limitations due to hip OA may hinder individuals from timely responding to the urge to void. This situation may create a predisposition to delayed bladder emptying, urinary incontinence (UI), and exacerbation or onset of other LUTS. Furthermore, physical inactivity secondary to OA may lead to pelvic floor muscle weakness, which in turn may impair bladder control and reduce the efficiency of continence mechanisms (6,7).

Although previous studies have extensively investigated the impact of hip OA on pain, mobility limitation, and disability, the factors associated with LUTS in this population have not yet been fully elucidated. This study aims to evaluate the relationship between LUTS, OA symptom severity, and physical activity levels in women diagnosed with hip OA. The findings are expected to contribute to the development of early screening, diagnostic, and intervention strategies for managing LUTS in women with hip OA.

MATERIAL AND METHODS

Study design and participants

This cross-sectional study was conducted with 40 female patients diagnosed with hip OA who presented to the outpatient clinic of physical medicine and rehabilitation. To be eligible for inclusion, participants had to be able to ambulate with or without walking aids, report activity-related hip pain, have at least one hip fulfilling the diagnostic criteria for hip OA according to the American College of Rheumatology (ACR), and demonstrate a radiological OA grade of ≥ 2 based on the Kellgren–Lawrence classification (8,9). Additionally, participants were required to be over 40 years of age.

Exclusion criteria included a prior diagnosis of urological disorders, recent documented or symptomatic urinary tract infection, history of urogenital malignancy, history of pelvic radiotherapy, history of pelvic surgery, cognitive impairment, significant visual or hearing deficits, stroke sequelae, and Parkinson's disease. Participants were also excluded if they had previously undergone total hip replacement on the symptomatic side, were scheduled for hip arthroplasty, or had a referral for orthopedic consultation regarding total hip replacement. Furthermore, individuals diagnosed with inflammatory arthritic conditions, hip osteonecrosis, or Paget's disease were excluded from the study. Additionally, individuals with knee dysfunction, defined as a history of diagnosed knee OA or previous total knee arthroplasty, were also excluded from the study.

Data Collection

Sociodemographic and clinical data were obtained through face-to-face interviews and physical examinations. The variables collected included age, body mass index (BMI), and time of onset of symptoms (in years).

LUTS were assessed using the Bristol Female Lower Urinary Tract Symptom Questionnaire (BFLUTS), a validated multidimensional tool specifically developed for women. The questionnaire includes 19 items grouped into five subdomains: filling (4 items), voiding (3 items), UI (5 items), sexual life (2 items), and quality of life (5 items). Total scores range from 0 to 71, with higher scores reflecting more severe LUTS and a more negative impact on sexual and overall quality of life. No specific cut-off score has been reported in the literature. In the present study, responses other than "none/never" in the BFLUTS subdomains were considered indicative of the presence of the corresponding symptom at any degree of severity. The Turkish version of the BFLUTS has been validated and shown to be both reliable and culturally appropriate for use in clinical research (10–12).

To evaluate hip osteoarthritis-related symptoms, the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was utilized. The WOMAC consists of 24 items divided into three subscales: 5 for pain, 2 for joint stiffness, and 17 for physical function. Each item is scored on a 5-point Likert scale (0 = none, 4 = extreme), with maximum subscale scores of 20 for pain, 8 for stiffness, and 68 for physical function. The maximum possible total WOMAC score is 96, obtained by summing the three subscale scores. Higher scores indicate increased symptom severity and greater disability. The Turkish version of the WOMAC has demonstrated acceptable psychometric properties in previous validation studies (13–15).

To assess physical activity levels, the International Physical Activity Questionnaire-Short Form (IPAQ-SF) was employed. This instrument, consisting of 7 items, evaluates the frequency (days) and duration (minutes) of walking, moderate, and vigorous physical activities, as well as time spent sitting. Total physical activity was calculated using MET-minutes/week values by multiplying the minutes, number of days, and corresponding MET coefficient for each activity: 3.3 METs for walking, 4 METs for moderate activity, and 8 METs for vigorous activity. Based on the total MET score, participants were classified as having low physical activity (<600 MET-min/week), moderate physical activity (600–3000 MET-min/week), or high physical activity (>3000 MET-min/week). The Turkish version of IPAQ-SF has been validated and shown to be reliable (16,17).

Ethics Statement

This study was approved by the non-interventional clinical research ethics committee of İstanbul Medipol University (Approval No: E-10840098-202.3.02-435, Date: January 19, 2026). All procedures complied with the Declaration of Helsinki, and informed consent was obtained from all participants.

Statistical Analysis

Statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS) Statistics version 26.0 (IBM Corp., Armonk, NY, USA). The Kolmogorov–Smirnov test was employed to evaluate the normality of continuous variables. Since the majority of the variables did not demonstrate normal distribution, non-parametric tests were preferred for inferential analyses. Descriptive statistics were presented as median (minimum–maximum) for continuous variables, and as number (n) with percentage (%) for categorical variables. Correlations between continuous variables were evaluated using Spearman's correlation analysis. Differences in BFLUTS subscale and total scores according to physical activity levels (low, moderate, and high) were analyzed using the Kruskal–Wallis test. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 40 women diagnosed with hip OA were included in the study (Table 1). The median age of the participants was 62 (45–76) years, and the median BMI was 27.58 (22.24–35.72) kg/m^2. The median duration of symptoms was 4 (1–9) years. According to the Kellgren–Lawrence classification, 42.5% of the participants were grade 2 and 57.5% were grade 3. The median WOMAC total score was 45 (24–71). The median IPAQ-SF total score was 549.5 (0–4407) MET-min/week. Regarding physical activity levels, 52.5% of participants were classified as having low physical activity, 37.5% moderate, and 10% high physical activity (Table 1). The median total BFLUTS score was 12 [0, 24]. The median BFLUTS subscale scores were 2 [0, 12] for filling symptoms, 2 [0, 8] for voiding symptoms, and 3 [0, 12] for incontinence symptoms. The median sexual function score was 0 [0, 4], and the quality of life subscale score was 2 [0, 8] (Table 2). Table 3 presents the frequency distribution of LUTS according to the BFLUTS questionnaire. Filling symptoms were commonly reported: nocturia (>1 time per night) was present in 75% of participants, urgency in 60%, and urinary frequency in 52.5%, while bladder pain was reported by 20%. Among voiding symptoms, intermittency was observed in 35% of participants, hesitancy in 25%, and straining to urinate in 17.5%. Regarding UI, urge incontinence was reported by 50% of participants, frequency of incontinence by 37.5%, stress incontinence by 25%, unpredictable incontinence by 15%, and nocturnal incontinence by 5%. In terms of sexual function, 25% of participants reported that their sex life was negatively affected by urinary symptoms, and 15% reported leakage during intercourse. Concerning quality of life, 35% reported overall interference with life, 32.5% avoided situations where no toilet was available, 27.5% reported affected daily tasks, 25% changed outer clothing, and 22.5% reduced fluid intake (Table 3).

Table 1. Characteristics of the Study Population (n = 40)

Variable	n (%) or median [Min, Max]
Age (years)	62 [45, 76]
BMI (kg/m²)	27.58 [22.24, 35.72]
Education level	
Literate	8 (20%)
Primary	18 (45%)
High school and higher	14 (35%)
Time of symptom onset (years)	4 [1, 9]
KL grade ≥ 2	
Grade 2	17 (42.5%)
Grade 3	23 (57.5%)
WOMAC total	45 [24, 71]
BFLUTS total	12 [0, 24]
IPAQ-SF total MET-min/week	549.5 [0, 4407]
Physical activity level	
Low	21 (52.5%)
Moderate	15 (37.5%)
High	4 (10%)

Abbreviations: BMI, Body Mass Index; KL, Kellgren–Lawrence; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index; BFLUTS, Bristol Female Lower Urinary Tract Symptoms; IPAQ-SF, International Physical Activity Questionnaire–Short Form; MET, Metabolic equivalent.

Table 2. BFLUTS Scores of the Participants

Domain	Median [Min, Max]
Filling	2 [0, 12]
Voiding	2 [0, 8]
Incontinence	3 [0, 12]
Quality of life	2 [0, 8]
Sexual function	0 [0, 4]
Total BFLUTS	12 [0, 24]

Abbreviations: BFLUTS, Bristol Female Lower Urinary Tract Symptoms

Table 3. Frequency of Lower Urinary Tract Symptoms According to BFLUTS

BFLUTS*	n	(%)
Filling symptoms		
Nocturia (>1 time)	30	(75.0)
Urgency	24	(60.0)
Bladder pain	8	(20.0)
Frequency	21	(52.5)
Voiding symptoms		
Hesitancy	10	(25.0)
Strain to urinate	7	(17.5)
Intermittency (stop and start more than once)	14	(35.0)
Incontinence symptoms		
Urge incontinence (leaking before reaching the toilet)	20	(50.0)
Frequency of incontinence	15	(37.5)
Stress incontinence (during physical activity, coughing, etc.)	10	(25.0)
Unpredictable incontinence (without warning)	6	(15.0)
Nocturnal incontinence (leakage during sleep)	2	(5.0)
Sexual function		
Sex life spoiled by urinary symptoms	10	(25.0)
Leaking during intercourse	6	(15.0)
Quality of life		
Change outer clothing	10	(25.0)
Cut down fluid intake	9	(22.5)
Affected daily tasks	11	(27.5)
Avoid situations where no toilet is available	13	(32.5)
Overall interference with life	14	(35.0)

Abbreviations: BFLUTS, Bristol Female Lower Urinary Tract Symptoms.

* Responses for BFLUTS symptoms other than none/never were accepted as presence of the symptom in any degree of severity.

Table 4 shows the correlation analysis between clinical variables and BFLUTS domains. No significant correlations were found between age or duration of symptoms and BFLUTS subscale scores ($p > 0.05$). BMI was positively correlated with filling symptoms ($r = 0.515$, $p = 0.001$). WOMAC total score showed significant positive correlations with incontinence ($r = 0.592$, $p < 0.001$), quality of life ($r = 0.518$, $p = 0.001$), and total BFLUTS score ($r = 0.435$, $p = 0.005$). IPAQ-SF total MET score demonstrated significant negative correlations with incontinence ($r = -0.378$, $p = 0.016$), quality of life ($r = -0.328$, $p = 0.039$), and total BFLUTS score ($r = -0.362$, $p = 0.022$) (Table 4).

Regarding physical activity levels, significant differences were observed in incontinence symptoms ($p = 0.045$) and total BFLUTS score ($p = 0.027$). No statistically significant

differences were found in filling, voiding, sexual function, or quality of life subscale scores across physical activity levels (Table 5).

DISCUSSION

This study showed a high prevalence of LUTS in women with hip OA. The most commonly observed symptoms included filling symptoms (frequency, nocturia, and urgency) and incontinence symptoms (urge incontinence and frequency of incontinence). Among voiding symptoms, intermittency was the most common. Additionally, significant correlations were observed between patients' disability levels, physical activity levels, and certain LUTS domains as well as total LUTS scores. Hip OA is recognized as a major public health concern, as it limits physical activity levels and consequently leads to a substantial decline in quality of life. Functional impairment in hip OA is a multifactorial process, and previous studies have identified several key determinants of reduced physical function, including pain severity, impaired proprioceptive accuracy, and decreased muscle strength (18,19).

Studies investigating the association between physical activity and LUTS in women are limited. In a large population-based prospective study, Maserejian et al. demonstrated that low

Table 4. Correlation Between Clinical Variables and BFLUTS Domains

		Filling	Voiding	Incontinence	QoL	Sexual function	Total BFLUTS
Age (years)	r	0.139	0.097	0.059	-0.064	0.202	0.138
	p	0.391	0.552	0.720	0.696	0.212	0.397
BMI (kg/m²)	r	0.515**	-0.061	-0.191	-0.006	0.174	0.175
	p	**0.001**	0.707	0.238	0.969	0.282	0.281
Time of symptom onset	r	-0.009	-0.077	0.285	0.150	0.186	0.183
	p	0.957	0.637	0.074	0.355	0.249	0.257
WOMAC total	r	-0.079	-0.021	0.592**	0.518**	0.216	0.435**
	p	0.628	0.896	**<0.001**	**0.001**	0.181	**0.005**
IPAQ-SF total (MET-min/week)	r	-0.142	-0.011	-0.378*	-0.328*	-0.019	-0.362*
	p	0.383	0.945	**0.016**	**0.039**	0.907	**0.022**

Abbreviations: QoL, Quality of Life; BFLUTS, Bristol Female Lower Urinary Tract Symptoms; BMI, Body Mass Index; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index; IPAQ-SF, International Physical Activity Questionnaire–Short Form; MET, Metabolic equivalent.

Note: Values of $p < 0.05$ were accepted as significant and are marked in bold.

*p<0.05 , **p<0.01

r : Spearman correlation coefficient

Table 5. Comparison of BFLUTS Scores According to Physical Activity Level (n = 40)

	Physical Activity Level			p value
	Low (n=21)	Moderate (n=15)	High (n=4)	
Filling Symptoms	2 [0, 12]	3 [0, 7]	2 [0, 3]	0.596
Voiding Symptoms	1 [0, 8]	2 [0, 5]	1.5 [0, 2]	0.759
Incontinence Symptoms	3 [0, 12]	3 [0, 6]	0.5 [0, 1]	**0.045**
Quality of Life	3 [0, 8]	3 [1, 4]	1 [0, 2]	0.136
Sexual Function	0 [0, 4]	0 [0, 2]	0 [0, 1]	0.705
BFLUTS Total	12 [0, 24]	11 [5, 17]	5.5 [0, 8]	**0.027**

Abbreviations: BFLUTS, Bristol Female Lower Urinary Tract Symptoms.

Note: Values are presented as Median [Min, Max]. Values of $p < 0.05$ were accepted as significant and are marked in bold.

levels of physical activity were a significant risk factor for the development of LUTS, particularly among women (20). The authors suggested that physical activity may exert a protective effect by reducing resting sympathetic muscle tone, attenuating systemic inflammation, modulating hormonal mechanisms associated with metabolic syndrome, and contributing to long-term weight maintenance. Similarly, Park et al. conducted a large prospective cohort study involving 69,795 participants without LUTS at baseline and demonstrated that both low physical activity levels and prolonged sitting time were independently associated with incident LUTS (21). Notably, in multivariable analyses adjusting for potential confounding factors, the association between sitting time and the risk of LUTS remained significant regardless of physical activity level. These findings suggest that sedentary behavior may play an independent role in the development of LUTS beyond insufficient physical activity alone. The authors proposed several potential mechanisms underlying this association, including endothelial dysfunction, vascular alterations, pelvic ischemia, and inflammatory processes related to prolonged sitting. Furthermore, Alhababi et al. conducted a prospective cohort study and reported that higher levels of physical activity were associated with significantly reduced odds of stress, urgency, and mixed UI among parous middle-aged women (22). In our study**,** a significant correlation was observed between disability scores and total LUTS scores. Furthermore, when participants were stratified according to physical activity levels, women with low physical activity demonstrated significantly higher total BFLUTS scores compared to those with moderate and high physical activity levels. These findings suggest that increasing physical activity may be clinically important in women with hip OA who are at risk of developing LUTS. Structured rehabilitation programs incorporating aerobic exercise, strengthening interventions, and pelvic floor muscle training may provide dual benefits by improving mobility while simultaneously reducing urinary symptom burden. However, prospective studies are needed to determine the effectiveness of targeted physical activity interventions in reducing LUTS severity in this population.

In addition to reduced physical activity levels, hip OA may also influence toileting behaviors. Pain, joint stiffness, and fear of movement may hinder timely access to the toilet, leading patients to delay voiding. Accumulating evidence suggests that repeated delayed voiding may result in increased intravesical pressure and impaired sphincter relaxation, which may ultimately contribute to bladder dysfunction and the development of LUTS (23,24). In our study, according to the BFLUTS assessment, the most frequently reported symptoms were categorized under the storage and incontinence domains, with nocturia (75%), urgency (60%), and increased daytime frequency (52.5%) being the most prevalent. Among incontinence symptoms, urge incontinence was the most common (50%). Furthermore, incontinence scores were positively and significantly correlated with disability scores, and women in the low physical activity group demonstrated significantly higher incontinence scores compared to those with moderate and high physical activity levels. Several studies in the literature have demonstrated a significant association between OA and UI (25–27). In a study including 247 patients, nearly half of the individuals with OA reported difficulties with urinary control; these individuals exhibited higher levels of disability and required more time to reach the toilet within their home environment (25). Similarly, a recent study reported a 67% prevalence of UI among middle-aged and older women with hip and knee OA, with urgency UI being one of the most frequently observed subtypes; older age, morbid obesity, and reduced physical activity were identified as independent risk factors (26). In another large-scale investigation (n = 1,584), arthritis was found to be associated with both stress and urgency types of UI, and this relationship was suggested to be related to mobility limitations and reduced ability to undress promptly (27). Taken together, these findings highlight the need for a multidisciplinary clinical approach in women with hip OA presenting with urinary symptoms. Interventions focusing on pain management, functional rehabilitation, and mobility enhancement should be prioritized. Additionally, strategies aimed at reducing sedentary behavior and promoting timely toileting habits may contribute to preventing symptom progression.

Another important finding of our study was the association between BMI and LUTS. BMI demonstrated a significant positive correlation particularly with storage symptoms. Obesity has been identified as a major, modifiable risk factor for urinary incontinence and LUTS in women (28). Increased BMI may elevate intra-abdominal pressure, thereby compromising pelvic floor support and adversely affecting bladder function (29). In women with hip OA, excess

body weight may further exacerbate mobility limitations, potentially reinforcing the risk of urinary symptoms. Therefore, weight control strategies, including lifestyle modification and structured weight reduction programs, are important components in the management of women with hip OA and concomitant LUTS.

This study has several limitations. First, the cross-sectional design precludes causal inference. Additionally, the absence of an age-matched non-osteoarthritic control group limits the generalizability of the findings and restricts direct comparisons with healthy individuals. The relatively small sample size may have reduced the external validity of the results. Furthermore, the assessment of LUTS and physical activity levels using self-reported measures may have introduced potential reporting bias. In addition, menopausal status and parity-related variables were not evaluated in this study. As both factors may influence the prevalence and severity of LUTS in women, their omission should be considered when interpreting the present findings. Therefore, future studies with larger sample sizes, appropriately matched control groups, and longitudinal designs are warranted to further validate and expand upon these findings.

CONCLUSIONS

This study demonstrates that LUTS are highly prevalent among women with hip OA and may be associated with greater disability and lower levels of physical activity. These findings underscore the clinical importance of routinely assessing LUTS as part of the comprehensive evaluation of patients with hip OA. Furthermore, structured rehabilitation programs aimed at increasing physical activity may contribute not only to improvements in mobility but also to a potential reduction in urinary symptom burden.

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Conflict of Interest: The authors declare that they have no conflicts of interest related to this study.

Informed Consent: Written informed consent was obtained from all participants prior to their inclusion in the study.

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Ethical Approval: The study was approved by the non-interventional clinical research ethics committee of İstanbul Medipol University (Approval No: E-10840098-202.3.02-435, Date: January 19, 2026). All procedures performed in this study were conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments.

Author Contributions

- Concept and Design: HBM, AR
- Supervision: AR, IK
- Data Collection and/or Analysis: HBM
- Analysis and/or Interpretation: HBM, AR
- Literature Search: HBM, IK
- Writing: HBM
- Critical Review: AR, IK

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