Impact of Falls and Sleep Quality on Quality of Life among Older Men with Lower Urinary Tract Symptoms due to Benign Prostatic Hyperplasia

Pitchaya Kaosaiyanant, Inthira Roopsawang, Suparb Aree-Ue*

Abstract: Suffering from lower urinary tract symptoms in male older adults with benign prostatic hyperplasia affects their quality of life profoundly. Lower urinary tract symptoms may precipitate falls and poor quality of sleep. Little is known about the impact of falls and sleep quality on quality of life. This cross-sectional study aimed to determine the impact of falls and sleep quality on quality of life in this population. Participants were 140 older males, diagnosed with benign prostatic hyperplasia, presented with lower urinary tract symptoms, and no history of prostatic surgery. Structured interviews were conducted with questionnaires—Demographic and Health Record Form, International Prostate Symptom Score, Pittsburgh Sleep Quality Index, and European Quality of Life—Five Dimension— in outpatient urological surgery units at a tertiary care hospital in Bangkok, Thailand. Descriptive statistics and multiple-logistic regression with bootstrapping analysis were used for data analysis.

Results revealed that nearly half of the participants reported falls and poor quality of life, while half had poor quality of sleep. Moderate lower urinary tract symptoms severity including nocturia, frequency, and urgency were predominantly identified. The predictive model explained 36.7% and correctly classified 74.3% of the cases. Significantly, those who experienced falls last year, and poor sleep quality increased the risk of developing the poor quality of life by 2.43 to 20.68-fold and 4.90-fold, respectively. Findings suggest that nurses and healthcare personnel working with older males should focus on delivering interventions to prevent falls and poor sleep quality that may improve quality of life. Proactive identification or specific symptom assessment, particularly falls history, sleep quality, and severity of urinary symptoms during the treatment, is of concern in older men with lower urinary tract symptoms.

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Introduction

Lower urinary tract symptoms (LUTS), a common urinary problem, profoundly affects older males, particularly those with benign prostatic hyperplasia (BPH), which is the primary cause of this.[1,2] According to the International Continence Society (ICS), symptoms related to LUTS typically presents in various urinary symptoms included storage (daytime frequency, nocturia, urgency, and urinary incontinence), voiding (slow stream, hesitancy, straining, and termination dribble), and post-micturition

(incomplete, empty or post micturition dribble).[2,3] Identifying and managing symptomatic manifestations of LUTS can be challenging in the older population. Inappropriate management of the LUTS due to BPH may increase the risk of developing unpleasant complications, such as urinary retention, renal insufficiency, and bladder stone, needed surgical treatment or complex care.[2,4] Urinary problems are a global issue that warrant attention in older males. Benign prostatic hyperplasia (BPH) affects men's health and quality of life greatly more than is generally expected. The global statistics include that over 80% of older males suffer from clinical presentations of LUTS due to BPH.[1-2,4] The burden or impact of LUTS seems to be constantly increasing across demographics worldwide. Depending on various factors, the burden of LUTS may vary; mounting evidence reveals that increased age, health-socioeconomic status, LUTS severity, unhealthy behavior, or country income level impose the symptoms burden.[4,5] In Thailand, from 2017-2019, the number of older patients receiving care for benign prostatic hyperplasia, ranged from 78,262 to 90,225 cases.[6] Hence, as the global population ages, the conundrum of LUTS due to BPH is expected to increase, leading to negative impacts on the heath and quality of life of older males.

Although LUTS is considered a non-life-threatening condition, suffering from LUTS due to BPH significantly affects the health and quality of life of the individual and their caregivers in many dimensions.[1,7] The consequences of LUTS clinical presentation may disturb people's daily lives leading to poor sleep quality, insomnia, frailty, falls and fall-related injury,[8] social isolation, physical limitation, anxiety, and depression.[8-10] Evidence indicates that falls and sleep problems due to LUTS may be responsible for increased dependency or disability, increased cost of care, and reduced quality of life.[11] Promoting health and quality of life for an older person with LUTS due to BPH is clinically challenging. However, little exploration has been carried out on investigating LUTS symptoms driven functional impairment—falls and sleep quality—on quality of life in older males with LUTS due to BPH. Undoubtedly, the more increased age, the more decline in health status may increase the risk of developing LUTS burden; the consequences of LUTS due to BPH on quality of life both individuals and caregivers have been increasingly recognized over time.[1,7] Thus, this study aimed to investigate the impact of falls and sleep quality on quality of life in older men with LUTS due to BPH. Findings may provide crucial information on the prevalence of falls and sleep quality and to further understand the factors contributing to poor quality of life in this population.

Review Literature and Conceptual Framework

Understanding individuals' perceiving or satisfying with their health and well-being is of concern in enhancing care and strengthening patient-centered therapeutic benefits for people with chronic conditions. The concept of quality of life has become more interesting for healthcare professionals to address factors impacting personal health and well-being in promoting healthcare quality and quality of life. Ferrans and colleagues' framework[12] —a conceptual model of health-related quality of life (HRQol)—and literature review were used to guide this study. Based on this conceptual model, quality of life was defined as personal perceptions and satisfaction with various domains in life as a whole, which encompasses the complexity of clinical variables linking to individual and environmental characteristics. In this model, the health-related quality of life consists of five essential factors; biological function, symptoms, functional status, general health perception, and overall quality of life—and other two components—characteristics of the individual and characteristics of environment influencing health outcomes and quality of life. [12]

Based on the model, the association with the complexity of LUTS affecting the quality of life may be due to the changes in the proliferation of prostatic

stromal cells and prostatic glandular epithelial cells (biological function), which involves age and sex hormone (individual characteristic). Recent studies demonstrate that increased age was more likely to develop LUTS compared to younger age.[1,4-5] Prostate growth is an interaction between androgen and androgen receptors that are controlled by dihydrotestosterone, especially in aging. It is found that estrogens play an important role in enlarging the prostate by influencing the expression of androgen receptors in the prostate gland.[13] Another significant factor of individual characteristic contributing to BPH and turning to LUTS is comorbidities, especially metabolic syndrome (MetS) commonly known in older adults. A recent systematic review and meta-analysis indicated that patients with MetS had higher annual prostate growth rates, larger prostate volumes, and more residual urine remaining after urination in comparison to those who did not have MetS.[14] The more enlargement of prostate gland that develops related to impairment of the prostate, bladder, ureter, or sphincter muscle, the more likely LUTS presents with various severity.[1,4,7]

A common symptom of LUTS, such as nocturia, may decrease physical functions leading to elevated risk for falls (functional performance)[8] or increasing poor sleep quality (functional capacity).[10] In addition, the sequelae of LUTS clinical symptoms presentation significantly disturb daily life leading to poor sleep quality, insomnia, frailty, falls [15,16] and fall-related injury.[8] Evidence also underlines that falls[15-19] and sleep problems due to LUTS increases the risk of developing dependency or disability, high cost of care, and poor quality of life.[11] Moreover, recent studies demonstrate that suffering from severe LUTS severity or urinary symptoms related to LUTS—nocturia, frequency, and urgency—associated with falls[16-19] and poor sleep quality,[10,11,16,20] result in reduced quality of life. Markedly, the more the frequency of falls,[19] the greater chance of a lessened quality of life that may lately develop life-threatening injuries. Evidently, sleep disturbance or poor sleep quality due to increased LUTS's severity also have substantial impacts on both physical and mental aspects.[9,21, 22-23]

Extensive LUTS diagnosis with proper treatment is essential, yet inappropriate management of LUTS may affect older men's health and quality of life beyond expectations. Suffering from LUTS due to BPH is affected by multiple factors; therefore, understanding factors influencing the quality of life is crucial to promote health and quality of life for this population. The European Association of Urology 2021 Guideline and the Agency for Health Care Policy and Research (AHCPR) suggest that efficient health promotion interventions for LUTS is to applying proactive evaluation of the LUTS severity, identifying risk factors, and exploring its impact on persons' daily living to enhance the quality of life.[24] Intrinsic factors, such as biological or symptomatic features, may increase the enduring suffering of LUTS, which can, in turn, lead to decreased physical and mental well-being—health related quality of life. Taken together, older male patients suffering from LUTS due to BPH are more prone to diminished quality of life.[9] The notion of LUTS, falls, and sleep quality influences the quality of life has increased. Nevertheless, there remains a paucity of evidence on the burden of LUTS due to BPH, particularly in low- and middle-income countries, as in the Thai context. More research on the prevalence and impact of falls and sleep quality is required to strengthen nursing care and enhance the quality of life in this population.

Study Aim

This study aimed to determine the association between falls and sleep quality with quality of life in older men with LUTS due to BPH while controlling for age and comorbidities.

Methods

Design: This study employed a cross-sectional analytical design and is presented here using the

observational studies in epidemiology— STROBE guidelines checklist.[25]

Sample and setting: The sample were older males with BPH who visited and/or were followed-up at the urology surgery outpatient department at a tertiary care hospital, Bangkok, Thailand. With purposive recruitment, the inclusion criteria were: 1) male aged 60 years old and over with a diagnosis of BPH based on ICD10 (coded N40), 2) no history of receiving surgery involving the prostate, 3) having LUTS, 4) fluent in Thai, and 5) no cognitive impairment screened by the 6-item Cognitive Impairment Test (6CIT).[27] Those who regularly used sedatives or hypnotic drugs and had a medical history or were currently experiencing mental health problems (schizophrenia, depression, or anxiety), were excluded.

The sample size was based on a literature review;[26] the evidence recommends that a small sample size for logistic regression analysis is 20 candidates per 1 variable. Thus, for the final model including adjusted variables (6 variables), a minimum sample size of 120 candidates is enough for prediction analysis with logistic regression model. In addition, an estimated 15% were adjusted for missing data. Finally, the total number of samples was 140 participants.

Ethical considerations: The study protocol was approved by the Institutional Review Board (IRB) of the tertiary care hospital, Faculty of Medicine Ramathibodi Hospital (COA MURA2021/982). The informed consent was obtained from all participants after explaining the study objectives, risks and benefits, and their rights to withdraw or decline participation without any consequences on individuals' treatments. All personal and health information provided was kept confidential and de-identified; these data were only used for educational purposes.

Instruments: The instruments used in this research include tools for screening and data collection.

The Demographic and Health Information Questionnaire. These questionnaires were developed based on an extensive review of the available literature. The records included both personal and health information; age, fall history, comorbidities, and medication usage. The items were multiple-choice or open-ended questions.

The 6-item Cognitive Impairment Test (6CIT) Thai version. This instrument was used to screen cognitive impairment, and was firstly developed by Brooke and Bullock.[28] Later, it was translated into Thai by Suparb Aree-Ue et al.[27] The 6CIT, is a brief cognitive assessment questionnaire consisting of 3 parts (7 items): 1) surrounding circumstance perception (3 items), 2) attention (2 items), and 3) memory (1 item). The 6CIT total scores range from 0 to 28 points; a score higher than 7 indicates a higher risk of developing cognitive impairment. The 6CIT Thai version has demonstrated good reliability and validity, as shown by the content validity index for scales (S-CVI) and item validity context (I-CVI) of 1. When compared with the standard instrument—Mini-Cog—the congruent validity was acceptable ($r_s = -.42$, $p < .001$).

The International Prostate Symptom Score Thai version: IPSS. The IPSS Thai version, a self-report instrument, was used to screen the lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia (BPH). Originally, the IPSS, known as the American Urological Association Symptom Score (AUA-7), consists of 8 items (7 items: clinical symptoms and 1 item: quality of life) and was developed by Barry and the American Urological Association›s Measurement Committee.[29] Later, the original IPSS was translated into the Thai languages by Nontakaew et al.[30] In the current study, only 7 items of the IPSS were selected to measure the severity of LUTS symptoms—obstructive, irritative, and nocturia symptoms—over the last month. The LUTS symptoms scale was used, with each item being given a rating of 0-5 points to show the severity of the symptom. Scoring of the clinical presentation of LUTS symptoms was based on these following responses: not at all (0 points); less than 1 in 5 times (1 point); less than half the time (2 points); about half the time (3 points); more than half the time (4 points); and almost always (5 points). For nocturia

symptoms presentation, the scoring of the response was not at all (0 points); 1 time (1 point); 2 times (2 points); 3 times (3 points); 4 times (4 points); and 5 times or more (5 points). To classify the LUTS symptoms, a cumulative score is calculated from all 7 items of the IPSS. The total sum score of these 7 items is 35 points, graded into 4 classifications, including no symptoms (0 points), mild (1-7 points), moderate (8-19 points), and severe symptoms (20-35 points). In the Thai population, the IPSS Thai version was a reliable instrument, with a Cronbach›s alpha coefficient of 0.77; test-retest reliability in 188 males at two-week intervals demonstrated high reliability, with an intraclass correlation coefficient (ICC) of 0.96.[30] For our present study, the Cronbach›s alpha coefficient was 0. 61.

Pittsburgh Sleep Quality Index (PSQI) Thai version. Originally, the PSQI was first developed by Buysse et al.[31] in early 1990s. The PSQI, a self-reported measure, is a practical instrument for measuring sleep quality that can be completely assessed within 5-10 minutes. The PSQI questionnaire was translated into Thai by Sitasuwan and colleagues[32] to evaluate respondents' overall quality of sleep in the last months through 19 items, and 5 items were rated by their roommates. In the present study, only 19 items of self-evaluation were used to identify an individual's perceived sleep quality. In order to justify both sleep quantity and quality, these 19 self-rated items were divided into two parts: 1) sleep quantity (sleep latency, sleep duration, and habitual sleep efficiency and sleep), and 2) sleep quality (sleep disturbance, subjective sleep quality, use of sleep medication, and daytime dysfunction). Each item has a rating score between 0 (no burden) and 3 (severe burden or more than 3 times per week); the total score ranges from 0 to 21 points. The scores greater than 5 points demonstrates sleep disturbance or poor sleep quality.[32] In the Thai population, the PSQI Thai version demonstrated the excellent value of reliability and validity; the internal consistency of the Cronbach's alpha value of all components was 0.84. The test-retest in 138 patients between 2 and 4 weeks found an interclass correlation coefficient of 0.89. Concerning the validity, it was validated by comparing 2 groups—control and depressive along with obstructive sleep apnea patient groups—using ANCOVA statistics. The findings revealed significant differences between the 2 groups in all components ($p < 0.001$).[32] With a cut-off of 5 points, the PSQI Thai version demonstrated high specificity (93.33%) and sensitivity (77.78%).[32] For our present study, the Cronbach›s alpha coefficient was 0. 67.

European Quality of Life—Five Dimension (EQ-5D-5L) Thai version. The original EQ-5D-5L - a self-report instrument—was developed by multidiscipline research teams to evaluate quality of life.[33] It was translated into the Thai version by Pattanaphesaj,[34] and has been used for measuring the perception of health-related quality of life and hospital outcomes. Generally, the EQ-5D-5L has two parts—personal health (5D-5L) and a visual analog rating scale for quality of life (EQ VAS)—to demonstrate an individual's perspective on their health and quality of life. The first section has five dimensions of personal health (5D): mobility, self-care, usual activity, pain/discomfort, and anxiety/depression. Each dimension has five levels (5L) related to personal perception of health problems: no problems (level 1), slight problems (level 2), moderate problems (level 3), severe problems (level 4), and unable to/extreme problems (level 5). Remarkably, all responses to the personal health state section (5D-5L) are not defined as arithmetic meanings; thus, the number "11111" indicates the best health while "55555" indicates the worst. The EQ-VAS has a rating scale of 0-100 for individuals envisioning their quality of life, ranging from the worst possible health (rating = 0) to the finest possible health (rating = 100). Additionally, personal preference of their health—utility score—was calculated by its coefficient value into a continuous score ranging from -1 to 1. A score of 1 means perfectly healthy, while a score of 0 or less indicates the worst health as worse than dead.[34] In our

study, the utility score between 0 and 1 was categorized as good quality of life, while between lesser than 0 and -1 was poor quality of life. The reliability of the Cohen's Kappa in Python indicated fair agreement (Cohen's Kappa = .36) in the present population.

Data collection: This was carried out from March to April 2022. Recruiting eligible participants for enrollment, the research team screened the participants who visited the urology clinic via electronic medical records (EMRs) to assure they met the inclusion criteria. After obtaining agreement consent and screening for cognitive impairment, a structured interview method—face-to-face or telephone interviews—was started. Since data collection was delivered during COVID-19 pandemic, the research team abided by the COVID-19 prevention measures policy during the face-to-face interview (less than 5-10 minutes).

Data analysis: The Statistic Package for the Social Sciences for Windows (SPSS/FW) program version 18 and RStudio version 4.4.4 MacOS were used for data analysis. Descriptive statistics—frequency, percent, mean, and standard deviation—were performed to analyze demographic data and general information. Based on the age-related decline phenomena, it is difficult to explain the association with linearity relationship of the study variables. Therefore, the quality of life was classified into binary variable, and the logistic regression was employed. The multiple logistic regression was performed to investigate the association of interested variables—falls (over the past year) and sleep quality—on quality of life, controlling for age and comorbidities. To increase precision, the central theorem and bootstrapping with bias corrected methods were applied for the final logistic regression analysis model. The level of significance was set at $p < .05$.

Results

The total of participants was 140 older men with LUTS due to BPH; the majority of these had an average age of 72.34 ± 6.88 years old, were married (85.7%) and obese (average BMI 25.02 ± 3.93 kg/m^2). Nearly half (41.4%) reported a history of falls within the last year; of these, more than half (62.1%) stated no serious injuries or no admission to seek medical care. For health conditions, the majority of participants had a history of alcohol consumption (58.6%), smoking (57.9%), and surgery (55.7%) as well as multiple comorbidities (75.7%), including hypertension (62.1%), dyslipidemia (55.7%), and diabetes mellitus (37.1%). More than half (63.6%) had more than five items of medication usage, and the alpha-blocker group was mostly used (83.6%). In terms of LUTS, moderate symptoms were most prevalent (87.1%), demonstrating that nocturia (97.9%), frequency (70.7%), and urgency (67.1%) represented the most common presentations. Notably, half of participants reported poor sleep (50.0%), while nearly half perceived poor quality of life (42.1%) (more details are shown in **Tables 1 and 2**).

Table 1. Number and percentage of the participants' demographic characteristics and health information (N = 140)

Variables	N	%
Age (years)		
60-69	50	35.7
70-79	65	46.4
≥ 80	25	17.9
(Mean = 72.34 ± 6.88 years)		
Falls over the past year		
None	82	58.6
Falls	58	41.4

Table 1. Number and percentage of the participants' demographic characteristics and health information (N = 140) (Cont.)

Variables	N	%
1 time	33	23.6
2 times	11	7.8
≥ 3 times	14	10.0
Fall consequences		
Not severe/No injury needed to visit the doctor	36	62.1
Taking medicine	14	24.1
Scheduled for surgery	3	5.2
Visiting emergency room/Having injury	2	3.4
Others	3	5.2
Alcohol consumption		
Never	31	22.1
Used to drink	82	58.6
Currently drink	27	19.3
Smoking		
Never	52	37.1
Used to smoke	81	57.9
Currently smoke	7	5.0
History of surgery (any part of the body)		
None	62	44.3
Yes	78	55.7
BMI (kg/m^2)[a]		
< 18.50 (Underweight)	1	0.7
18.50-22.99 (Normal)	45	32.1
23.00 – 24.99 (Overweight)	31	22.1
25.00 – 29.99 (Obesity class I)	52	37.1
≥ 30.00 (Obesity class II)	11	8.0
(Mean = 25.02 ± 3.933 kg/m^2)		
Underlying disease/Chronic disease		
No	34	24.3
Yes[b]	106	75.7
Hypertension	87	62.1
Dyslipidemia	78	55.7
Diabetes mellitus	52	37.1
Cardiovascular disease	34	24.3
Chronic kidney disease	29	20.7
Others (i.e. Cancer, Obesity)	30	21.5
Medication history		
None	2	1.4
1- 4drugs	49	35.0
≥ 5 drugs	89	63.6
α - blocker medicine		
None	23	16.4
Taking α - blocker medicine	117	83.6

Table 1. Number and percentage of the participants' demographic characteristics and health information (N = 140) (Cont.)

Variables	N	%
Lower urinary tract symptoms severity		
Moderate	122	87.1
Severe	18	12.9
(Mean = 13.33±5.082)		
Urinary symptom		
Nocturia	137	97.9
Frequency	99	70.7
Urgency	94	67.1
Incomplete emptying	89	63.6
Weak stream	86	61.4
Intermittency	77	55.0
Straining	69	49.3

Value is presented as mean ± standard deviation

BMI: Body mass index; [a]BMI classifications for Asian population

[b]Participant could select more than one answer

Table 2. Number, percentage, mean and standard deviation of the study variables (N = 140)

Variables	Mean ± SD	Possible Range	Actual Range	N (%)
Age (year)	72.34±6.888	≥ 60	60-90	
Number of comorbidities	3.97±2.139	0	0-10	
Fall (over past 1 year)	0.82±1.540			
None		0	0	82 (58.6)
Fall (number of falls)		1-actual	0-10	58 (41.4)
Quality of sleep (raw score)	10.72±2.732	0-21	5-17	
Quality of sleep (the standard score: Z-score)				
Good quality of sleep (no or less sleep disturbance)				70 (50.0)
Poor quality of sleep (increased sleep disturbance)				70 (50.0)
Quality of life (raw scores)	0.91±0.092	-1 to 1	0.49-1	
Quality of life (the standard score: Z-score)				
Good quality of life				81 (57.9)
Poor quality of life				59 (42.1)

Table 3 demonstrates the relationship between quality of life and variables of interest. Findings revealed that the number of comorbidities, number of falls last one year, and sleep quality associated with quality of life in older males with LUTS due to BPH. Specifying the predictive model, the multiple logistic regression model explained 36.7% (Nagelkerke R^2) of the variance in quality of life and correctly classified 74.3% of cases. Generally, increased age, multiple comorbidities, a fall history last year, and decreased sleep quality were more likely to lessen the quality of life in this population (**Tables 3** and **4**).

Table 3. The correlation among quality of life and other related variables in older males with LUTS due to BPH (N=140)

Variables	1	2	3	4	5
1. Quality of life	1.000				
2. Age	-.005	1.000			
3. Number of comorbidities	.180*	.162	1.000		
4. Number of falls (last 1 year)	.318**	.171*	.175*	1.000	
5. Quality of sleep	.304**	-.109	.195*	-.019	1.000

*p <.05, ** p < .01

Table 4. Multiple logistic regression analysis of the impact of falls and sleep quality on poor quality of life in older males with LUTS due to BPH (N = 140, Bootstrapping 1,000)

Variables	B	Bias	S.E.	Df	p	ORs	Bca 95%CI	
							Lower	Upper
Age								
60-69 years				2	.006	Reference group		
70-79 years	-1.264	-.002	.086	1	< .001	.283	-1.352	-1.177
≥ 80 years	.404	-.001	.061	1	< .001	1.498	.287	.524
Comorbidities	.098	.000	.015	1	< .001	1.103	.071	.126
Fall								
No fall (within 1 year ago)				3	< .001	Reference group		
Falls								
1 time	.951	.000	.041	1	< .001	2.431	.810	.972
2 times	2.834	.002	.018	1	< .001	20.685	3.001	3.073
≥ 3 times	2.531	.002	.009	1	< .001	11.071	2.391	2.422
Quality of sleep	1.491	.004	.071	1	< .001	4.900	1.454	1.734

-2Log likelihood = 146.030; Cox & Snell R^2 = .273; Nagelkerke R^2 = .367

Chi- square = 44.580; df = 7; p <.001; Hosmer and Lemeshow test: p > .05

Classification accuracy = 74.3%

Abbreviations: Bca = Bias corrected bootstrap confidence intervals; CI = Confidence Interval; ORs = Odds ratios; SE = Standard errors

After controlling for age and comorbidities, the multiple logistic regression analysis with bootstrapping methods demonstrated that the higher number of falls last year, the lessen quality of life [Odd ratios (ORs) fall one time = 2.43 (95% CI = .81-.97); fall two times = 20.68 (95% CI = 3.00 -3.07); fall more than three times = 11.07 (95% CI = 2.39-2.42)] when compared with those who had no history of fall at last year. Furthermore, poor sleep quality significantly increased the risk of developing a poor quality of life (OR = 4.9; 95% CI = 1.45-1.73) (**Table 4**).

Discussion

Findings from our study demonstrated that the older male population with LUTS due to BPH suffered from urinary symptoms related to LUTS, falls-related health consequences, and poor sleep quality. When age and comorbidities were controlled, the higher number of falls and the lower sleep quality significantly predicted the worst quality of life. Our findings are consistent with previous studies that the prevalence of falls is common, and its consequences are found

impact on health leading to decreased quality of life.[16-19] A study in the Korean community indicated that falls (15.3%) were commonly reported in males with LUTS; indoor falls significantly increased with LUTS severity.[17] Also, urinary symptoms, particularly nocturia, hesitancy, and urgency, increased the risk of falls significantly. The increased frequent nocturia increased higher risk of falls or fall-related injuries.[15,16] Moreover, a meta-analysis study demonstrated that falls are prevalent in older adults with bladder control problems; the risk of falls and fall-related injuries has increased in older adults with urinary problems or bladder control problems as urinary incontinence, resulting in poor quality of life.[16] The increased risk of falls in older adults with urinary problems may be due to the fact that the symptoms of LUTS can result in a need to hurry to get out of bed or walk to the bathroom for voiding. This can lead to falls or falls-related life-threatening injuries. Further studies with more focus on identifying the risk of falls in particular urinary symptoms—daytime frequency and nocturia—or exploring specific characteristics of fallers with LUTS across settings is therefore recommended.

However, the prevalence of falls and its association with LUTS are well-documented, confounding factors—comorbidities or polypharmacy—may influence falls in this population, requiring cautious interpretation. It could be argued that the high prevalence of falls might be due to polypharmacy or medications related to falls since more than half of the participants (63.6%) reported multiple medication usage; polypharmacy is related to falls in LUTS.[35] Moreover, most of participants in our study reported using alpha1-blocker medication (83.6%). Evidence has demonstrated that alpha1- blockers have some side effects affecting sympathetic nervous systems—hypotension, dizziness, and tachycardia—that may lead to falls or fall-related injuries. Notably, the risk of falls has increased in older adults using alpha-antagonists prescribed for LUTS due to BPH.[36] Although older men with LUTS due to BPH tended to experience less injury because of falls in our study, the consequences of repeated falls may contribute a more detrimental effect on health and quality of life than anticipated. Recent evidence reveals that most fallers who have urinary problems are more likely to have further falls because of post-fall syndrome—fear of future falls—leading to increasing immobility, physical limitation, disability, or life-threatening consequences.[16,18,29,35] A study highlighted that falls not only impact the health of the person who falls, but also the physical and emotional burden of caregivers.[37] Unquestionably, falls and their consequences affect the quality of life; the more falls and injury occur, the lower the quality of life becomes. Hence, healthcare professionals and nurses in practice should pay attention to falls and their impacts on health-related quality of life in older men with LUTS due to BPH. More research is needed to underline the prevalence of falls and to improve understanding of the relationship between falls and LUTS, making fall prevention more effective in this population.

This study demonstrated that poor sleep quality is prevalent (50%) and significantly impacts the quality of life, which are in line with those of previous studies,[10,11,20] and older persons who suffer from LUTS often have a poorer sleep quality.[9,11,16] Particularly this is the case in those with nocturia and LUTS men.[10,11,20,21] A possible explanation for these results might be that nocturia may interrupt sleep patterns leading to sleep disturbance. Evidence revealed that an increase frequency in voiding awakenings during nighttime disrupted non-rapid eye movement (NREM) sleep duration, resulting in poor sleep quality. Notably, nocturia affects slow-wave sleep (SWS)—the deepest period of NREM sleep—leading to a reduction in the effectiveness of sleep. Also, the SWS interruption is associated with a shorter daily recovery phase, leading to fatigue, daytime sleepiness, discomfort, and decreased pain threshold, which results in a lower quality of life.[38] Additionally, sleep quality plays a significant role in

the relationship between nocturnal urinary volume and health-related quality of life.[20] Research has found that poor sleep quality leads to decreasing daytime function, increasing cognitive impairment, heightening medical illness and hospitalization, and reducing productivity; all of which affect the quality of life in both physical and mental domains.[39]

Although decreased sleep quality depends on the severity of LUTS, exacerbating BPH symptoms may interfere with the sleep patterns in older adults with LUTS.[22] As expected, comparing PSQI mean scores, our findings revealed that the participants with LUTS due to BPH had poorer sleep quality than in a previous study. The poorer sleep quality may be partly explained by personal factors—history of alcohol consumption, smoking, obesity, comorbidities, and surgery—of the participants that might influence worsening LUTS and BPH symptoms. A previous study indicates that increased age, gender, physical activity, alcohol consumption, smoking, and obesity are associated with increased severity of LUTS leading to a higher risk of sleep disturbance.[40] Hence, our findings accord with the early evidence suggesting that suffering from LUTS and symptomatic BPH diseases may induce sleep disturbance resulting in the poor sleep quality[22] and quality of life.[23] However, individual characteristics may contribute to LUTS due to BPH in this study; after controlling the prominent confounding factors—age and comorbidities—our findings help to gain more understanding of the impact of falls and sleep quality on quality of life, which is congruent with the health-related quality of life model of Ferrans et al.[12] that described linkage among concepts on quality of life.

Limitations

Although our findings shed light on the need for complex care to enhance the quality of life, some limitations need to be noted. Firstly, the generalizability may be limited since participants were recruited by purposeful criteria and the study was carried out at only a tertiary hospital. Therefore, generalizations to other settings or participants with distinctive characteristics from this study should be interpreted cautiously. Secondly, due to a cross-sectional design, the high predictability findings found in the present study may not infer a true causal relationship among falls, sleep quality, and quality of life. Moreover, these promising about sleep quality and quality of life findings must be interpreted cautiously because the quality of life assessment was a self-report. Hence the perceived good or poor quality of life may vary depending on individual perception, LUTS's severity and frequency, or other confounding factors. Lastly, as falls and sleep quality in older adults may be influenced by multiple factors, considering other confounding factors related to falls and sleep quality, a further study on quality of life in this population is needed. Notably, the impact of factors influencing dysregulated circadian rhythm—sleep quality, duration of sleep, or pathological involvement—on older adults with LUTS due to BPH remains inconclusive, and require further exploration.

Conclusions and Implications for Nursing Practice and Research

Falls and poor sleep quality significantly decreased the quality of life. These findings suggest that nurses should be aware of these problems in older men with LUTS. For public health policy, it is crucial to enable proactive health promotion with early identification of LUTS symptoms along with a history of falls and sleep quality during treatment for BPH. In addition, developing interventions to prevent falls and improve sleep quality may enhance the quality of life in older men with LUTS due to BPH. Notably, further studies with more focus on identifying the risk of falls, exploring specific characteristics of fallers, and understanding the impact of circadian rhythm dysregulation in LUTS, particularly the clinical presentation of daytime frequency or nocturia across multiple settings, is therefore recommended.

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ผลกระทบของการหกล้ม และคุณภาพการนอนหลับต่อคุณภาพชีวิตของผู้สูงอายุชายที่มีกลุ่มอาการทางเดินปัสสาวะส่วนล่างจากต่อมลูกหมากโต

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บทคัดย่อ: ความไม่สุขสบายจากกลุ่มอาการทางเดินปัสสาวะส่วนล่างเนื่องจากต่อมลูกหมากโตมีผลต่อคุณภาพชีวิตผู้สูงอายุชาย โดยกลุ่มอาการทางเดินปัสสาวะส่วนล่างอาจเป็นสาเหตุนำที่ทำให้เกิดการหกล้ม และรบกวนคุณภาพการนอนหลับ ซึ่งส่งผลต่อคุณภาพชีวิตของผู้สูงอายุ แต่การศึกษาข้อมูลเหล่านี้ยังมีอยู่อย่างจำกัด การศึกษาแบบภาคตัดขวางครั้งนี้ มีวัตถุประสงค์เพื่อศึกษาผลกระทบของการหกล้ม และคุณภาพการนอนหลับ ต่อคุณภาพชีวิตของผู้สูงอายุชายที่มีกลุ่มอาการทางเดินปัสสาวะส่วนล่างจากต่อมลูกหมากโต กลุ่มตัวอย่างผู้ร่วมวิจัยจำนวน 140 ราย ที่มีคุณสมบัติตามเกณฑ์ที่กำหนด คือ อายุ 60 ปีขึ้นไป ได้รับการวินิจฉัยภาวะต่อมลูกหมากโต มีอาการแสดงทางคลินิกของกลุ่มอาการทางเดินปัสสาวะส่วนล่าง และยังไม่ได้เข้ารับการผ่าตัดเกี่ยวกับต่อมลูกหมาก เก็บรวบรวมข้อมูลโดยการสัมภาษณ์ผู้สูงอายุที่เข้ารับบริการ ณ หน่วยตรวจผู้ป่วยนอกศัลยกรรมระบบทางเดินปัสสาวะ โรงพยาบาลระดับตติยภูมิในกรุงเทพฯ ประเทศไทย ด้วยเครื่องมือวิจัย ได้แก่ แบบสอบถามข้อมูลส่วนบุคคลและสุขภาพ แบบประเมินต่อมลูกหมากโตที่มีอาการปัสสาวะลำบาก แบบประเมินคุณภาพการนอนหลับของพิตส์เบิร์ก และแบบประเมินคุณภาพชีวิตของกลุ่มยูโรเปียน วิเคราะห์ข้อมูลโดยใช้สถิติเชิงบรรยาย และสถิติการถดถอยแบบลอจิสติกเชิงพหุร่วมกับการวิเคราะห์บูตสแตรป

ผลการศึกษาพบว่า เกือบครึ่งหนึ่งของกลุ่มตัวอย่างมีประวัติการหกล้ม และมีคุณภาพชีวิตต่ำ ในขณะที่ครึ่งหนึ่งของกลุ่มตัวอย่างมีคุณภาพการนอนหลับไม่ดี กลุ่มอาการทางเดินปัสสาวะส่วนล่างมีความรุนแรงระดับปานกลาง โดยอาการที่พบบ่อยได้แก่ ปัสสาวะกลางคืน ปัสสาวะบ่อย และกลั้นปัสสาวะไม่ได้ สำหรับการวิเคราะห์ถดถอยโลจิสติกเชิงพหุ พบว่า การหกล้ม และคุณภาพการนอนหลับสามารถร่วมอธิบายความแปรปรวนของคุณภาพชีวิตได้ร้อยละ 36.7 โดยมีความถูกต้องร้อยละ 74.3 กลุ่มตัวอย่างที่เคยหกล้มและมีคุณภาพการนอนหลับไม่ดี เพิ่มความเสี่ยงต่อการเกิดคุณภาพชีวิตที่ไม่ดี 2.43 ถึง 20.6 และ 4.90 เท่าตามลำดับ ผลการศึกษานี้เป็นข้อมูลสำหรับพยาบาลและทีมสุขภาพที่ทำงานเกี่ยวข้องกับผู้สูงอายุ ควรตระหนักถึงการจัดกิจกรรมป้องการการหกล้มและป้องกันคุณภาพการนอนหลับไม่ดีเพื่อส่งเสริมคุณภาพชีวิตในผู้สูงอายุ การเฝ้าระวังหรือการประเมินเชิงลึกโดยเฉพาะประวัติการหกล้ม คุณภาพการนอนหลับ และความรุนแรงของอาการปัสสาวะในช่วงการรักษากลุ่มอาการปัสสาวะส่วนล่างในผู้สูงอายุชายเป็นสิ่งสำคัญ

Pacific Rim Int J Nurs Res 2023; 27(3) 549-563

คำสำคัญ: ต่อมลูกหมากโต การหกล้ม กลุ่มอาการทางเดินปัสสาวะส่วนล่าง ผู้สูงอายุชาย คุณภาพชีวิต คุณภาพการนอนหลับ

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