The Prevalence of Lower Urinary Tract Symptoms and Their Associations with Health Outcomes among Older Nursing Home Residents: A Cross-sectional Study

Krit Kobkam, Suparb Aree-Ue, Inthira Roopsawang*

Abstract: Lower urinary tract symptoms are a common health problem in older adults, but there is limited information on their prevalence and consequences among older residents of nursing homes in the Thai context. This cross-sectional study aimed to examine the prevalence of lower urinary tract symptoms and their associations with health outcomes (sleep quality and fatigue) among older residents in private nursing homes. The participants were older adults residing in nine private nursing homes in a province in central Thailand. With purposive sampling according to the inclusion criteria, 120 participants were recruited for the study. The data collection was conducted through structured interviews with questionnaires, including the Personal Data, the International Prostate Symptom Score, the Pittsburgh Sleep Quality Index, and the Multidimensional Assessment of Fatigue. Descriptive statistics and multiple logistic regression were utilized for data analysis.

Findings revealed that the prevalence of lower urinary tract symptoms was 96.7%. Most participants had poor sleep quality, while half had severe fatigue when the fatigue score was transformed into a z-score. Participants suffering from moderate to severe symptoms in the lower urinary tract were 3.35 times more likely to develop poor sleep quality than those with mild symptoms and 2.61 times more likely to develop severe fatigue than those with mild symptoms. This study highlights the associations between lower urinary tract symptoms and health outcomes. The knowledge gained from this study serves as a basis for helping healthcare professionals, particularly those working in nursing homes, to become more aware of the severity of lower urinary tract symptoms and establish tailored interventions to reduce fatigue and promote sleep quality, which could maximize the quality of life in this population.

Keywords: Fatigue, Health outcomes, Lower urinary tract symptoms, Nursing home, Older adults, Sleep quality

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***Krit Kobkam**, RN, MNS (Candidate), Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand. E-mail: krit.kob@student.mahidol.ac.th*

***Correspondence to: Suparb Aree-Ue**,* RN, PhD, Dip. APAGN, Cert. in Nurse Practitioner, Associate Professor, Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand. E-mail: suparb.are@mahidol.ac.th*

***Inthira Roopsawang**, RN, PhD, Dip. APMSN, Cert. in Nurse Practitioner, Assistant Professor, Ramathibodi School of Nursing, Faculty of Medicine Ramathibodi Hospital,Mahidol University, Thailand. E-mail: inthira.ros@mahidol.edu*

Introduction

Lower urinary tract symptoms—LUTS— are changes in the urinary system that affect the bladder's capacity, decrease the pressure in the urinary tract, and increase the residual urine volume after urination.[1] Among the older population, a notable prevalence of

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lower urinary tract symptoms (LUTS) has been reported globally.[2,3] Evidence from previous studies demonstrated a prevalence of urinary incontinence—a significant symptom of LUTS—ranging from 24.3%-66.1% in nursing homes.[4,5] Recent evidence revealed that suffering from LUTS affects the health of older adults—poor sleep quality,[6] fatigue,[7] decreased quality of life,[2,4,8] and dead[9]—particularly those residing in nursing homes. Also, a study in the United States demonstrated that treatment costs for older men with LUTS have upsurged to at least $1.9 billion in 2013.[10]

Exploring possible LUTS-related factors has been documented. Several studies have reported sex-based differences in the prevalence of developing LUTS.[7,11,12] In addition, several studies emphasized essential risk factors related to LUTS—life-long,[13] more advanced ages,[13-15] comorbidity,[5] with high and low body mass index.[16] Furthermore, it has been found that older people with constipation, bedridden, using wheelchairs, having heart and vascular disease, and undergoing pelvic and spine surgery, particularly in nursing homes, are at higher risk for LUTS.[5] Generally, nursing homes provide health services to various older ages, health conditions with comorbidity, and both sexes; therefore, these factors related to LUTS were highlighted in this study.

Among the impacts of LUTS in older adults, evidence from various studies highlighted a linkage between LUTS and poor sleep quality[6,17] and fatigue.[7,15,17] Poor sleep quality or increased sleep disturbance in older adults leads to detrimental health outcomes[8]; adequate sleep quality is needed for organ cellular repair. As LUTS, poor sleep quality and fatigue are interrelated, early identifying at-risk older individuals with LUTS is of concern for healthcare professionals to promote proactive nursing care and prevent negative consequences in this population. More importantly, as a global population aging, the conundrum of LUTS may be beyond expectation. The global demand for care in nursing homes has correspondingly led to a heightened prevalence of misunderstandings. If a substantial number of older individuals residing in nursing homes remained undiagnosed or untreated regarding LUTS, the economic impact or health consequences would have been significantly higher than previously estimated. Therefore, promoting early identification of LUTS, especially for those at risk living in nursing homes, is more challenging to delay proper treatment, worsen symptoms, and more deleterious effects in this population. Unfortunately, very little is currently known about LUTS, sleep quality, and fatigue in older people residing in nursing homes, particularly in Thailand.

Review Literature

The anatomical structure of the lower urinary tract (LUT) consists of the urethra and bladder as well as prostate in males. Lower urinary tract symptoms (LUTS) involve a group of symptoms—voiding and obstruction of urine flow—commonly occurring in older adults as they age due to several age-related changes in the urinary system.[18] These changes include decreased urinary bladder capacity, increased bladder contraction, decreased urethral pressure causing decreased urine flow rate, and increased residual urine volume.[1] The International Continence Society (ICS) has categorized the typical urinary symptoms into storage, voiding, and post-micturition. The storage symptoms present with an increase in daytime urinary frequency, nocturia, urgency, and urinary incontinence. Based on a study conducted on 90 females aged between 72 and 80 years who experienced urinary incontinence, it was observed that more than one-fourth of them had an average post-void residual (PVR) volume exceeding 50 milliliters within 24 hours, and 7% had a PVR volume exceeding 100 milliliters.[19] It has also been found that older males tend to have prostate gland enlargement, which is a risk factor contributing to develop benign prostatic hyperplasia, which, in turn, obstructs urine flow.[8] For voiding symptoms, several symptoms were reported, for

example, slow stream, splitting or spraying, and hesitancy. Among these symptoms, slow stream is a high prevalence.[2] Concerning post-micturition symptoms, people suffer from the unintentional leakage of urine after the completion of urination. Przydacz et al.[12] conducted a study on 6,005 Polish reported that the prevalence of incomplete emptying and dribble was 12.1% and 20.8% in men and 4.4% and 10.4% in women, respectively. Concerning nocturia, although most published studies have focused on men, women experienced a greater impact than men,[11] but men with multiple comorbidities—hypertension, heart disease, and diabetes—were more likely to have nocturia than women.[7] However, among the prevalence of LUTS, nocturia and frequency—storage symptoms—were the most prevalent, bothersome and impacted older adults in various aspects of health outcomes, particularly sleep quality and fatigue.[6,7,20,21]

Sleep quality refers to both good and poor sleep quality, yet in this study, poor sleep quality is more of a concern. The term "poor sleep quality" indicates the loss of continuation of sleep or disruption of sleep resulting in sleep pattern impairment/ sleep disturbance. Sleep disturbances include insufficient sleep duration, insomnia, frequent awakenings, or early morning awakening.[20,22] Many older adults have sleep problems, and those living in nursing homes were found to have poor sleep quality.[21] Moreover, older adults with LUTS are at risk for developing sleep problems since frequent night time reduces time and sleep quality, resulting in chronic daytime tiredness and the disruption of circadian rhythm.[20] A study of 5,355 males aged over 40 years reported having moderate LUTS (24.6%) and severity (3.9%) of LUTS. A high correlation was also found between all components of sleep disorders—sleep quality, sleep latency, and daytime dysfunction—and the LUTS, especially in those with sleep disturbance and severity of LUTS.[13] Similarly, another study of 168 older males with benign prostatic hyperplasia (BPH) or prostate cancer demonstrated that severe LUTS was associated with poor sleep quality, and 53% of the participants reported poor sleep quality and difficulties initiating sleep.[6] In females with overactive bladder symptoms, evidence revealed nocturnal incontinence is associated with sleep quality,[17] and females are approximately twice more likely to experience poor sleep quality than males, particularly those with more advanced age.[21,23] However, recent evidence confirmed that older people with 1-2 comorbidities exhibited a 2.05-fold increased risk of having poor sleep quality, while those with 3 or more had a 2.35-fold higher risk[21]; pathological aging indicated a high prevalence of sleep disturbance.[22] It could be confirmed that gender, age, and comorbidity are variables that have relationships with sleep quality.

Fatigue is characterized by a persistent feeling of tiredness or decreased capacity for activity and a decline in social and physical function; it is commonly observed in many patients suffering from various diseases,[15,22] particularly in older adults. In addition, it was found approximately 67.4 % of older adults living in nursing homes experienced moderate or severe fatigue,[24] which was a high prevalence. Results from a systematic review revealed an association between age, comorbidities, sleep and fatigue.[15] A study of 140 females with overactive bladder—LUTS—indicated a significant positive correlation between poor sleep quality and fatigue; patients with severe LUTS awoke multiple times during the night to use the restroom, resulting in fatigue and a reduction in their ability to perform daytime activities.[17] In addition, comorbidities are common among older individuals in nursing homes, and a study found that sleep disturbance is one of the factors that affect fatigue in those with comorbidities.[25] The following systematic review focusing on older adults shows that having a sleep duration of fewer than six hours and waking up too early are factors related to increasing fatigue and also cause weakened physical and cognitive function in older adults.[26]

From the information above, the LUTS impact sleep quality and fatigue in older adults with age differently, advancing age, and comorbidity, and it is

evidence that there was a relationship between personal factors (gender, age, comorbidities), LUTS, and health outcomes (sleep quality and fatigue). However, clear evidence in Thai older adults residing in private nursing homes, which are different in environmental circumstances from other older groups, needs to be explored by employing the relationship among factors mentioned above as a conceptual framework. Understanding the LUTS and these associated factors is essential not only for promoting health and quality of life, but also for impeding the advancement of symptoms and their impacts on older adults' health by applying risk reduction and early detection of LUTS in Thai older adults residing in nursing homes.

Study Aim

This study aimed to examine the prevalence of lower urinary tract symptoms (LUTS) and their associated factors (age, gender, comorbidity) with health outcomes (sleep quality and fatigue) among older adults living in nursing homes in a province in central Thailand.

Methods

Design: This study utilized a descriptive-predictive, cross-sectional design, and the STROBE checklist guidelines were followed for reporting.

Sample and Setting: The sample included older adults aged 60 and above, both men and women, residing in nine private nursing homes in one province in central Thailand. Regarding setting selection, a simple random sampling method with a proportional sampling ratio of 1:3 was selected from 28 certified nursing homes. Participants were recruited using simple random sampling, with specific criteria including age 60 or older and cognitively intact. The 6-item Cognitive Impairment Test—6CIT—Thai version was used to screen the cognition with a total score of 7 or lower.[27] Prospective participants who were currently and regularly taking sleep medication, had been diagnosed with psychiatric disorders or mental health conditions or treated with mental illness treatment, were bedridden, and retained urinary catheters were excluded from the study.

A minimum sample size of 20 participants per study variable was established to assure the accuracy of statistical analysis— logistic regression analysis.[28] In this study, there were six study variables; 120 participants were needed. To achieve the target number of participants, 120 eligible older persons were randomly recruited using the proportional stratified random sampling formula, considering the population proportions within each nursing home.

Ethical Consideration: Before data collection, the study protocol had been officially approved by the Institutional Review Board of the Faculty of Medicine Ramathibodi Hospital, Mahidol University (COA. MURA2023/181). Information and details about the study, including its objectives, procedures, potential benefits, and associated risks, were provided to the participants during the recruitment. The participants were given time and the opportunity to provide informed consent; moreover, they have the right to accept or decline to participate in this study without impacting their services. The participants also have the option to withdraw from the study or decline to respond to particular inquiries without any explanation or consequences. The confidentiality of all data collected was rigorously protected, and all data were safely stored in a locked cabinet. Only the research team had access to a password-protected computer program for processing the data. The study findings would be presented without identifying names or other information implied to participants. More importantly, during the cognitive assessment process, if the prospective participants were cognitively impaired, this health problem was discussed with the staff responsible for the nursing home for further proper management.

Instruments: This study used instruments for screening and data collection, and all copyrighted instruments could be used in this study following

approval by the instrument developers or copyright companies.

The 6-item Cognitive Impairment Test (6CIT) has been used as a screening tool to evaluate cognitive impairment in older adults.[29] It was translated into Thai by Aree-Ue et al.[27] The 6CIT consisted of six questions of three dimensions: orientation (three items, i.e., What year is it?), attention (two items, i.e., Count backwards from 20 to 1), and memory (one item, i.e., Repeat address phase). The total score of the 6CIT ranges from 0 to 28; notably, the scores of 0-7 suggested no evidence of cognitive impairment, and scores of 8 or higher indicated potential developing cognitive impairment.

The original version of the 6CIT test reported its reliability by comparing it with the standard instrument—MMSE; the 6CIT demonstrated a strong correlation ($r = -.91$), with a high sensitivity of 78.57% and a specificity of 100% for detecting cognitive impairment.[29] The 6CIT Thai versions were tested for validity and reliability after translation. The content validity indexes for scales (S-CVI) and items (I-CVI) were reported as 1 for both assessments. Subsequently, the 6CIT Thai version was administered to 100 older persons in senior citizen clubs compared to the Mini-Cog test; the concurrent validity analysis revealed a moderate negative correlation ($r = -.42$, $p < .001$). For stability reliability, the 6CIT was administered in 50 older adults by measuring twice with a 2-week interval, resulting in a correlation coefficient of $r = .64$ ($p < .001$).[27]

The primary investigator (PI) developed the Personal Data Questionnaire using a thorough literature review. The questionnaire consisted of two distinct sections: Section 1 is designed to obtain information related to participants' demographic information, including gender, age, body mass index, marital status, educational level, reasons for seeking services at the nursing home, and length of time spent in the nursing home. Section 2 gathers health-related information, such as history of alcohol consumption, smoking history, presence of comorbidities, past surgical history, current use of medications, and frequency of urination per day. The questions are organized in a categorized-choice format, accompanied by open-ended inquiries.

The International Prostate Symptom Score (IPSS) was developed by the World Health Organization (WHO) to assess LUTS, and was translated into Thai by Nontakaew et al.[30] The IPSS could be used in men and women,[12] and it consisted of seven questions (i.e., Over the last month, how frequently have you experienced a feeling of incomplete voiding of your bladder following finish urination?), each offering five response options for the severity of the LUTS symptoms ranging from 0 points (indicating no presence of symptoms) to 5 points (indicating symptoms are almost usually present). The IPSS's total score ranges from 0 to 35, with scores of 0-7 denoting mild level severity of lower urinary tract symptoms, 8-19, suggesting moderate severity, and 20-35 indicating severe severity.[30]

The IPSS Thai version was tested for its internal consistency reliability; the Cronbach's alpha coefficient value overall was 0.77 when tested on 50 healthy Thai male participants. The test-retest reliability assessment was conducted on 188 males with a two-week interval; high reliability with the value of the intraclass correlation coefficient (ICC) was 0.96.[30] In this current study, the Cronbach's alpha coefficient was 0.63.

The Pittsburgh Sleep Quality Index (PSQI) was utilized to evaluate the sleep quality in this study. The PSQI—a self-reported—was developed by Buysse et al.,[31] and translated into Thai by Sitasuwan et al.[32] The PSQI comprised 19 items (i.e., Over the past month, how would you rate the overall quality of your sleep?) with seven components, which was categorized to two parts: sleep quantity—sleep latency, sleep duration, and habitual sleep efficiency and sleep—and sleep quality-sleep disturbance, perception of sleep quality, utilization of sleep medication, and daytime dysfunction. Each item has a rating score between 0 (no burden) and 3 (severe burden or a frequency greater than three times a week); the overall score of the assessment ranges from 0 to 21 points. The scores

greater than 5 points demonstrated sleep disturbance or deficit.[31]

The original version of PSQI exhibited a Cronbach's alpha coefficient of 0.83 for all components, indicating good reliability. The test-retest reliability in 91 participants with an average 28.2-day interval showed a high correlation coefficient of 0.85 ($p < .001$). Additionally, the PSQI exhibited a sensitivity of 89.6% and a specificity of 86.5%.[31] The PSQI Thai version was tested for its reliability with 138 participants. The internal consistency with the Cronbach′s alpha coefficient value was 0.83. Test-retest reliability was evaluated over 2 to 4 weeks, yielding inter-correlation coefficients of 0.89 for all participants and 0.84 for the group with sleep problems, and it demonstrated a sensitivity of 77.78% and a specificity of 93.33%.[32] The reliability in this present study was 0.77, as indicated by Cronbach's alpha coefficient.

The Multidimensional Assessment of Fatigue (MAF) was used to evaluate the fatigue of participants in this study. The MAF was originally developed by Belza et al.[33] and translated into many languages, including Thai. The MAF questionnaire comprises 16 items, categorized into four domains: fatigue severity, distress, level of interference with daily activities, and timing (frequency experienced over the past week). Each of the first 14 items (e.g., Exercise other than walking) is evaluated using a numerical scale ranging from 1 (not at all) to 10 (a great deal), and two items are answered in a multiple-choice format. These scores are computed to determine the General Fatigue Index (GFI), which ranges from 1 (indicating the absence of fatigue) to 50 (indicating a high level of fatigue).

The original version of MAF was reported to have an exceptional level of internal consistency, with a Cronbach's alpha coefficient of 0.93 in 133 patients with rheumatoid arthritis.[33] Remarkably, the reliability, as indicated by Cronbach's alpha coefficient in this study, was 0.87.

Data Collection: This was started after IRB approval and permission to collect data was granted by the person responsible for each targeted nursing home. Data were collected from April to August 2023. Due to the ongoing COVID-19 pandemic, the data collection processes were designed using two methods to promote precautions and safety measures for all older adults in nursing homes—face-to-face and phone interviews. For face-to-face interviews, the PI personally met with the older adults to assess their eligibility based on the inclusion criteria with high respect for their rights. For those who met the inclusion criteria, the interview process based on the questionnaires strictly followed the distancing, mask wearing, hand washing, and testing (DMHT) guidelines for COVID-19 prevention. Regarding those who were inconvenient to face-to-face interviews or the policy of the setting restricted outside people from entering the nursing home, the PI conducted a verification to ascertain the eligibility of participants for the study by cross-referencing the names provided by the nursing home staff with the participants' personal histories before the individual interview. The interviews usually took approximately 30 minutes per participant.

Data Analysis: The Statistical Package for the Social Sciences for Windows (SPSS/FW) program version 18 and RStudio version 4.4.4 MacOS were employed for data analysis. Descriptive statistics—frequency distributions, percentages, means, and standard deviations—were utilized to analyze personal and health information. Pearson's correlation was employed to investigate the relationship between individual factors (gender, age, and presence of comorbidities) and lower urinary tract symptoms and association with health outcomes (sleep quality and fatigue). However, gender and comorbidity variables had a non-normal distribution; Spearman's correlation was used to analyze the relationship instead. There was no relationship among independent variables at a high level ($r > .80$), indicating no problem with multicollinearity; the multiple logistic regression analysis was employed for the prediction analysis. However, since fatigue was scored as an interval score level, the fatigue score was transformed into a z-score, indicating a binary outcome; the cut point of the z-score was used for the final analysis.

Results

Among 126 older adults screened, six individuals did not satisfy the inclusion criteria due to cognitive impairment, resulting in a final participant of 120 individuals. Among these, 22 older participants from one nursing home were interviewed by phone for data collection. Most participants were female, accounting for 57.5% of the sample, with a mean age of 74.94 years (SD = 9.70). It should be noted that 96.7% received services from nursing homes due to lacking available caregivers. The average length of stay in nursing homes was 21 months (Interquartile range 9.25–48). Regarding comorbidity and chronic illness, 90.8% of participants had comorbidities and chronic illness; the most common diseases are hypertension (n = 88; 73.3%), dyslipidemia (n = 64; 53.3%), diabetes (n = 42; 35%), and cardiovascular disease (n = 30; 25%), respectively. The majority of the participants reported a frequency of six times urination daily, with 76.7% waking up two times or more during the night. Details of participants' characteristics and health information are displayed in **Tables 1** and **2**, which depict the prevalence of LUTS of 96.7% (n = 116) and the number of participants who experienced sleep quality and fatigue.

Table 1. Personal and health information of participants (N = 120)

Information	n	%	Information	n	%
Gender			Education level		
Male	51	42.5	No formal education	11	9.2
Female	69	57.5	Primary level	47	39.2
Age (years)			Secondary level	33	27.4
60–69	39	32.5	Diploma	11	9.2
70–79	45	37.5	At least bachelor's degree	18	15.0
≥ 80	36	30.0	Reasons for receiving services*		
Range = 60–96 years; Mean			No caregivers	116	96.7
= 74.94, SD = 9.70			Physical therapy	14	11.7
BMI (kg/m^2)**			Dependence (Comorbidity & Falls)	14	11.7
< 18.5 (Underweight)	14	11.6	History of surgery		
18.5–22.99 (Normal)	62	51.7	No	62	51.7
23.0–24.99 (Overweight)	24	20.0	Yes	58	48.3
25–29.9 (Obesity I)	14	11.7	Medications taken (types)		
> 30 (Obesity II)	6	5.0	Less than 5	75	62.5
Marital status			More than 5	45	37.5
Single	39	32.5	Frequency of urination per day (times)		
Married	32	26.7	Range = 3–15; Median (IQR)***		
Widowed	27	22.5	= 6 (5–8)		
Divorced/separated	22	18.3	History of waking up at night		
History of drinking alcohol			Never	11	9.1
Never drink	60	50.0	1 time/night	17	14.2
Previously drank but no longer	60	50.0	≥ 2 times/night	92	76.7
History of smoking			Cause of waking up at night*		
Never smoke	84	70.0	Urinate	92	76.7
Used to smoke but currently quit	36	30.0	Drink water	10	8.3
Co-morbidities*			Disturbing noise	7	5.8
No	11	9.2	Have a startled awake /Nightmare	21	17.5
Yes	109	90.8	Others	7	5.8

Table 1. Personal and health information of participants (N = 120) (Cont.)

Information	n	%	Information	n	%
Hypertension	88	73.3	Feelings and emotions after waking up		
Dyslipidemia	64	53.3	in the morning*		
Diabetes mellitus	42	35.0	Normal/refreshing	96	80.0
Cardiovascular disease	30	25.0	Moody/sleepy	24	20.0
Obesity	22	18.3			
Others (Kidney, Cancer, BPH****)	57	47.5			
Number of co-morbidities					
Less than 3	58	48.3			
More than 3	62	51.7			

Note. *Participants could select more than one answer.
**BMI = body mass index classified by the World Health Organization (WHO) for Asian people
***IQR = Interquartile range
****BPH = Benign prostatic hyperplasia

Table 2. The number, percentage, mean and standard deviation of the lower urinary tract symptoms, sleep quality, and fatigue (N = 120)

Variables	n	%
Levels of lower urinary tract symptoms (LUTS)		
No symptoms (0 point)	4	3.3
Mild symptoms (1-7 points)	73	60.8
Moderate symptoms (8-19 points)	40	33.3
Severe symptoms (20-30 points)	3	2.6
Sleep quality		
Good quality of sleep (PSQI ≤ 5)	32	26.7
Poor quality of sleep (PSQI > 5)	88	73.3
Fatigue (z-score)		
Severe fatigue	60	50
Mild fatigue	60	50

Table 3 shows the associations between variables of interest— personal factors (age, gender, comorbidity) and LUTS— and health outcomes (sleep quality and fatigue). Notably, the strong correlation (r > .80) between variables was not identified; therefore, this study had no multicollinearity issues.

Table 3. Correlation coefficients among personal factors, lower urinary tract symptoms, and health outcomes (quality of sleep and fatigue) (N = 120)

Variables	1	2	3	4	5	6
1. Gender[a]	1.000					
2. Age	.277**	1.000				
3. Comorbidities[a]	-.089	.054	1.000			
4. LUTS	.056	.340**	.120	1.000		
5. Sleep quality[b]	-.030	.393*	.236**	.461**	1.000	
6. Fatigue	.043	-.009	.189*	.287**	.209*	1.000

Note: *p < .05; **p < .01; [a]Spearman's rank correlation coefficient; [b]The higher score indicated poorer sleep quality; LUTS = Lower urinary tract symptoms

Table 4 demonstrates that LUTS were associated with poor sleep quality. Compared to LUTS with mild symptoms, the participants with moderate to severe LUTS were 3.35 times, signifying increasing risks of developing poor sleep quality (OR = 3.35, 95%CI = 1.12-9.99, p = 0.03). For personal factors, non-significant relationships were found. However, it should be noted that the PSQI score demonstrated excellent value in predicting sleep quality (sensitivity = 83.33%, specificity = 76.32%); the model accurately predicted poor sleep quality in 74.2% of the cases.

Table 4. Multiple logistic regression analysis of selected factors on sleep quality in older persons residing in private nursing homes (N = 120)

Variables	b	S.E.	Wald	df	p-value	ORs	95%CI
Gender							
Female	Reference						
Male	.614	.477	1.660	1	.198	.848	.726-4.703
Age	.039	.026	2.321	1	.128	1.014	.989-1.094
Number of comorbidities							
Less than 3	Reference						
3 or more	.453	.440	1.061	1	.303	1.573	.664-3.723
LUTS							
Mild symptoms	Reference						
Moderate/severe symptoms	1.209	.558	4.704	1	.030	3.351	1.123-9.994
Constant	-2.683	1.946	1.900	1	.168	.068	

Note. -2LL = 126.237; Nagelkerke R^2 = .149; Hosmer and Lemeshow test, p > .05; Classification accuracy = 74.2%; CI = Confidence interval; ORs = Odds ratios; LUTS = Lower urinary tract symptoms

Regarding the associations among personal factors (gender, age, comorbidity), LUTS, and fatigue, participants with moderate or severe LUTS were 2.61 times more likely to have severe fatigue than those with mild LUTS (OR = 2.61, 95%CI = 1.12-6.07, p-value = 0.02). For personal factors, the relationship between individual factors—age, gender, and comorbidities—and fatigue was observed, but there was no statistical significance. The GFI score was acceptable in predicting fatigue (sensitivity = 61.7%, specificity = 68.3%); the model accurately predicted fatigue in 65% of the cases (details in **Table 5**).

Table 5. Multiple logistic regression analysis of selected factors on fatigue in older persons residing in private nursing homes (N = 120)

Variables	b	S.E.	Wald	df	p-value	ORs	95%CI
Gender							
Female	Reference						
Male	-.531	.405	1.719	1	.190	.588	.266-1.301
Age	-.036	.022	2.599	1	.107	.965	.924-1.008
Number of comorbidities							
Less than 3	Reference						
3 or more	.528	.386	1.873	1	.171	1.695	.796-3.611
LUTS							
Mild symptoms	Reference						
Moderate/severe symptoms	.960	.430	4.982	1	.026	2.612	1.124-6.070
Constant	2.284	1.672	1.865	1	.172	9.815	

Note: -2LL = 156.936; Nagelkerke R2 = .101; Hosmer and Lemeshow test: p > .05; Classification accuracy = 65%; CI = Confidence interval; ORs = Odds ratios; LUTS = Lower urinary tract symptoms

Discussion

Our investigation sought to explore the prevalence of lower urinary tract symptoms (LUTS) and the association between personal factors and LUTS and health outcomes—sleep quality and fatigue—among older residing in nursing homes. The prevalence of LUTS was widespread among participants, with the majority reporting varying degrees of LUTS, including no symptoms (3.3%), mild (60.8%), moderate (33.3%), and severe LUTS (2.6%). These findings have underlined that LUTS was common in the older adult population, consistent with previous studies conducted on male older adults in urban areas who visit primary care health centers, which found a high prevalence of mild LUTS symptoms of 76.1% following moderate to severe of 23.9%.[34] In addition, a study conducted in community-dwelling Japanese older adults (age 65 and over) revealed that participants experienced various symptoms of LUTS with a high prevalence in both men and women. However, the different associations between LUTS and functional ability differed between genders.[7] The high prevalence of LUTS may result from age-related decline and other health conditions. Older age was a significant factor associated with LUTS due to several neutral and genitourinary changes, including sex hormones that pivot the pathogenesis of age-related diseases.[14] Comorbidities—metabolic syndrome (MetS)—was found to be linkage contributing LUTS in older adults. MetS is a systemic inflammatory state; chronic inflammation induces overgrowth of prostatic tissue and bladder outlet obstruction, which play a vital role in LUTS.[35] However, the prevalence of LUTS varies among studies and may depend on various factors. As critically observed, it is possible that the participants did not undergo screening for LUTS. The participants had a prearranged appointment with a physician to evaluate their underlying medical conditions, and most older persons assumed that LUTS was an inevitable decline due to aging that could not be treated.[34] Therefore, providing essential knowledge regarding age-related decline, clinical reasons, and options for screening for LUTS among older adults in nursing homes is necessary to promote the quality of life among this population.

The present study's findings highlight that LUTS are associated with poor sleep quality and fatigue. Nevertheless, personal characteristics (age, gender, and multiple comorbidities) demonstrated a non-significant association with poor sleep quality or fatigue. The forthcoming discussion elucidates particulars and analyzes the association between each variable and health outcomes. The present study's findings align with previous studies on the association of LUTS with poor sleep quality and fatigue. Regarding sleep quality, our findings revealed that increased LUTS severity was positively associated with sleep quality; participants with moderate or severe LUTS were at a higher risk of increased poor sleep quality. This finding is consistent with a study conducted by Przydacz et al.[12,] which measured sleep quality by using IPSS question #8 among patients with LUTS and found that moderate or severe LUTS individuals experienced sleep difficulties higher than those with mild LUTS or without these symptoms. Moreover, a previous study conducted in nursing home residents[36] proved that older adults having LUTS clinical presentations—nocturia and urgency—were at risk of poor sleep quality; notably, those with nocturia were 6.1 times higher risk of developing poor sleep quality. Poor sleep quality due to waking up during the night is confirmed by our findings, revealing that 76.7% of the participants reported waking up at night to urinate two times or more. The aging process might have influenced urinary bladder capacity, contraction, and decreased urine flow, leading to nocturia.[1]

Concerning LUTS and fatigue, it was found that LUTS were significantly positively related to fatigue; older participants with moderate or severe LUTS were 2.61 times higher risk of developing fatigue than those with mild LUTS. Our findings were

consistent with an earlier study[11] on participants with nocturia, which revealed more significant daytime fatigue than those without nocturia participants. This is also consistent with a study by Shokouhi et al.[17] demonstrating that persons with an overactive bladder reported that urination at night was related to fatigue; moreover, 76.7% of older persons who woke up at night to urinate led to increased fatigue. Since the LUTS is a significant variable contributing to poor sleep quality and increased fatigue severity, proactive care from health professionals is essential to improve care quality in this population. It should be noted that most older adults residing in nursing homes might not be screened for LUTS regularly; thus, the longer the problem persists, the higher its impact on poor sleep quality[36] and fatigue.[11,17] An early stage of LUTS screening or early detection is recommended for the healthcare team, which will strengthen better care and reduce the severity of LUTS consequences.

Despite identifying notable findings, this present study did not find a statistically significant association between personal factors (age, gender, and multiple comorbidities) with poor sleep quality and fatigue. Increased age is more likely to develop poor sleep quality. However, recent research suggests that age alone may not fully explain poor sleep quality in older adults since other factors—comorbidity, lifestyle, emotional factors, and personal differences—may play a vital role in influencing sleep disturbance among older adults rather than age only.[37] Therefore, further studies are needed to explore these factors and their impact on sleep quality in older people residing in nursing homes. For fatigue it could be assumed that fatigue in older persons may be affected by multiple factors. Perhaps most older adults living in nursing homes had different underlying diseases; the most extended stay in nursing homes was 168 months, which may affect mental status, including social status and social roles, differently. Factors of specific diseases, bio-physiology, psychology, social roles, and anxiety are more likely to affect the occurrence of fatigue in a different way.[15]

Regarding gender and its association with poor sleep quality and fatigue, the present finding could not explain gender differences in predicting sleep quality and fatigue. Prior research suggests gender differences in predicting poor sleep quality; females report poorer sleep quality and experience disruptions due to menstrual cycles, pregnancy, and menopause, which impact their sleep cycle.[20] The possibility exists that there is a divergence in the proportion of participants or race compared to earlier studies. It should also be noted that the previous study participants were older adults who lived in a community. In contrast, the participants of this study were primarily female older adults residing in nursing homes and having multiple underlying conditions. Hence, the differences in characteristics and the number of participants probably affect gender differences not associated with poor sleep quality in older adults living in nursing homes. Regarding gender and fatigue, our findings revealed that older male adults demonstrated a non-significant risk of developing fatigue compared to females. Corroborate with the study by Rimaud et al.,[38] the authors measured fatigue with the FACIT fatigue scale (FACIT-F) and found that women were more likely to have the highest level of fatigue than men; fatigue would increase afterward when getting older than 75 years old. Another source of caution is that different fatigue scales were used; therefore, other outcomes were obtained. Also, this study's participants were retired older adults living in nursing homes.

For comorbidity, although the non-statistically significant relationship between multiple comorbidities and poor sleep quality was identified in this present study, the findings demonstrated some insight regarding the risk of developing poor sleep quality due to an individual's comorbiities. In the same way, Zhu et al.[21] explored sleep quality in 814 older adults in 24 nursing homes in China and found that older adults with 1-2 kinds of chronic diseases were 2.05 times at risk of poor sleep quality and those with three types of chronic diseases or more were 2.35 times at higher

risk of poor sleep quality. However, the non-statistically significant finding between multiple comorbidities and sleep quality might be that the number of older adults and nursing homes was smaller than that of the previous studies. Therefore, a definite conclusion on the complex relationship between sleep quality and multiple comorbidities requires further exploration. Concerning comorbidity and fatigue, our findings slightly differ from those of earlier studies. Even though the present findings are inconsistent with the relationship demonstrated by prior evidence,[15] it is vital to consider that the relationship between comorbidity and fatigue may vary depending on the specific population and health conditions being studied. Further study is required to explore this relationship in more detail and consider other potential factors contributing to fatigue in older adults living in nursing homes.

Limitations

Some study limitations should be taken into consideration as follows. This study was conducted in only nine private nursing homes in one province in central Thailand. Most of the participants were young-old and middle-old female residents with chronic health conditions. Thus, the study results can be used as a reference for older adults with similar characteristics to those in private nursing homes. Given that the present study is cross-sectional, it is essential to note that the potential association between the variables of interest may not provide comprehensive explanations for any other causal relationships.

Conclusions and Implications for Nursing Practice and Research

The promising findings of this study revealed that most of the older residents in private nursing homes experienced LUTS, ranging from mild to severe clinical presentation. Moderate and severe LUTS leads to poor sleep quality and severe fatigue. In clinical practices, healthcare professionals—nurses or gerontological nurse practitioners—need to prioritize raising awareness about the effects of LUTS on sleep quality and fatigue among this population. Identifying LUTS issues and their consequences at an early stage is more advantageous than intervening later. Moreover, initiating interventions focused on lessening fatigue and enhancing sleep quality would be essential for improving the quality of life among this population. In addition, since this present study was a cross-sectional study that limited a causal relationship, further research on a longitudinal study will help explore the complex relationship among these study variables. Thus, the more understanding of the impact of LUTS on sleep quality and fatigue, the better care older residents living in nursing homes get in return.

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ความชุกของกลุ่มอาการทางเดินปัสสาวะส่วนล่าง และความสัมพันธ์กับผลลัพธ์ทางสุขภาพในผู้สูงอายุที่อาศัยอยู่ในศูนย์ดูแลผู้สูงอายุ : การศึกษาภาคตัดขวาง

กฤษ กอบกำ สุภาพ อารีเอื้อ อินทิรา รูปสว่าง*

บทคัดย่อ: กลุ่มอาการทางเดินปัสสาวะส่วนล่างเป็นปัญหาสุขภาพที่พบได้บ่อยในผู้สูงอายุ แต่ความชุกและผลกระทบต่อสุขภาพในผู้สูงอายุที่อาศัยอยู่ในศูนย์ดูแลผู้สูงอายุยังมีข้อมูลอยู่อย่างจำกัด การศึกษาภาคตัดขวางครั้งนี้มีวัตถุประสงค์เพื่อศึกษาความชุกของกลุ่มอาการทางเดินปัสสาวะส่วนล่าง และศึกษาความสัมพันธ์ระหว่างกลุ่มอาการทางเดินปัสสาวะส่วนล่างกับผลลัพธ์ทางสุขภาพ (คุณภาพการนอนหลับ และความเหนื่อยล้า) ในผู้สูงอายุที่อาศัยอยู่ในศูนย์ดูแลผู้สูงอายุเอกชน 9 แห่งที่ตั้งอยู่ในจังหวัดหนึ่งในภาคกลางของประเทศไทย กลุ่มตัวอย่าง จำนวน 120 ราย เป็นผู้ที่มีคุณสมบัติตามเกณฑ์ที่กำหนด การเก็บรวบรวมข้อมูลใช้การสัมภาษณ์ด้วยแบบสอบถาม ซึ่งประกอบด้วย 1) แบบสัมภาษณ์ข้อมูลส่วนบุคคล 2) แบบประเมินอาการต่อมลูกหมากโต 3) แบบประเมินคุณภาพการนอนหลับพิทสเบิร์ก 4) แบบประเมินความเหนื่อยล้าแบบหลายมิติ การวิเคราะห์ข้อมูลใช้สถิติบรรยาย และสถิติการวิเคราะห์ถดถอยโลจิสติก

ผลการวิจัย พบความชุกกลุ่มอาการทางเดินปัสสาวะส่วนล่างร้อยละ 96.7 กลุ่มตัวอย่างส่วนมากมีคุณภาพการนอนหลับไม่ดี ในขณะที่ร้อยละ 50 ของกลุ่มตัวอย่างพบความเหนื่อยล้ารุนแรงเมื่อแปลงคะแนนความเหนื่อยล้าเป็นคะแนนมาตรฐาน z ผู้สูงอายุที่มีกลุ่มอาการทางเดินปัสสาวะส่วนล่างที่มีอาการปานกลางถึงรุนแรงมีโอกาสเกิดคุณภาพการนอนหลับที่ไม่ดี 3.35 เท่าเมื่อเปรียบเทียบกับกลุ่มที่มีอาการทางเดินปัสสาวะส่วนล่างเล็กน้อย และมีโอกาสเกิดความเหนื่อยล้าในระดับรุนแรงมาก 2.61 เท่าเมื่อเปรียบเทียบกับกลุ่มที่มีอาการทางเดินปัสสาวะส่วนล่างเล็กน้อย การศึกษานี้ได้ชี้ให้เห็นถึงความสัมพันธ์ระหว่างกลุ่มอาการทางเดินปัสสาวะส่วนล่างและผลลัพธ์ด้านสุขภาพ ความรู้ที่ได้รับจากการศึกษานี้สามารถใช้เป็นข้อมูลพื้นฐานสำหรับทีมสุขภาพ โดยเฉพาะบุคลากรที่ทำงานในศูนย์ดูแลผู้สูงอายุได้ตระหนักถึงความรุนแรงของกลุ่มอาการทางเดินปัสสาวะส่วนล่าง และออกแบบกิจกรรมการพยาบาลในการลดอาการเหนื่อยล้าและส่งเสริมคุณภาพการนอนหลับ ซึ่งอาจนำไปสู่การมีคุณภาพชีวิตที่ดีในประชากรสูงอายุกลุ่มนี้

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คำสำคัญ: ความเหนื่อยล้า ผลลัพธ์ทางสุขภาพ กลุ่มอาการทางเดินปัสสาวะส่วนล่าง ศูนย์ดูแลผู้สูงอายุ ผู้สูงอายุ คุณภาพการนอนหลับ

กฤษ กอบกำ *นักศึกษาหลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาวิชาการพยาบาลเวชปฏิบัติผู้สูงอายุ โรงเรียนพยาบาลรามาธิบดี คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล E-mail: krit.kob@student.mahidol.ac.th*

ติดต่อที่ : สุภาพ อารีเอื้อ* *รองศาสตราจารย์ โรงเรียนพยาบาลรามาธิบดี คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล E-mail: suparb.are@mahidol.ac.th*

อินทิรา รูปสว่าง *ผู้ช่วยศาสตราจารย์โรงเรียนพยาบาลรามาธิบดี คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล E-mail: inthira.ros@mahidol.edu*