Original Article

Association of Lower Urinary Tract Symptoms with Body Mass Index in Women Attending Gynecology Clinic in a Tertiary Care Center in Nepal

Maryada Malla[1], Sandesh Poudel[2]

[1] MD, MRCOG (UK), Fellow Urogynaecology, National Academy of Medical Sciences
[2] MD, Fellowship in Urogynaecology, Associate Professor, Department of Obstetrics and Gynaecology and Deputy Director, Paropakar Maternity and Women's Hospital

ABSTRACT

Introduction: Lower urinary tract symptoms (LUTS) is a very prevalent condition worldwide, including Nepal. Among several risk factors, body mass index (BMI) has also been attributed to its development. We intended to see if a high BMI is associated with LUTS in our population.

Methos: An observational analytical study was conducted among 246 women who attended the gynaecologic clinic of a tertiary care center in Kathmandu, Nepal. Sociodemographic, anthropometric, clinical, gynecological and characteristics pertaining to LUTS were recorded. Descriptive statistics were used to describe the study sample. A binary logistic regression analysis was performed to find the association of BMI with LUTS.

Results: The incidence of LUTS was 43.5%. Frequency (22.3%) was the most common subtype followed by urgency (20.14%) and nocturia (17.9%). Obese patients (BMI > 30 kg/m2) had 1.72 (1.12-2.65; p= 0.01) times the probability of having LUTS than those with a normal or low BMI (BMI <25kg/m2).

Conclusion: LUTS was very common in women presenting to the gynecological clinic in our tertiary care center. Frequency was the commonest symptom. High BMI was found to be strongly associated with presence of LUTS.

Key words: lower urinary tract symptoms, body mass index, women

Introduction

Lower urinary tract symptoms (LUTS) in women is a common condition with worldwide prevalence.[1-2] The prevalence, however, varies widely as it depends on age, geography and culture, and is particularly high in ages above 40 with reports as high as 76%.[3] LUTS as per International Continence Society (ICS), consists of storage, voiding and post-micturition symptoms. The storage symptoms include overactive bladder (OAB) and urinary incontinence (UI); the voiding symptoms include slow or weak stream, hesitancy and terminal dribble; and post-micturition symptoms consists of incomplete emptying and post-micturition dribble.[4-6]

Several risk factors have been reported to be associated with LUTS including increasing age, pregnancy, childbirth, diabetes and smoking. Previous major pelvic surgery and hereditary factors can also influence the development of LUTS.[6] Some studies have shown tendencies in females with high body mass index (BMI) for developing LUTS. This has even attributed to excess weight in the abdominal area which increases the abdominal pressure and as a consequence increases the pressure of the bladder and causes mobility of the urethra.[7-8] Another explanation is that release of cytokines by adipose tissue can promote the urgency to urinate and thereby contribute to mixed type of UI.[9]

As per our knowledge, there are no published data regarding the prevalence of LUTS in our population, neither there is any data depicting its association of BMI with LUTS. This study was performed to find the association of LUTS with BMI in our setting. The assessment of risk factors,

Correspondence:

Maryada Malla,
National Academy of Medical Sciences
Email: mallamaryada@gmail.com

particularly BMI, could allow simple interventions like life-style changes such as diet and exercise to help reduce LUTS. Furthermore, a detailed knowledge of the natural history of LUTS in women with determination of various types of LUTS in our population could help improve and streamline urogynaecological services in Nepal.

Method

This was an observational analytical study conducted in Paroparkar Maternity Hospital, Kathmandu, Nepal, a tertiary care government hospital dedicated to the care of women. Women over the age of 18 years who attended the gynecology clinic were included in the study. Women, who did not give informed consent for the study, pregnant women and postpartum women were excluded from the study.

A convenience sampling technique was used to enroll patients. With an expected prevalence of 20% (P),[10] and allowing a confidence interval of 95% (z) and error of margin of 5% (d), a sample size of 246 patients was calculated using the formula $n= Z^2 P(1-P) / d^2$.

After approval from the Institutional Review Board,National Academy of Medical Sciences, data was collected using a proforma. Sociodemographic data, menstrual history, obstetric history, personal history, medical comorbidities and past pelvic surgeries were recorded. Anthropometric measurement, which included height and weight, were taken and BMI calculated accordingly. Presence of LUTS and its different subtypes (urgency, nocturia, urinary incontinence, stress incontinence, urge incontinence, interruption, dysuria, hesitancy, frequency, and bladder pain syndrome) as well as their severity were determined using a validated questionnaire (International Consultation on Incontinence Modular Questionnaire for Female Lower Urinary Tract Symptoms- ICIQ-FLUTS[11]) translated by a certified translator into Nepali and reviewed by two urogynecologist for content validity.

After checking for correctness and completeness, the information was entered into Microsoft Excel Program. Statistical Package for the Social Sciences (SPSS) version 16 was used for analysis. Categorical data were presented as percentage, whereas numerical data were described in terms of mean and standard deviation for normal distribution, or median and interquartile range for skewed distribution. Categorical variables were compared using Chi-square analysis, T-test was applied for parametric variables and Mann-Whitney U test was performed to compare non-parametric variables. Binary logistic regression was used to determine the association of BMI with development of LUTS. A p-value of less than or equal to 0.05 was considered significant.

Results

Patients were recruited from October 2022 to March 2023. The incidence of LUTS in the study was 43.5%. The mean age, height and weight of the population were 45.29, 1.525m, 61.05 kg, whereas the median BMI was 26.2 kg/m^2. According to BMI category, 39.4% had BMI less than 25, 49.1% were overweight (BMI of 25-30) and 11.5% were obese (BMI > 30).

Table 1: Characteristics of patients in those with and without LUTS

	LUTS negative	LUTS positive	p-value
Age (mean, SD)	43.59 (11.58)	46.99 (11.93)	0.03
Height, m (mean, SD)	1.53 (0.08)	1.52 (0.07)	0.50
Weight, kg (mean, SD)	60.55 (8.20)	61.56 (9.56)	0.39
BMI (median, IQR)	25.66 (23.44-28.10)	26.89 (24.55-28.93)	0.04
BMI category (N, %)			0.03
<25	51(47.6)	46 (33)	-
25-30	50 (46.7)	71 (51)	-
>30	6 (5.7)	22 (16)	-
Alcohol consumer (N, %)	9 (8.4)	27 (19.4)	0.03
Smoking (N, %)	21 (19.6)	46 (33.1)	0.04
HRT (N, %)	2 (1.8)	4 (2.8)	1.00
Menopause (N, %)	35 (32)	72 (51.17)	0.01
Mode of delivery (N,%)			0.57
None	3 (2.8)	2 (1.4)	-
Vaginal	76 (71)	115 (82.7)	-
Cesarean section	18 (16.8)	22 (15.8)	-
Comorbidities (N, %)			<0.001
None	94 (87.8)	91 (65.5)	-
Diabetes mellitus	1 (0.9)	24 (17.2)	-
Hypertension	4 (3.7)	20 (14.3)	-
Others	1 (0.9)	6 (4.3)	-
Previous pelvic surgery (N, %)	23 (21.4)	32 (23)	1.00

LUTS: lower urinary tract symptoms; HRT: hormone replacement therapy; N: number; SD: standard deviation;

IQR: interquartile range

Table 1 summarizes the characteristics of the study participants according to the presence of LUTS. The BMI was found to be lower in patients without LUTS compared to those with LUTS (median (IQR) 25.66 kg/m^2 (23.44-28.10) vs 26.89 kg/m^2 (24.55-28.93)). Mean age, alcohol consumption, smoking, menopause status, and presence of comorbid conditions were also significantly lower in those without LUTS than in those with LUTS. Similarly, according to BMI category, a higher proportion of overweight (51% vs 46.7%) and obese patients (16% vs 5.7%) were found in the LUTS group.

Figure 1 describes the incidence of various types of LUTS as well as their severity scale as determined from the questionnaire. Frequency (22.3%) was the most common symptom, followed by urgency (20.14%) and nocturia (17.9%). Stress urinary incontinence (15.8%), dysuria (16.5%) and bladder pain (14.4%) were also common symptoms. Urinary incontinence (5%), hesitancy (4%), and interruption (2%) were the least common symptoms.

Binary logistic regression analysis was performed to assess the association of BMI with the presence of LUTS (Table 2).

Table 2: Binary logistic regression analysis

Variable	Odds ratio	95% C.I		p-value
		Lower	Upper	
Age	0.99	0.96	1.028	0.71
BMI	1.72	1.12	2.65	0.01
HRT	1.15	0.19	6.93	0.87
Menopause	2.03	0.92	4.51	0.08
Smoking	1.12	0.54	2.32	0.76
Alcohol	2.10	0.84	5.25	0.11
Mode of delivery	1.01	0.47	2.18	0.98
Previous pelvic surgery	1.17	0.54	2.56	0.68

BMI: body mass index; HRT: hormone replacement therapy; C.I.: confidence interval

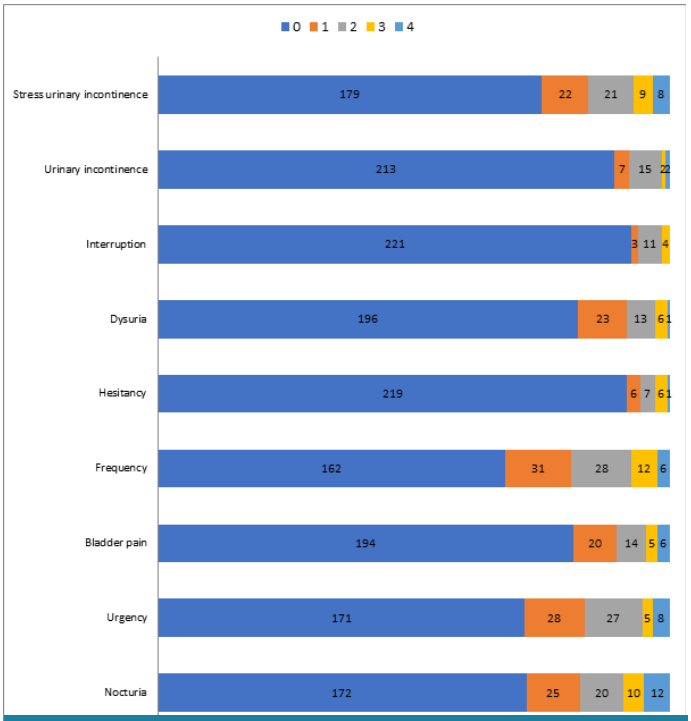

Fig 1: Types and severity of LUTS

For all subtypes except frequency and nocturia, 0- never, 1- occasionally, 2- sometimes, 3-most of the times, 4- all of the time. For nocturia, 0- none, 1- one time, 2- two times, 3- three times, 4- four or more times. For frequency, 0- 1 to 6 times, 1- 7 to 8 times, 2- 9 to 10 times, 3- 11 to 12 times, 4- 13 or more times.

Discussion

In this study conducted in women attending gynecology clinic in a tertiary care center in Nepal, increasing BMI was associated with presence of LUTS. The association was observed when the presence of LUTS was compared with median BMI as well as BMI classified according to severity. This association was further established by using binary logistic regression, where variables, decided pre-hoc, were tested for confounding. Obese patients (BMI > 30 kg/m^2) had an odds of 1.72 (1.12-2.65; p-value 0.01) in having LUTS compared to those with a normal or low BMI (BMI <25kg/m^2).

These results are consistent with many previous studies from around the world. A study from the United States reported that women with a BMI > 30kg/m^2 had an odds of 1.77 in having urinary incontinence compared to women with a BMI < 30 kg/m^2, which is quite comparable to our results.[12] Another study from Denmark found that obese women were more than twice as likely to have urinary incontinence than underweight women.[13] A study done in Mexico observed that women with urinary incontinence had a higher BMI than those who were continent (24.6+/-4 vs 27+/-5.5 kg/m2, p<0.0001).[14] Elia G et al. after adjusting for prior bladder surgery, any surgery, history of medical problems and physical inactivity, only the association between BMI and incontinence remained statistically significant (adjusted OR 1.95; 95% CI 1.18-3.19).[15] A retrospective study by Santaniello F et al. found that incidence of urinary incontinence rose as the BMI increased, with 70.8% complaining of urinary symptoms in class I BMI, increasing to 78.9% in class II, 95.1% in class III and all 16 patients in BMI class IV were incontinent.[16]

Most of these studies have only reported the association of urinary incontinence with BMI. However, our study encompasses all the spectrum of LUTS and shows that there is an overall association of BMI with LUTS. This finding is corroborated by a large observational cross-sectional study which found a correlation between the presence of urinary urgency (r=0.7; P=0.00), nocturia (r=0.7; P=0.00), and urinary incontinence (r=0.9; P=0.00) with waist circumference, which is a parameter closely related to BMI.[17]

The biological plausibility for the association between BMI and LUTS has been explained by the fact that individuals who are overweight have undue pressure placed on the bladder and surrounding muscles.[18,19] Being overweight, especially with central adiposity, increases intra-abdominal pressure and, thus, pressure on the bladder and pelvic organ support structures. As this abdominal pressure upon the bladder increases, the severity of LUTS also increases.[20]

Almost half of the patients (43.5%) had some or other form of LUTS of various severity indicating that it is a very common condition in our population. Studies from other population settings have also reported similar incidences with one from Malaysia showing 50.6%.[21]

The commonest symptom of LUTS in our study was frequency. This is in contrast to most studies, where stress urinary incontinence is the more common feature. One study observed that 49% of the symptoms were due to SUI.[21] However, in a study done by Pradhan T et al. in Nepal 13, 82.4% patients had complaints of overactive bladder symptoms such as urgency, urge incontinence and increased daytime frequency.[22]

The limitation of this study was that it was a single center study. Nevertheless, the setting where it took place was a high-volume center with good representation from almost all areas of Nepal. This study focused only on association of incidence of LUTS and not its implications such as quality of life.

Conclusion

LUTS was very common in women presenting to the gynecological clinic in our tertiary care high volume center. Frequency was the commonest symptom and most symptoms were of mild severity. High BMI was found to be strongly associated with presence of LUTS.

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