Kwaghe International
Journal of Sciences and Technology

ISSN: 1595-7977

Index: Harvard, Boston, Sydney University, Dimensions, Lens, ResearchGet Scilit, Semantic, Google Scholar, Base etc

https://doi.org/10.58578/KIJST.v2i2.5669

Association Between Selected Socio-Demographic Characteristics and Lower Urinary Tract Symptoms Among First-Time Mothers in Ogbomosho, Oyo State, Nigeria

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Article Info:

Submitted:	Revised:	Accepted:	Published:
Apr 6, 2025	Apr 21, 2025	May 3, 2025	May 8, 2025

Abstract

Urinary incontinence and other lower urinary tract symptoms (LUTS) are common postpartum complaints that can significantly affect the quality of life of new mothers. Previous researchers have reported the influence of selected sociodemographic factors on LUTS in a general female population and multiparous women. However, there is limited literature on the association between these factors and LUTS among first-time mothers in this part of the world. Therefore, this study was designed to investigate the association between body mass index (BMI), age, mode of delivery, and the occurrence of LUTS among first-time mothers in Ogbomoso. Oyo State Nigeria. This cross-sectional survey was conducted among 70 consenting first-time mothers recruited from 3 major hospitals (or ante-natal clinics) in Ogbomoso, Oyo State. A sociodemographic form was used to assess sociodemographic

characteristics of participants. Height was measured using a portable stadiometer, while weight was measured using a calibrated digital bathroom scale. The ICIQ-FLUTS, a structured questionnaire was used to assess LUTS among participants, this questionnaire assesses LUTS in three domains - filling, voiding, and incontinence domains. The Chi-square test was used to assess associations between variables, with level of significance set at 0.05. The mean age of participants was 31.26 ± 6.00 years (range: 22–45 years), mean BMI was 25.20 ± 4.21 kg/m² (range: 18.16–36.69 kg/m²), and mean weight was 69.48 ± 11.92 kg (range: 45–100 kg), 65.7% of participants delivered through spontaneous vaginal delivery, while 34.3% underwent cesarean section, and majority of (85.7%) had single births, whereas 14.3% had multiple births. BMI was significantly associated with both filling ($\chi^2 = 20.213$, $p = 0.017$) and incontinence symptoms ($\chi^2 = 26.773$, $p = 0.002$), but not with voiding symptoms ($p = 0.431$). No significant associations were observed between LUTS and age, mode of delivery, number of births, educational level, or occupation. A large proportion (75.7%) of the participants reported mild to moderate LUTS in the incontinence domain. Among first-time mothers, elevated BMI is a key risk factor for urinary filling and incontinence symptoms. These findings underscore the importance of incorporating weight management and pelvic floor rehabilitation into postpartum physiotherapy programs. Broader and longitudinal studies are recommended to validate these findings and guide effective intervention strategies.

Keywords: Urinary incontinence, BMI, first-time mothers, pelvic floor, mode of delivery, lower urinary tract symptoms.

INTRODUCTION

Urinary incontinence (UI) is a common and often underreported condition among women, particularly in the postpartum period. It is defined by the International Continence Society as "the complaint of any involuntary leakage of urine" [(1)]. UI can significantly impair a woman's quality of life, leading to physical discomfort, emotional stress, social embarrassment, and even depression [(2)]. Although it can occur at any age, the postpartum period presents a heightened risk, especially for first-term mothers who experience pelvic floor stress for the first time. Several maternal factors such as body mass index (BMI), mode of delivery, and age at the time of birth have been consistently identified as key risk factors for developing UI [(3,4)]. However, there is limited evidence on how these factors interplay in surb-urban populations like Ogbomoso, Oyo State, Nigeria, where sociocultural practices and healthcare access can considerably influence maternal outcomes.

Body mass index (BMI) is a crucial determinant of urinary incontinence risk. Higher BMI has been associated with an increased risk of stress UI due to the additional pressure exerted on the bladder and urethral sphincter [5]. Studies have shown that women with a BMI categorized as overweight or obese are nearly twice as likely to report postpartum UI compared to women with a normal BMI [6,7]. Despite these known associations, few studies have examined the impact of BMI on urinary incontinence specifically among first-time mothers in Nigerian communities, where the double burden of malnutrition and obesity is emerging [8].

The mode of delivery is another critical factor influencing postpartum urinary function. Vaginal deliveries, particularly those involving prolonged labor, macrosomic infants, or instrumental assistance (such as forceps or vacuum extraction), are associated with significant pelvic floor trauma, leading to increased UI prevalence [9,10]. Conversely, elective cesarean sections have been found to offer some protective effect against UI by preserving pelvic floor integrity [11]. Nonetheless, cesarean sections are not without risks, including higher rates of postpartum infection, surgical complications, and future pregnancy complications [12]. In many parts of Nigeria, including Ogbomoso, cesarean sections are often viewed with cultural suspicion and sometimes interpreted as a sign of maternal weakness [13]. This cultural context may influence delivery choices and, indirectly, postpartum urinary health outcomes.

Maternal age at the time of first delivery also significantly impacts the risk of postpartum urinary incontinence. Older maternal age has been associated with decreased collagen elasticity and muscle tone in the pelvic floor, increasing the susceptibility to UI [14,15]. Women aged 30 years and above at the time of their first delivery have been shown to be at a higher risk compared to younger mothers [3]. Also, a study by[16] reported that very young maternal age (teenage mothers) may also predispose women to UI due to incomplete pelvic development. These contrasting findings underscore the need for further research to better understand the age-related risk patterns for urinary incontinence in this population.

Given the multidimensional factors involved, it is essential to comprehensively assess the association between BMI, mode of delivery, age, and urinary incontinence among first-time mothers in Ogbomoso, Oyo State, Nigeria. By focusing on this population, the current study seeks to fill the gap in existing literature, offering context-specific insights that can inform maternal health policies and clinical practices. Identifying high-risk groups and

modifiable factors can facilitate early interventions such as pelvic floor muscle training, weight management, and informed delivery planning, ultimately reducing the burden of postpartum UI [17,18]. Such findings are critical for improving women's postpartum quality of life and advancing maternal healthcare outcomes in Nigeria and similar resource-constrained settings.

MATERIALS AND METHODS

This quantitative cross-sectional study was conducted among 70 first-time mothers attending postnatal clinics at the three major healthcare facilities in Ogbomoso, Oyo State, Nigeria: Bowen University Teaching Hospital, Mainspring Hospital, and Ibrahim Taiwo Hospital. The study specifically targeted primiparous women with no pre-existing urological or neurological disorders to eliminate confounding complications from previous deliveries and other co-morbid conditions. Ethical approval was obtained from the Bowen University Teaching Hospital Health Research and Ethics Committee (BUTH-HREC). All participants provided written informed consent prior to data collection, in accordance with the Declaration of Helsinki.

An initial population of 204 first-time mothers was identified from the register of postnatal clinics of the 3 major hospitals in Ogbomoso, Oyo state. Using Slovin's formula [19] at a 95% confidence level and 5% margin of error, a sample size of 135 was determined. From this, 70 mothers consented to participate, resulting in a response rate of 51.9%. Participants were recruited through a consecutive sampling method, ensuring inclusion of all eligible and consenting individuals within the study period.

All physical measurements were conducted under standardized conditions by the same examiner to ensure measurement consistency. Height was measured to the nearest 0.1 cm using a portable stadiometer, with participants standing barefoot in an upright position. Weight was measured to the nearest 0.1 kg using a calibrated digital bathroom scale, with participants minimally clothed. Body Mass Index (BMI) was subsequently calculated using the standard formula:

$$BMI = \text{Weight (kg)} / \text{Height (m}^2\text{)}$$

Participants were then categorized according to WHO BMI classifications: underweight (<18.5), normal (18.5–24.9), overweight (25–29.9), and obese (≥ 30).

Lower Urinary Tract Symptoms (LUTS) were evaluated using the International Consultation on Incontinence Questionnaire – Female Lower Urinary Tract Symptoms (ICIQ-FLUTS). This validated tool comprises 12 items covering domains of filling symptoms (e.g., frequency, urgency, nocturia), voiding symptoms (e.g., hesitancy, straining, intermittency), and incontinence symptoms (e.g., stress, urge, unexplained urinary leakage). Each symptom is scored individually, and domain-specific totals are calculated: Filling (0–16), Voiding (0–12), and Incontinence (0–20). Although the questionnaire includes a "bother" scale assessing subjective distress, it is not included in domain totals. Completion time for the questionnaire averaged 4–5 minutes.

Data was analyzed using IBM SPSS Statistics Version 23. Descriptive statistics of means, standard deviations, and frequencies were used to summarize participant socio-demographic characteristics. Associations between BMI, age, mode of delivery, number of births, and LUTS domains (filling, voiding, incontinence) were evaluated using inferential statistics of Chi-square test with level of statistical significance set at $p < 0.05$.

RESULTS

The mean age of the participants was 31.26 ± 6.00 years (range: 22–45 years). Most participants were aged between 22–29 years (41.4%) and 30–37 years (40.0%), while 18.6% were between 38–45 years. The majority were married (87.1%), with smaller proportions being single (8.6%), widowed (2.9%), or divorced (1.4%). Educational attainment was predominantly tertiary (68.6%), followed by secondary (28.6%), and primary (2.9%). In terms of employment, 51.4% were self-employed, 30.0% reported other forms of occupation, 10.0% were civil servants, and 8.6% were unemployed (Table 1). The mean height was 1.66 ± 0.71 meters (range: 1.50–1.82 m), and the mean weight was 69.48 ± 11.92 kg (range: 45–100 kg), resulting in a mean Body Mass Index (BMI) of 25.20 ± 4.21 kg/m² (range: 18.16–36.69 kg/m²) (Table 2). Based on BMI classification, 38 participants were of normal weight, 20 were overweight, 11 were obese, and 1 participant was under weight (Figure 1).

With regard to obstetric history, 65.7% of participants delivered vaginally (with no assistance), while 34.3% underwent cesarean section. A majority (85.7%) had single births, whereas 14.3% had multiple births (Table 3). Assessment of lower urinary tract symptoms (LUTS) revealed that 48.6% of participants experienced mild filling symptoms, 30.0% had

moderate symptoms, and 15.7% reported severe symptoms; only 5.7% had no symptoms. Voiding symptoms were less prevalent, with 54.3% of participants reporting no symptoms, 28.6% experiencing mild symptoms, and a combined 17.1% reporting moderate or severe symptoms. Incontinence symptoms were observed in 75.7% of participants in varying degrees: 42.9% mild, 25.7% moderate, and 7.1% severe; the remaining 24.3% reported no incontinence (Table 4).

Chi-square analysis revealed no statistically significant associations between age group and LUTS domains: filling ($\chi^2 = 6.461$, $p = 0.374$), voiding ($\chi^2 = 2.218$, $p = 0.696$), and incontinence ($\chi^2 = 4.990$, $p = 0.545$). Similarly, no significant associations were found between LUTS and educational level or occupation. The association between education and filling symptoms approached significance ($\chi^2 = 10.672$, $p = 0.099$), but did not meet the conventional threshold. Associations with voiding ($\chi^2 = 3.838$, $p = 0.428$) and incontinence symptoms ($\chi^2 = 5.675$, $p = 0.404$) were not statistically significant. For occupation, no significant relationships were observed with filling ($\chi^2 = 9.429$, $p = 0.399$), voiding ($\chi^2 = 1.943$, $p = 0.925$), or incontinence symptoms ($\chi^2 = 10.041$, $p = 0.347$) (Table 5).

BMI was significantly associated with both filling ($\chi^2 = 20.213$, $p = 0.017$) and incontinence symptoms ($\chi^2 = 26.773$, $p = 0.002$), but not with voiding symptoms ($\chi^2 = 5.929$, $p = 0.431$) (Table 6). No significant associations were observed between LUTS and obstetric variables including mode of delivery (filling: $p = 0.127$; voiding: $p = 0.304$; incontinence: $p = 0.250$) or number of children (filling: $p = 0.890$; voiding: $p = 0.484$; incontinence: $p = 0.645$ (Table 7).

Table 1: Sociodemographic for Participants

Sociodemographic variable		Mean ± S.D	Minimum	Maximum
Age(years)		31.26±6.004	22	45
		Frequency	%	
Age-groups	22-29	29	41.4	
	30-37	28	40.0	

	38-45	13	18.6
Marital status	Single	6	8.6
	Married	61	87.1
	Divorced	1	1.4
	Widow	2	2.9
Educational Level	Primary	2	2.9
	Secondary	20	28.6
	Tertiary	48	68.6
Occupation	Civil servant	7	10.0
	Others	21	30.0
	Self Employed	36	51.4
	Unemployed	6	8.6

Table 2: Physical Characteristics of the Participants

Physical Characteristics/ Measurement	Mean ±S.D	Minimum	Maximum
Height of the Respondents (m)	1.66±0.71	1.5	1.82
Weight of the Respondents (Kg)	69.48±11.92	45	100
Body Mass Index (Kgm^{-1})	25.198±4.205	18.16	36.69

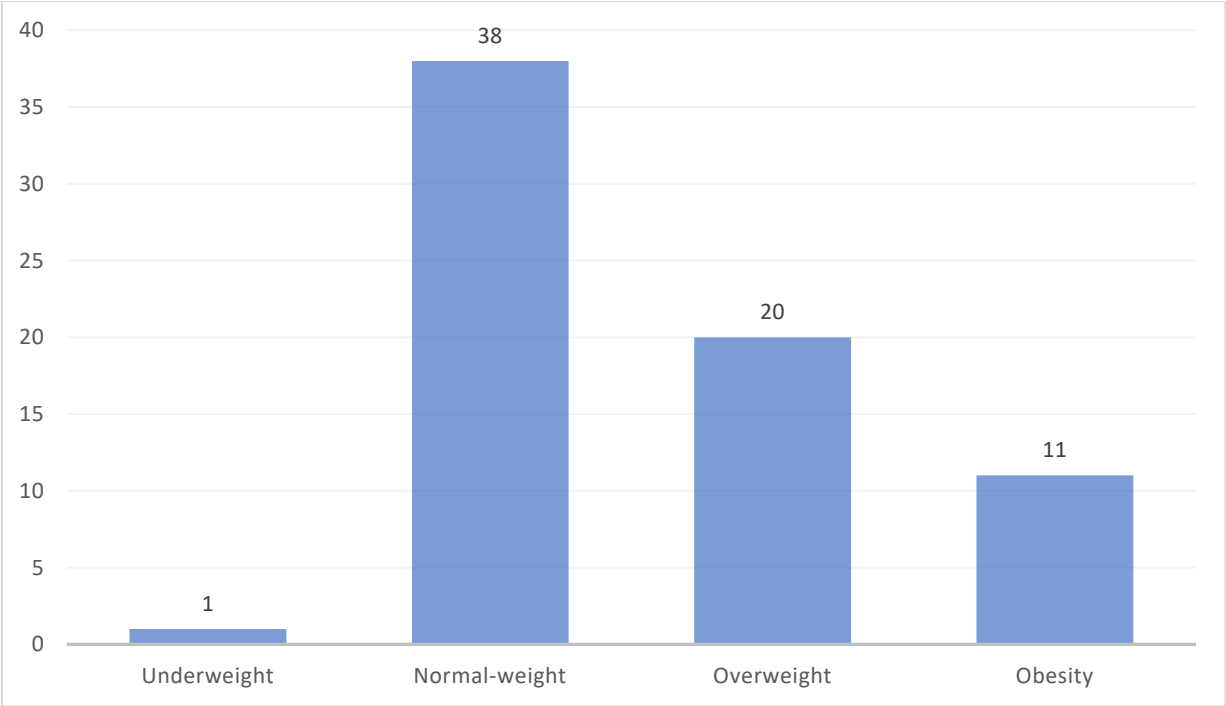

Figure 1: The Body Mass Index of the Participants

Table 3: Mode of Delivery and number of births of the Participants

Variables		Frequency	%
Mode of delivery	Spontaneous vaginal delivery	46	65.7
	Caesarean section	24	34.3
No. of children at birth	Single birth	60	85.7
	Multiple birth	10	14.3

Table 4: Lower urinary tract symptoms among Participants

Lower Urinary Tract Symptoms	Frequency	%
Filling		
No symptom	4	5.7
Mild	34	48.6
Moderate	21	30.0

Severe	11	15.7
Voiding Symptom		
No symptom	38	54.3
Mild	20	28.6
Moderate	2	2.9
Severe	10	14.2
Incontinence Symptom		
No symptom	17	24.3
Mild	30	42.9
Moderate	18	25.7
Severe	5	7.1

Table 5: Association between Lower Urinary Tract Symptoms and Sociodemographic Characteristics of Participants.

Sociodemographic Variables	Lower Urinary Tract Symptoms					
	Filling symptoms		Voiding Symptoms		Incontinence symptoms	
	χ^2	p-value	χ^2	p-value	χ^2	p-value
Age group	6.461	0.374	2.218	0.696	4.990	0.545
Educational level	10.672	0.099	3.838	0.428	5.6175	0.404
Occupation	9.429	0.399	1.943	0.925	10.041	0.347

Table 6: Association between Lower Urinary Tract Symptoms and BMI.

Physical characteristics	Lower Urinary Tract Symptoms					
	Filling symptoms		Voiding Symptoms		Incontinence symptoms	
	χ^2	p-value	χ^2	p-value	χ^2	p-value
BMI	20.213	0.017*	5.929	0.431	26.773	0.002*

*significant at $p \leq 0.05$

Table 7: Association between Lower Urinary Tract Symptoms and Number of Births of participants.

Pregnancy history	Lower Urinary Tract Symptoms					
	Filling symptoms		Voiding Symptoms		Incontinence symptoms	
	χ^2	p-value	χ^2	p-value	χ^2	p-value
Mode of delivery	5.697	0.127	2.380	0.304	4.106	0.250
No. of Children	2.303	0.890	3.460	0.484	4.234	0.645

DISCUSSION

This study aimed to explore the association between body mass index (BMI), age, mode of delivery, and the prevalence of lower urinary tract symptoms (LUTS) among first-time mothers. While a majority of participants reported mild to moderate LUTS across the domains of filling, voiding, and incontinence, significant associations were only observed with BMI, specifically for filling and incontinence symptoms. Age, educational level, occupation, mode of delivery, and number of children did not show statistically significant relationships with any LUTS domains.

The finding that BMI was significantly associated with both filling and incontinence symptoms aligns with several previous studies that have identified elevated BMI as a risk factor for urinary incontinence. Obesity is thought to contribute to pelvic floor dysfunction through increased intra-abdominal pressure, which places strain on pelvic structures and the urethral sphincter[5]. Similarly, a study by [20] concluded that higher BMI is a strong predictor of stress urinary incontinence among postpartum women, even after controlling for age and delivery mode.

In contrast, these results did not show any significant association between BMI and voiding symptoms. This aligns with findings by [21], who reported that while BMI correlates with stress and urge incontinence, it does not significantly affect voiding dysfunction in women of reproductive age. Interestingly, age was not significantly associated with any LUTS domains in this study. Although several studies have reported that advancing age increases the risk of urinary incontinence due to hormonal changes and reduced tissue elasticity [3], this study's findings suggest that within the maternal age range of 22–45 years, age might

not impact significantly on the continence of this population since they are still relatively young.

The absence of a statistically significant relationship between LUTS and mode of delivery is noteworthy. Vaginal delivery is often implicated as a risk factor for pelvic floor trauma, leading to urinary symptoms postpartum [22]. However, our findings did not support this association. One possible explanation is that pelvic floor recovery in the immediate postpartum period can vary greatly and may not be solely dependent on the mode of delivery, but also on individual factors such as pelvic floor muscle strength, genetic predisposition, and postnatal rehabilitation engagement. A similar lack of association was reported by [23], who found no clear link between delivery method and long-term urinary incontinence in first-time mothers.

The findings of this study also indicate that the number of children (single vs. multiple births) did not significantly influence the occurrence of LUTS. This result contrasts with studies suggesting that multiparity contributes to greater pelvic floor strain [24]. However, given that all participants in the current study were first-time mothers, the parity factor may not have had enough variability to demonstrate an effect. Socioeconomic variables such as education and occupation did not exhibit significant associations with LUTS in this study. This may reflect the complex and multifactorial etiology of urinary incontinence, in which behavioral and physiological factors may overshadow demographic characteristics. Nonetheless, the borderline association between educational level and filling symptoms suggests that health literacy and awareness may play a role in symptom perception or reporting.

Overall, the current findings underscore the importance of addressing modifiable risk factors—particularly BMI—in postpartum rehabilitation strategies. Given the established link between overweight and urinary incontinence, physiotherapists and maternal health professionals as well as medical social workers should incorporate targeted weight management, pelvic floor muscle training (PFMT) and social support programs early in postnatal care plans, as supported by [25], who demonstrated the efficacy of PFMT and timely weight management in reducing postpartum urinary symptoms.

CONCLUSION

This study contributes to the growing body of evidence emphasizing the impact of maternal physical characteristics particularly Body Mass Index (BMI) on postpartum lower urinary tract symptoms (LUTS). Among the various factors examined, BMI emerged as the only variable with statistically significant associations, specifically influencing both filling and incontinence symptoms. These findings align with previous research suggesting that increased body weight contributes to pelvic floor dysfunction due to heightened intra-abdominal pressure and weakened pelvic musculature. Consequently, overweight and obesity can compromise the urethral closure mechanism and bladder control, exacerbating urinary symptoms in postpartum women.

In contrast, variables traditionally implicated in postpartum urinary dysfunction such as age, mode of delivery, and number of children did not show significant associations in this study. This finding is particularly important as it challenges the long-held assumption that vaginal delivery is a primary risk factor for LUTS in new mothers. Instead, it suggests that for first-time mothers, modifiable factors such as BMI may play a more central role in symptom presentation than non-modifiable obstetric history. The lack of association between urinary incontinence and age may also reflect the relatively young demographic of the sample, in which age-related degenerative pelvic floor changes have not yet taken effect.

These findings have meaningful implications for clinical physiotherapy, medical social works, and public health practice. Given that BMI is a modifiable risk factor, physiotherapists have a unique opportunity for early intervention through structured postnatal rehabilitation programs. Interventions may include pelvic floor muscle training (PFMT), core strengthening, and individualized weight management strategies, all of which are evidence-based approaches to managing and preventing LUTS. Such early interventions not only improves quality of life for postpartum women but may also reduce the long-term healthcare burden associated with chronic urinary dysfunction.

Moreover, this study underscores the importance of a holistic preventive approach to maternal health that extends beyond obstetric care. Routine postpartum physiotherapy assessments should integrate screening for LUTS, particularly among women with elevated BMI, regardless of their delivery mode or obstetric history. BMI stands out as a key determinant of LUTS in first-time mothers. By recognizing and addressing this modifiable

risk factor through targeted physiotherapeutic, dietary and lifestyle modification interventions, healthcare providers can significantly improve maternal outcomes and long-term pelvic health. Also, medical social workers can also be involved earlier in the post-natal care program, so as to provide needed counselling and social support for these young mothers to hasten their quick adaptation to the new role of motherhood while remaining active enough to prevent sedentary lifestyle that can predispose them to UI. Above all, health education and awareness campaigns can also play a vital role in reducing stigma around urinary symptoms and encourage early reporting and treatment.

Despite its contributions, this study is not without limitations. The relatively small sample size and cross-sectional design limits the generalizability of these findings as well the confidence to draw causal inferences. Additionally, self-reported symptoms may be subject to recall bias or underreporting due to embarrassment. Future research should aim to involve larger, more diverse populations and consider longitudinal cohort designs to better assess the progression and predictors of LUTS over time. Incorporating objective measures such as urodynamic testing could also enhance the reliability of findings.

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