PREVALENCE, PATTERN, AND RISK FACTORS FOR URINARY INCONTINENCE AMONG WOMEN IN A LOW-RESOURCE SETTING

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Abstract: **Introduction**: Urinary incontinence (UI) is a common but under-reported condition among women in low-resource settings. The prevalence and pattern of UI, as well as associated risk factors must be examined to inform appropriate health interventions. This study investigated the prevalence, pattern, and risk factors for UI among women in a low-resource setting.

Methods: This community-based cross-sectional study was conducted among 400 women ≥ 15 years old in Ilorin South Local Government Area, Kwara State, Nigeria. An interviewer-administered questionnaire was used to collect socio-demographic and health-related data on UI The prevalence of UI was determined using the International Consultation on Incontinence Modular Questionnaire-Urgency Frequency Scale (ICIQ-UFS). Analysis was done using SPSS version 20.

Results: The mean age of the respondents was 47.9 (± 4.5), and 200 (50.0%) were grand-multipara. The prevalence of UI among women in our study setting was 52.7%. The most common pattern of UI was stress incontinence at 140 (67%), followed by mixed incontinence at 45(21%) and urge incontinence at 26 (12%). Age (p < 0.001), parity (p = 0.006), and BMI (p < 0.001) were significantly associated with UI.

Conclusion: The findings of this study suggest that UI is highly prevalent among our study population and that age, parity, and BMI are associated with the occurrence of UI. There is a need for interventions that focus on preventing and managing UI among women in low-resource settings.

Keywords: prevalence, pattern, risk factors, urinary incontinence, women.

INTRODUCTION

Urinary incontinence, which is the involuntary loss of bladder control, affects women of all ages and races and may have severe psychological effects. The International Continence Society defines urinary incontinence as *"the complaint of any involuntary leakage of urine"* (1, 2). Several disorders of lower urinary tract function and other conditions may lead to urine incontinence, which manifests in various ways. Stress urinary incontinence is *"the involuntary loss of urine in response to physical exertion, such as sneezing or coughing"*. Urge urinary incontinence is the involuntary loss of urine that occurs during or shortly before an episode of urgency (a strong, sudden need to urinate that can't be put off for long). The involuntary loss of urine due to urgency and physical activity (sneezing, coughing, etc.) is known as "mixed urinary incontinence". The symptoms of an overactive bladder include urgency, frequency, and nighttime urination, with or without urine incontinence (1, 2, 3).

Embarrassment, a lack of awareness about treatment choices, and a fear of surgery may all make patients hesitant to begin conversations regarding incontinence and urinary symptoms (3). Previous surveys reported that between 26% and 61% of women who live in the community have urinary incontinence, but only 18% seek treatment for it (4, 5). Urge and stress incontinence are often mentioned in Western nations (6, 7). These latter ailments certainly occur, but in Nigerian culture, they are not often seen as severe enough to need a trip to the hospital (8, 9).

Women still see urinary incontinence as a taboo because of how it presents (10). Worldwide, urinary

incontinence is primarily unrecognized, unreported, and untreated (10, 11).

Usually, women's continence is aided by the pelvic floor muscles, which assist in holding urine in the urinary bladder and, when necessary, release it. The bladder expands progressively in relation to the volume of urine stored in it (12). Urine is forced into the urethra when the bladder muscles contract in response to certain stimuli with a concomitant relaxation of the muscles of the sphincter encircling the urethra to allow urination. However, incontinence develops when the expulsive force in the bladder is greater than the closure force in the urethra, leading to involuntary urine leakage. A dysfunctional urethra sphincter may also cause urinary incontinence (13).

Although it's sometimes thought that only older women have urinary incontinence, there are women of all ages who deal with this condition (14). According to Seshan et al. (12), women of reproductive age who had specific risk factors were more likely to have urinary incontinence. Urinary incontinence has a detrimental influence on women's quality of life, especially as they age (15, 16). Rogers argues that age is a significant risk factor, particularly for women who have given birth vaginally. These women are more likely to experience stress incontinence due to the destruction of their pelvic muscles (8).

The detrusor muscles are further weakened by obesity, a significant risk factor (15). Turkish research found that obesity, urinary tract infections, and constipation are all risk factors for urinary incontinence in women over the age of 65 (15).

Age brings about hormonal changes in women, particularly after childbirth. This increases the possibility of urinary tract infections and, therefore, incontinence. Hygiene plays a role in why there are more illiterate women experiencing urinary incontinence (16). Urinary incontinence was a common problem among women with body mass indexes of 26 or above (14). Women are more likely to get urinary incontinence when their parity increases (14). This is because there is an increase in urethral mobility during pregnancy, and this worsens by injury to the pelvic floor muscles with the widening of the hiatus during vaginal birth (15, 16, 17). Urinary incontinence has a negative impact on quality of life and may lead to a loss of self-esteem; thus, it is essential to identify the prevalence and risk factors of this condition among our population so that we can take appropriate preventative actions. The prevalence, pattern, and risk factors for urinary incontinence among Nigerian women were examined in this research. This study will add to the body of knowledge on urinary incontinence among Nigerian women.

MATERIAL AND METHODOLOGY

Study design

This was a community-based cross-sectional study conducted in Ilorin South Local Government Areas (LGAs) in Kwara State, Nigeria, between January and July 2022. This LGA has a projected population of 248,759 (2018 census) (14). The study population comprised women aged ≥ 15 years living permanently within Ilorin South LGA, which constitutes 22% of the total population in this LGA.

Included in the study were non-pregnant women, irrespective of their parity experience, those who were not on medication for urinary symptoms, and women who resided in Ilorin South LGA. Pregnant women, women in the puerperium, and those who were too ill to participate in the study were excluded. We also excluded those who refused to participate in the study. The STROBE Checklist was used to review this manuscript.

Sample size determination

The projected population of Ilorin South LGA is 248,759 (2006 census), of which women aged 15 years and above are 54,727 (18). Fisher's formula was used to determine the minimum sample size, where the population is greater than 10,000, as shown below:

$$n = \frac{z^2 pq}{d^2}$$

Where:

n = The desired sample size (when the population is greater than 10,000)

z = The standard normal deviation, usually set at 1.96, corresponds to the 95% confidence level.

p = the proportion of women with urinary incontinence using an estimated prevalence rate of 30.6% (11).

$q = 1.0 - p$

d = degree of accuracy, set at 0.05 for this study

Therefore:

$n = (1.96)^2 (0.306) (0.694) / (0.05)$

$= 326.33$

The minimum sample size for this study was 362 (assuming a 10% attrition rate).

Sampling techniques

A multistage sampling technique was employed in the selection of the respondents. Proportional allocation was used to distribute the sample size across the selected wards and communities.

Stage 1: Selection of Wards: Five out of the eleven wards in Ilorin South LGA were selected by simple random sampling using balloting without re-

placement. The wards set were Akanbi IV, Akanbi III, Akanbi V, Balogun Fulani I, and II.

Stage 2: Communities: Simple random sampling using the balloting method was used to select two communities each from the five wards earlier chosen to make ten communities. The communities selected were Ago-Aiyekale, Tanke-Akata, Agbabiaka, Oke-Ogun, Ogidi, Kulende, Erubu Asunara, Makana, Idiagbon, and Gbodofu.

Stage 3: Selection of Houses: A systematic sampling technique was used to select the required houses in each community. Every fourth house in each district was selected (or balloted when more than one) until the sampling frame was exhausted.

Stage 4: Selection of subjects: One eligible woman in each house was interviewed. When the respondent refused, the next eligible woman was interviewed. An eligible woman was selected by simple random sampling by balloting in households with more than one.

Data collection

A pre-test of the questionnaire was conducted in Ilorin East Local Government using 10% of the study sample. Necessary amendments were made before administering the questionnaire to the study participants. Data were collected by trained research assistants using the International Consultation on Incontinence Modular Questionnaire-Urgency Incontinence Short Form (ICIQ-UI Short Form) (2). It is a validated, interviewer-administered semi-structured questionnaire that assesses the presence or absence of any form of involuntary loss of urine within the last four weeks prior to the study. The questionnaire gathered information on the socio-demographics and obstetric characteristics of the respondents, along with more specific questions related to the prevalence, pattern, and risk factors for urinary incontinence. The severity of urinary incontinence was measured using the Sandvik Severity Index (15). This severity index was created by multiplying the reported frequency (four levels) by

Appendix I. *Questions used to assess the degree of urinary incontinence in women*

(1)	How often do you experience urinary leakage? 1 Less than once a month 2 One or several times a month 3 One or several times a week 4 Every day or night
(2)	How much urine do you lose each time? 1 Drop or little 2 More

The severity index is created by multiplying the results of questions (1) and (2): 1 2 = slight three 4 = moderate 6-8 = severe

the amount of leakage (two levels) (Appendix 1). The resulting index value (1-8) was further categorized into slight (1-2), moderate (3-4), and severe (6-8). Typically, slight incontinence denotes leakage of drops a few times a month, moderate incontinence daily leakage of drops, and severe incontinence, larger amounts at least once a week.

Data analysis

The data were sorted manually, edited (cleaned), and responses were checked for errors and completeness before they were coded. Data were analyzed statistically using the SPSS 20.0 statistical package. Descriptive analysis was used to determine the socio-demographic characteristics of the respondents and the prevalence and pattern of urinary incontinence among the study population. Descriptive analysis, as well as Pearson's Chi-squared test, was used with a p-value of 0.05. Multivariable logistic regression was used to identify factors that increased the odds of urinary incontinence.

Ethical considerations

Ethical approval was obtained from the ethical review committee of the Kwara State Ministry of Health. All participants were fully informed about the study and reserved the right to voluntarily withdraw for whatever reason at any stage of the study without penalty. Written informed consent was obtained from eligible participants. Written assent was obtained from eligible participants below the age of 18 years, while written consent was obtained from either their guardians or parents. Information collected was kept confidential, and respondents' names were not requested in the questionnaires.

RESULTS

Four hundred eligible participants were recruited for the study. Most respondents were between the ages of 31 and 60 (63.8%). The mean age of the respondents was 47.9 ± 4.5 years. The majority of the respondents were married (72%). Among the respondents, 116 (29%) were traders and full-time housewives, while 105 (26.3%) were in other occupations. The respondents were mainly Muslims (60.5%). About one-third of the respondents, 136 (34%), had tertiary education, while 29.7% were secondary school leavers, as shown in Table 1.

The study population's mean body mass index (BMI) was 30.4 ± 2.7. The prevalence rate of urinary incontinence was 52.7%. Over three-quarters of the participants, 318 (79.5%), had experienced at least

Table 1. *Socio-demographic characteristics of respondents*

Characteristics	Frequency (n= 400)	Percentage (%)
Age Groups		
15-30	84	(21.0)
31-45	135	(33.8)
46-60	120	(30.0)
> 60	61	(15.2)
Mean ± SD	47.9 (± 4.5)	
Marital Status		
Single	52	(13.0)
Married	288	(72.0)
Divorced	31	(7.7)
Widowed	29	(7.3)
Occupation		
Housewife	105	(26.3)
Trader	116	(29.0)
Artisan	13	(3.2)
Students	63	(15.8)
Civil servant	81	(20.2)
Professional	22	(5.5)
Religion		
Islam	242	(60.5)
Christianity	157	(39.3)
Traditional	1	(0.2)
Level of Education		
No formal Education	55	(13.8)
Primary	55	(13.8)
Secondary	119	(29.7)
Tertiary	136	(34.0)
Islamic	35	(8.7)

Table 2. *Obstetric and medical-related characteristics of respondents*

Variables	Frequency (n = 400)	Percentage (%)
Parity		
0–2	82	(20.5)
3–4	118	(29.5)
≥ 5	200	(50.0)
Mean (± SD)	4.3 (± 1.2)	
Place of birth		
PHC	35	(8.8)
SHC	81	(20.2)
THC	87	(21.8)
Private Hospitals	151	(37.8)
TBAs Centers	24	(6.0)
Home	22	(5.4)
Patient's BMI (Kg/M²)		
< 19.5	41	(12.2)
19.5-24.9	80	(20.0)
25.0-29.9	55	(13.8)
≥ 30.0	224	(56.0)
Mean (± SD)	30.4 (± 2.7)	
Episiotomy		
Yes	189	(47.3)
No	211	(52.7)
Presence of U.I.		
Yes	211	(52.7)
No	189	(47.3)

*PHC = Primary Health Care, SHC = Secondary Health Care, THC = Tertiary Health Care, TBAs = Traditional Birth Attendants

Pattern of UI (n=211)

Figure 1. Pattern of urinary incontinence among the study population

three parous experiences, while 189 (47.2%) had episiotomies or perineal lacerations during their previous vaginal deliveries, as shown in Table 2.
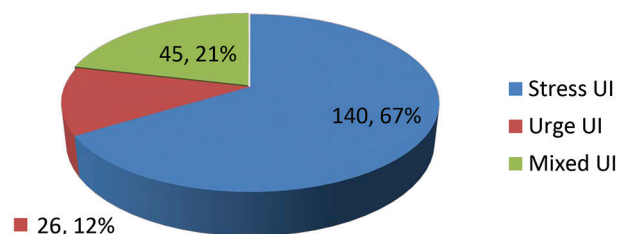
Among the 211 respondents with urinary incontinence, about 140 (67.0%) leaked urine when coughing, sneezing, laughing, or during physical activities or when feeling pressure on the bladder (stress urinary incontinence). In comparison, 26 (12.0%) respondents experienced leakage or loss of urine with the urge to urinate (urge urinary incontinence). The mixed type of urinary incontinence accounted for 45 (21.0%) respondents, as shown in Figure 1.

Table 3 shows that more than half of the respondents, 111 (52.6%), had lived with urinary incontinence for at least six years. The majority of the women with urinary incontinence, 156 (73.9%), only leaked a few drops of urine, while only 16 (7.4%) experienced leakage both day and night. Using the Sandvik severity index scoring, 22.1% of the respondents reported severe symptoms. Even though 122 (57.8%) had some concern about the impact of urinary incontinence, on-

ly 85 (40.3%) consulted medical personnel about the condition.

Table 4 demonstrates a significant relationship between high parity and the occurrence of urinary incontinence (X^2 = 10.291, p = 0.006, AOR = 3.0, CI 1.9-3.3). There is also a significant association between obesity and the occurrence of urinary incontinence (X^2 = 21.602, p < 0.001, AOR = 5.0, CI = 2.4-5.1). Women with four or more parous experiences are three times more likely to develop urinary incontinence than those with lower parity (X^2 = 10.291, p = 0.006, AOR = 3.0, CI = 1.9 – 3.3).

DISCUSSION

In our sample, 52.7% of participants had urinary incontinence. This figure is within the range of findings seen in other research, which vary from 16.2% to 81.9% (8, 19-22). Our study reveals a higher prevalence than that reported by Hunskaar et al. (17), who conducted a comprehensive analysis of urinary incontinence rates among European women. In Spain, the prevalence was 23%; in Germany, 41%; in the United Kingdom, 42%; and in France, it was 44% (20). Compared to a comprehensive evaluation of research conducted on women in Sub-Saharan Africa, which

Table 3. Quantity, severity, and Impac10 of incontinence among the respondents

Variables	Frequency (n = 211)	Percentage (%)
Quantity		
Drops or little	156	73.9
More	55	26.1
Frequency		
Less than once a month	88	41.9
Once or more per month	76	36.0
Once or more per week	31	14.7
Every day and night	16	7.4
Severity Index		
Slight	95	45.2
Moderate	69	32.7
Severe	47	22.1
Duration of U.I. (in years)		
0-5	100	47.4
6-10	95	45.2
> 10	16	7.4
Impact of UI		
No problem	89	42.4
A minor nuisance	40	18.9
Some bother	35	16.6
Much bothered	31	14.7
A significant problem	16	7.4
I consulted a doctor on U.I.		
Yes	85	40.3
No	126	59.7

Table 4. Association between urinary incontinence and selected characteristics of the respondents

Variables	Urinary Incontinence		Statistical Indices		OR	95% CI
	Yes (n = 211)%	No (n = 189)%	X^2	P values		
Patient Age						
15-30	12 (25)	62 (75)	89.15	P < 0.001	4.1	3.90 - 5.40
31-45	60 (44.4)	75 (55.6)				
46-60	86 (71.7)	34 (28.3)				
> 60	53 (86.9)	08 (13.1)				
Occupation						
Unemployed	50 (47.6)	55 (52.4)	8.645	P = 0.124	1.45	0.7 -3.6
Trader	66 (56.9)	50 (43.1)				
Artisan	05 (38.5)	08 (61.5)				
Students	33 (52.4)	30 (47.6)				
Civil servants	40 (47.1)	45 (52.9)				
Professionals	17 (77.3)	05 (22.7)				
Level of Education						
No formal education	27 (49.1)	28 (50.9)	1.801	1.717	1.0	0.95 – 1.34
Primary	28 (50.9)	27 (49.1)				
Secondary	57 (48.3)	62 (51.7)				
Tertiary	76 (55.9)	60 (44.1)				
Islamic education	23 (51.1)	22 (48.9)				
Parity						
0-2	30 (37.0)	51 (63.0)	10.291	P = 0.006	3.0	1.9 – 3.3
3-4	70 (64.8)	38 (35.2)				
≥ 5	111 (52.6)	100 (47.4)				
BMI (KG/M²)						
< 19.5	10 (24.4)	31 (75.6)	21.602	P < 0.001	5.0	2.4 – 5.1
19.5 – 24.9	35 (43.8)	45 (56.2)				
25.0 – 29.9	30 (54.5)	25 (45.5)				
≤ 30.0	136 (60.7)	88 (39.3)				

*OR = Adjusted Odd Ratio

indicated a frequency between 0.6% and 42.1%, our study's prevalence is significantly greater (22). In contrast, Aly et al. reported an even higher prevalence—80%—among the Egyptians they studied (23). Our study reveals one of the highest prevalence rates ever recorded in Nigeria (12, 24, 25, 26). The reasons for this discrepancy are not known; however, the differences in age groups, diagnostic criteria for urinary incontinence, survey formats, and data collection strategies might all contribute to the variability in prevalence rates (26).

Two-thirds of the women in our study who experienced urinary incontinence were diagnosed with stress urinary incontinence. This finding is consistent with the results of previous surveys (24, 25, 26). However, this finding contradicts research conducted by Akinlusi et al. among women in Lagos State, Nigeria, who found urge incontinence to be the most prevalent type (11). This discrepancy may be attributed to a higher rate of urinary tract infections in their Lagos sample group.

Our research showed that obesity and having more than four previous pregnancies were significant risk factors for urinary incontinence, regardless of the method of delivery. In our logistic regression analysis, these factors also served as predictors of urinary incontinence incidence. These findings corroborate previous research that established a link between obesity, advanced age, high parity, and urinary incontinence (2, 41, 24). Ojengbede et al. discovered that various factors, including age, number of children, location, birth style, and a history of diabetes, were significantly associated with urge incontinence; however, only location remained significant in the logistic model (23). Similar results have been found in research conducted in other parts of the world (25, 26, 27). Epidemiological research indicates that overweight and obesity are major risk factors for urinary incontinence (14, 25, 26, 27). Surgical and less invasive weight loss methods can be effective treatments for urinary incontinence and should be considered a first-line therapy for overweight or obese women suffering from this condition (25, 26, 27). Song and his associates (26) emphasized that damage to the pelvic floor muscles and structures during childbirth may result in stress urinary incontinence.

Age above 45 years is another strong predictor of urinary incontinence in our study. This finding aligns with previous studies where aging, especially menopausal age, was established as a significant risk factor for urinary incontinence (21-25). Muscle atrophy, weaker contractions, and altered hormonal stimulation are all consequences of aging and being overweight. Injury to the muscles, connective tissue, and nerves of the pelvic floor is common during pregnancy and childbirth.

Despite over half of our study population exhibiting varying patterns of urinary incontinence, only 40.3% sought medical attention for this condition. In the study by Liang et al., only 24% of patients visited a physician for urinary incontinence, 38% in the survey by Rashidi et al., 27% in the study by Li et al., and 27.7% according to Akinlusi et al. (11, 26, 27, 28). The exact reasons for this behavior among our study participants are not known. However, literature suggests several factors, including hope for symptom recovery, shyness, hesitance to discuss the problem with a physician, fear of surgery, the assumption that it is a natural consequence of childbirth and aging, and a lack of knowledge about available treatments (11, 30).

Study Limitations

The findings from this study should be interpreted in light of the following limitations. First, being a cross-sectional study, a causal relationship cannot be established between the occurrence of urinary incontinence and various risk factors. Additionally, the small sample size may limit the generalizability of the study's findings. A more robust multi-center survey on this subject will be needed.

CONCLUSON

The findings of this study suggest that urinary incontinence is highly prevalent among our study population, and that age, parity, and obesity are associated with its occurrence. The prevalence of urinary incontinence can potentially be decreased by addressing modifiable risk factors and enhancing treatment-seeking behavior. Given the high prevalence of urinary incontinence among women in this study, health officials need to prioritize treatment and rehabilitation efforts and consider diagnostic procedures for affected individuals.

Abbreviations

UI – Urinary Incontinence
ICIQ-UFS – International Consultation on Incontinence Modular Questionnaire-Urgency Frequency Scale
BMI – Body Mass Index
LGA – Local Government Area
ICIQ-UI - International Consultation on Incontinence Modular Questionnaire-Urinary Incontinence Short Form

Conflict of Interests: The authors declare no conflicts of interest related to this article.

Availability of Data and Materials

Sažetak

PREVALENCIJA, OBRASCI I FAKTORI RIZIKA ZA URINARNU INKONTINENCIJU KOD ŽENA U SREDINI SA OGRANIČENIM RESURSIMA

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Uvod: Urinarna inkontinencija (UI) je česta, ali nedovoljno prijavljena pojava među ženama u sredinama sa ograničenim resursima. Potrebno je istražiti prevalenciju i obrasce UI, kao i povezane faktore rizika, kako bi se informisale o odgovarajućim zdravstvenim intervencijama. Ova studija je istražila prevalenciju, obrasce i factore rizika za UI među ženama u sredini sa ograničenim resursima.

Metode: Ova studija preseka sprovedena je među 400 žena starijih od 15 godina u opštini Južni Ilorin, država Kwara, Nigerija. Upitnik koji je vodio intervjuer korišćen je za prikupljanje podataka o socio-demografskim i zdravstvenim aspektima UI. Prevalencija UI utvrđena je korišćenjem Međunarodnog upitnika o inkontinenciji (ICIQ-UFS). Analiza je rađena pomoću SPSS verzije 20.

Rezultati: Prosečna starost ispitanica bila je 47,9 (± 4,5), a 200 (50,0%) su bile višerotke. Prevalencija UI među ženama u našem istraživačkom uzorku iznosila je 52,7%. Najčešći oblik UI bile su stresna inkontinencija, 140 (67%), zatim mešovita inkontinencija sa 45 (21%) i urgentna inkontinencija sa 26 (12%). Starost (p < 0,001), paritet (p = 0,006) i BMI (p < 0,001) bili su značajno povezani sa UI.

Zaključak: Rezultati ove studije sugerišu da je UI visoko prisutna među našom istraživačkom populacijom i da su starost, paritet i BMI povezani sa pojavom UI. Postoji potreba za intervencijama koje se fokusiraju na prevenciju i upravljanje UI među ženama u sredinama sa ograničenim resursima.

Ključne reči: Prevalencija, obrazac, faktori rizika, urinarna inkontinencija, žene.

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