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Factors Associated with Types of Urinary Incontinence Among Moroccan Women: An Analytical Study

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Abstract

Background: Urinary Incontinence (UI) is a common yet underreported condition that significantly affects women's quality of life, especially in low- and middle-income countries. Despite its prevalence, limited data are available on the specific factors associated with different types of UI in Morocco.

Objective: To identify the clinical, gynecological-obstetric, and sociodemographic factors associated with different types of urinary incontinence among Moroccan women.

Methods: A cross-sectional study was conducted in 2021 at the Hassan II University Hospital in Fez Morocco. Adult women presenting with urinary leakage were recruited during routine consultations in the gynecology and urology departments. Data were collected via face-to-face interviews using a structured questionnaire covering sociodemographic, clinical, and obstetric history. UI types were classified as stress (SUI), Urgency (UUI), or Mixed (MUI). Statistical analyses included univariate tests (Chi-square, ANOVA), with a significance threshold set at $p<0.05$.

Results: A total of 104 women participated, with a mean age predominantly between 51 and 80 years. Mixed UI was the most common type (37.5%), followed by urgency (31.7%) and stress UI (30.8%). MUI was significantly associated with older age, menopause, multiparity, frequent and long-standing symptoms, and greater severity ($p<0.001$). SUI was more common among younger, non-menopausal women with fewer childbirths.

Conclusion: Mixed UI is the predominant form of urinary incontinence among Moroccan women in this hospital-based population and is linked to advanced age, menopause, and obstetric history. These findings underscore the need for individualized approaches in UI management and public health strategies tailored to local contexts.

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Introduction

Many women experience complications related to pregnancy and childbirth that persist beyond six weeks postpartum. Available data indicate that the most commonly reported conditions include dyspareunia (35%), lower back pain (32%), urinary incontinence (8% to 31%), anxiety (9% to 24%), anal incontinence (19%), depression (11% to 17%), tokophobia (6% to 15%), perineal pain (11%), and secondary infertility (11%) [1].

UI is a prevalent yet underrecognized health issue that affects millions of women globally [1]**.** It is defined by the International Continence Society (ICS) as the involuntary loss of urine, which represents a hygienic or social problem and can significantly impair quality of life [2]. This standardized definition promotes a precise understanding and systematic classification of urinary incontinence, thereby providing an essential foundation for its diagnosis, treatment, and effective management [2].

The global prevalence of UI among adult women is estimated to range between 10% and 58.4%, with rates varying according to age, geographic region, and the definition used [3]. In Morocco, the prevalence of UI is estimated at 32.8% [4]. Despite its high prevalence and impact on daily life, UI is still stigmatized, causing many women to remain silent and not seek medical assistance [5,6].

The higher prevalence of urinary incontinence in women can be attributed to several factors: the shorter length of the urethra, the anatomical structure of the pelvic floor, pregnancy and childbirth, as well as hormonal changes throughout the female life cycle [7].

There are three main types of urinary incontinence in women: stress urinary incontinence (SUI), Urge Urinary Incontinence (UUI), and Mixed Urinary Incontinence (MUI). SUI is characterized by urine leakage during activities that increase intra-abdominal pressure, such as coughing, laughing, or physical exertion. UUI involves a sudden and intense urge to urinate, often associated with overactive bladder syndrome. MUI combines symptoms of both stress and urge incontinence [6]. In Morocco mixed urinary incontinence is the most common type, accounting for over 64% of cases, followed by urgency incontinence at about 19%, and stress incontinence representing 16% of cases [4].

Several risk factors have been associated with the occurrence of urinary incontinence, including sociodemographic characteristics such as age, gynecological and obstetric events or procedures, obesity, history of childbirth, menopause, pelvic surgery, chronic diseases such as diabetes or neurological disorders, and daily habits like smoking, high caffeine intake, low physical activity, or, conversely, excessive physical exercise [7]. However, few studies, especially in low- and middle-income countries, have focused on the specific factors associated with each type of urinary incontinence [8], although these differ in terms of pathophysiology, prognosis, and treatment response [9].

Understanding the distribution and underlying determinants of the different types of urinary incontinence is of critical importance. Each type is characterized by distinct pathophysiological mechanisms, specific risk profiles, and varying responses to treatment. Identifying the contributing factors for each subtype is essential to ensure accurate diagnosis and to enable personalized and effective patient management [10-12].

From a public health perspective, understanding epidemiological patterns and modifiable risk factors, such as parity, obesity, diabetes, or chronic cough, enables the development of targeted prevention strategies, the optimization of health resource allocation, and the formulation of policies tailored to specific contexts. This is particularly relevant in low- and middle-income countries such as Morocco, where epidemiological data remain scarce [11].

Moreover, a better understanding of these determinants helps to break the silence and reduce the stigma surrounding urinary incontinence. By highlighting its medical and social significance, it may encourage women to seek care and strengthen the capacity of healthcare professionals to respond appropriately to their needs [10].

In Morocco, data on urinary incontinence among women remain limited, and few studies have explored the clinical and sociodemographic factors associated with the different types of UI. Given cultural barriers, generating local data that reflect women's actual needs is essential. The objective of this study was therefore to identify and analyze the factors associated with the different types of urinary incontinence among women in Morocco. This research seeks to enhance understanding of the specific profiles and determinants of UI types, contributing to more targeted prevention, diagnosis, and care in Morocco.

Materials and methods

Study design and population

A cross-sectional study was conducted in 2021 at the diagnostic center of the Hassan II University Hospital in Fez, Morocco. The study targeted adult women aged 18 years and older with urinary incontinence. Participants were selected using a consecutive sampling method during routine outpatient visits.

To ensure the validity of the collected data and the reliability of responses, several exclusion criteria were applied. Women were excluded if they refused to participate, were unable to complete the questionnaire due to cognitive or communication difficulties, were pregnant at the time of the survey, or had a recent urinary tract infection (within the past month). These criteria aimed to minimize potential bias and to ensure that the study population represented women with non-transient urinary incontinence symptoms.

Data collection

Data were collected through a structured and pre-tested questionnaire administered during face-to-face interviews with each participant. The questionnaire was designed to capture a comprehensive set of variables, including: Sociodemographic characteristics: age, marital status, level of education, occupation, and place of residence (urban or rural). Gynecological and obstetric history: number of pregnancies, number of vaginal deliveries, cesarean sections, history of episiotomy, and instrumental deliveries. And Clinical characteristics: Body Mass Index (BMI), menopausal status, type of urinary incontinence, frequency and duration of urine leakage, importance of leaks, and the severity of UI.

Urinary incontinence was defined as any involuntary leakage of urine reported by the participant at the time of the survey, regardless of the volume or frequency of the episodes [13]. Based on patients' descriptions, urinary incontinence was classified into three main types: Stress Urinary Incontinence (SUI), Urgency Urinary Incontinence (UUI), and Mixed Urinary Incontinence (MUI).

The severity of urinary incontinence was assessed using the Sandvik severity index [14], which combines the frequency and volume of urine loss into a score ranging from 1 to 6, with higher scores indicating greater severity. This index categorizes the severity into three levels: leger (score 1–2), moderate (score 3–4), and severe (score 5–6).

Data analysis

Incomplete questionnaires were excluded from the final analysis to ensure the reliability and validity of the data. All data entry and preliminary cleaning were conducted at the Laboratory of Epidemiology, Clinical Research, and Community Health, affiliated with the Faculty of Medicine, Pharmacy and dentistry of Fez Morocco. Initial data entry was performed using Microsoft Excel 2010.

Quantitative variables were summarized using means and standard deviations, while qualitative variables were described as frequencies and percentages. Univariate analyses were performed to explore associations between various independent factors and the different types of urinary incontinence. The Chi-square test was used for comparisons involving categorical variables, and one-way analysis of variance (ANOVA) was applied for comparing means across groups.

All statistical analyses were performed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). A p-value of less than 0.05 was considered statistically significant.

Ethical considerations

The study protocol received prior approval from the Ethics Committee of the Hassan II University Hospital of Fez, along with official authorization from the Moroccan Ministry of Health. All participants were informed about the objectives and procedures of the study, and their voluntary, written, and informed consent was obtained before participation. To uphold participant dignity and ensure confidentiality, interviews were conducted in a private, quiet setting within the hospital. Each interview was carried out by a trained investigator, without the presence of any third party, to protect the privacy and comfort of the participants, especially given the sensitive nature of the topic. All collected data were kept strictly confidential and used solely for research purposes.

Results

Sociodemographic characteristics (Table 1)

The study population consisted 104 women, with a predominance of participants aged between 51 and 80 years (63.1%). Most were married (69.2%) and illiterate (34.6%). Regarding geographic distribution, 75.5% lived in urban areas. The majority of women had no paid employment: 69.9% was identified as housewives, while only 18.4% had a salaried job. Other categories were marginal, including students (1.9%), unemployed women (4.9%), and retirees (4.9%).

Gynecological and obstetric history (Table 2)

Obstetric history showed a high frequency of multiparity: 52% of the women had five or more pregnancies, and 41% had at least five vaginal deliveries. Multiple cesarean sections (≥2) were rare (7.1%), as were repeated episiotomies (≥5: 5.6%) and instrumental deliveries (≥2: 4.7%).

Clinical characteristics of the patients (Table 3)

Clinically, 46% of the women were overweight, and 27.6% were obese. Most (60%) were postmenopausal. Mixed urinary incontinence was the most common type (37.5%), followed by urge (31.7%) and stress UI (30.8%). The majority of leaks were of small volume (87.5%), but 35.6% of women had a severe form of UI. More than half (55.3%) reported suffering from UI for over a year, and 10.6% reported urinating more than 10 times per day.

Factors associated with the type of urinary incontinence (Table 4)

Age:

The type of urinary incontinence varies significantly with age group. Women aged 25 to 50 years predominantly affected by stress incontinence (55.3%), whereas those aged 51 to 80 years are more often affected by mixed incontinence (50.8%), with P-value less than 0.001.

Number of pregnancies:

Women with fewer than five pregnancies are more likely to have stress incontinence (47.9%), while mixed incontinence is predominant among those with five or more pregnancies (55.8%), with P-value less than 0.001.

Number of vaginal deliveries:

A similar trend is observed with the number of vaginal deliveries: stress incontinence is more common among women with fewer than five vaginal deliveries (40.7%), whereas mixed incontinence becomes largely predominant (58.5%) among those with five or more vaginal deliveries, with P-value of 0.002.

Menopause:

Menopause is strongly associated with the type of urinary incontinence. Among menopausal women, mixed incontinence is the most common form (57.9%), in contrast to non-menopausal women, among whom stress incontinence is predominant (78.6%), with P-value less than 0.001.

Frequency of urinary leakage:

Patients with less frequent leakage episodes predominantly suffer from urge incontinence (40%), while those with more frequent leaks (at least once per week) are more likely to suffer from stress (43.6%) or mixed incontinence (38.5%), with P-value of 0.031.

Duration of urinary incontinence:

Stress incontinence is more frequent in patients whose symptoms have lasted for less than one year (45.7%), whereas mixed incontinence is more prevalent in those with symptoms lasting one year or more (43.9%), with P-value of 0.017.

Severity of incontinence:

Finally, symptom severity strongly influences the type of incontinence. Stress incontinence is predominant in mild to moderate cases (46.3%), whereas mixed incontinence accounts for the majority of severe cases (62.2%), with P-value less than 0.001.

Table 1: Socio-demographic characteristics.

Variable	Number	Percentage %
Number of Pregnancies		
<5	48	48%
≥5	52	52%
Number of Vaginal Deliveries		
<5	59	59%
≥5	41	41%
Number of C-section		
<2	92	92.90%
≥2	7	7.10%
Number of Episiotomy		
<5	85	94.40%
≥5	5	5.60%
Number of Instrumental delivery		
<2	82	95.30%
≥2	4	4.70%

Table 2: Patients' gynecological and obstetrical history.

Variable	Number	Percentage%
Age groups		
25-50	38	36.9
51-80	65	63.1
Gender		
Men	0	0%
Women	104	100%
Marital status		
Married	72	69.20%
Single	3	2.90%
Divorced	8	7.70%
Widower	21	20.20%
Study level		
Illiterate	36	34.60%
Koranic	7	6.70%
Primary	26	25%
Secondary	22	21.20%
Superior	13	12.50%
Profession		
Student	2	1.90%
Housewives	72	69.90%
Unemployed	5	4.90%
Retirees	5	4.90%
Employed	19	18.40%
Residence		
Rural	25	24.50%
Urban	77	75.50%

Discussion

This study aimed to identify the factors associated with different types of Urinary Incontinence (UI) among Moroccan women. The results show that Mixed Urinary Incontinence (MUI) was the most common type in our population (37.5%), followed by Urge Urinary Incontinence (UUI) (31.7%) and Stress Urinary Incontinence (SUI) (30.8%). These proportions indicate a frequent coexistence of multiple mechanisms, which is particularly important for guiding diagnosis and management. These results are consistent with findings observed in other contexts. For example, in a study conducted in Peru, MUI was

Table 3: Clinical characteristics.

Variable	Number	Percentage %
BMI		
Underweight	2	2.3%
Normal	21	24.1%
Obesity	24	27.6%
Overweight	40	46%
Ménopause		
Yes	57	60%
No	38	40%
Type of UI		
Stress	32	30.8%
Urge	33	31.7%
Mixed	39	37.5%
Leak frequency		
Less than once, once or more per month	65	62.5%
Once or more per week	39	37.5%
Importance of leaks		
A small volume	91	87.5%
A big volume	13	12.5%
Severity of UI		
Leger-Moderate	67	64.4%
severe	37	35.6%
Duration of UI		
<1 an	46	44.7%
≥1an	57	55.3%
Frequency of daily urination		
≤10 per day	93	89.4%
>10 per day	11	10.6%

Table 4: Factors associated with type of IU: Univariate analysis.

Variable	Type of UI			P-value
	Stress	Urgency	Mixed	
Age groups				
25-50	55.30%	31.60%	13.20%	<0.001
51-80	16.90%	32.30%	50.80%	
Number of Pregnancies				
<5	47.90%	31.30%	20.80%	<0.001
≥5	15.40%	28.80%	55.80%	
Number of Vaginal deliveries				
<5	40.70%	33.90%	25.40%	0.002
≥5	17.10%	24.40%	58.50%	
Menopause				
Yes	10.50%	31.60%	57.90%	<0.001
No	78.60%	37.90%	13.20%	
Leak frequency				
Less than once, once or more per month	23.10%	40%	36.90%	0.031
Once or more per week	43.60%	17.90%	38.50%	
Duration of UI				
<1	45.70%	23.90%	30.40%	0.017
≥1	19.30%	36.80%	43.90%	
Severity of UI				
Leger-Moderate	46.30%	29.90%	23.90%	<0.001
severe	2.70%	35.10%	62.20%	

the most common type, followed by SUI and then UUI [15]. Another study in Egypt confirmed that MUI was the most frequent type, followed by SUI, and finally UUI [16]. Moreover, several sociodemographic, gynecological-obstetric, and clinical factors showed a significant association with the type of incontinence, including age, number of pregnancies, number of vaginal deliveries, menopausal status, frequency of urine leakage, severity of UI, and duration of symptoms.

Influence of age and menopause

In our study, age was a determining factor, with a higher prevalence (50.8%) of Mixed Urinary Incontinence (MUI) among women aged 51 to 80 years, whereas the most frequent type (55.3%) among younger women was Stress Urinary Incontinence (SUI). Similarly, MUI was the most common type among postmenopausal women (57.9%) compared to non-menopausal women (13.2%). This finding is consistent with the review by Arthi Kozhumam et al. on UI in sub-Saharan Africa, which highlights that the physiological aging of the pelvic floor, combined with menopause, increases the risk of mixed and severe forms of incontinence [11]. Likewise, Walaa W. Aly et al. demonstrated in elderly and frail women in Egypt a positive correlation between age, menopause, and worsening of urinary symptoms [16]. In contrast, the study by Peyrat et al. [17], conducted exclusively among young premenopausal women, does not take the menopause factor into account. This highlights a significant difference in risk profiles: in younger women, Stress Urinary Incontinence (SUI) tends to predominate, often related to isolated obstetric trauma (episiotomies, instrumental deliveries). On the other hand, in our older, multiparous population, MUI is more frequent, likely reflecting a multifactorial and cumulative evolution of perineal damage, worsened by menopause.

These observations confirm that age and menopause act as aggravating factors, promoting the transition from isolated UI to a more complex and harder-to-treat mixed form.

Obstetric factors: Multiparity and vaginal deliveries

In our study, obstetric factors appear to be major determinants of the type of urinary incontinence. In particular, a high number of pregnancies (≥5) and vaginal deliveries (≥5) was significantly associated with an overrepresentation of Mixed Urinary Incontinence (MUI). This link likely reflects the cumulative effect of perineal trauma and pelvic floor alterations occurring over successive pregnancies. Similarly, the study by Peyrat et al. [17], although focused on a younger population, highlighted the impact of obstetric events on the development of Stress Urinary Incontinence (SUI). The authors reported that vaginal deliveries, especially those involving instrumental maneuvers or episiotomy, significantly increased the risk of SUI in young women. However, in that study, multiparity was not as prominent, likely because the sample mostly included younger women with fewer pregnancies. A study conducted in Peru showed a higher frequency of Mixed Urinary Incontinence (MUI) in women who had vaginal deliveries (30.6%) [18]. Urinary incontinence is significantly more common among multiparous women, and its symptoms may persist beyond the postpartum period [19,20]. Therefore, it is essential for healthcare professionals to consider parity as a major risk factor during the clinical assessment and management of UI, particularly during the prenatal and postnatal phases, in order to implement early prevention and intervention strategies [18].

Severity, duration and leaks frequency

Our results show that Mixed Urinary Incontinence (MUI) is often associated with more severe and long-standing forms (≥1 year) of UI, compared to Stress Urinary Incontinence (SUI) or Urgency Urinary Incontinence (UUI). In contrast, the most frequent type in mild to moderate cases with recent onset of symptoms was SUI. Additionally, the frequency of urinary leakage varies significantly depending on the type of UI. Women with SUI report more frequent leaks, while those with UUI generally experience less frequent leakage. Our findings are consistent with a study conducted in China on 611 women, which revealed that MUI is associated with greater symptom severity than UUI or SUI. Patients with MUI experienced more frequent weekly leaks and a greater impact on daily life, particularly in physical activities, mobility, and social relationships [21]. However, another study reported that women with stress incontinence are the most affected by severe forms, with more than 30 episodes per month [22].

Clinical implications

These results support an individualized assessment of each patient in order to tailor treatment based on the type of Urinary Incontinence (UI), its severity, obstetric history, and hormonal status. International guidelines, such as those from the International Continence Society, encourage this differentiated approach, emphasizing the need to distinguish between the different types of UI to provide appropriate interventions, whether pelvic floor rehabilitation, behavioral therapies, pharmacological treatments, or, in some cases, surgical procedures. This approach is all the more important in contexts like Morocco, where cultural norms still limit the expression of uro-gynecological complaints [23].

Study limitations

Some limitations must nonetheless be acknowledged. The cross-sectional design prevents the establishment of causal relationships. Additionally, self-reported data may be subject to recall bias or underreporting. Finally, the sample is hospital-based, which limits the generalizability of the results to the entire Moroccan female population. Further studies, particularly longitudinal ones, would be helpful to better understand the evolving trajectories of the different types of UI and to refine therapeutic strategies.

Conclusion

This study highlights a high prevalence of mixed urinary incontinence among Moroccan women consulting in a hospital setting, underlining the complexity of the underlying mechanisms. The results show that factors such as advanced age, menopause, multiparity, vaginal deliveries, the severity and duration of symptoms are significantly associated with this type of incontinence. In contrast, stress urinary incontinence is more frequent among younger, non-menopausal women with fewer childbirths. These findings reinforce the need for a differentiated and personalized approach in the prevention, screening, and management of urinary incontinence in Moroccan women. They also call for awareness and training initiatives for healthcare personnel in order to break the taboos surrounding this health issue, which is still too often ignored or minimized.

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