



# Prevalence Of Urinary Incontinence Among Postmenopausal Women

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**Abstract:**

**Background:**

**Purpose:** To investigate the prevalence of urinary incontinence (UI) among postmenopausal women.

**Methods:** Five hundred postmenopausal women were selected from different hospitals and healthcare providers in Cairo and Giza. Their ages ranged from 55 to 65, and their body mass index (BMI) was less than 30 Kg/m<sup>2</sup>. They answered the urinary incontinence questionnaire (UIQ).

**Results:** The prevalence of UI in this study was (57.8%). The results of the prevalence of stress urinary incontinence (SUI) in this study was (40%), urge urinary incontinence (UUI) in this study was (30%), and mixed urinary incontinence (MUI) in this study was (30%). There was a significant increase in the prevalence of UI in subjects with mixed types of deliveries (vaginal deliveries and cesarean sections) compared with other types. There was a significant increase in the prevalence of UI in subjects with 4-10 vaginal deliveries (VD) compared with that of 0- 3 VD. There was no significant difference in the prevalence of UI between subjects with normal weight and subjects with overweight.

**Conclusion:** Therefore, it could be concluded that a higher prevalence of UI was found.

**Keywords:** Prevalence, Urinary incontinence, post menopause

## 1. Introduction

Urinary incontinence (UI) is a public health concern worldwide that affects thousands of women and has a significant socio-economic impact. It may also affect the quality of life or contribute to depression or isolation (1). The latest research conducted shows that 50 percent of postmenopausal women have UI, and this percentage is growing from year to year (2).

Although the occurrence of UI is quite widespread, it continues to be under-identified and inadequately managed. It has been observed that approximately 50% of women might not disclose their incontinence issues to their healthcare

professionals. This could be attributed to embarrassment or the misconception that UI is a typical aspect of the aging process (1). Therefore, studying the prevalence of UI and understanding the various factors contributing to this issue is crucial.

Multiple contributing factors can predispose to the occurrence of UI. Identifying and understanding these distinct factors can help develop targeted strategies to prevent or manage UI cases (3) (4).

Several factors were proposed for the occurrence of UI, such as the number of pregnancies and childbirths, especially vaginal deliveries, induced with oxytocin. However, cesarean deliveries are proposed to be better in terms of UI incidence. A

fetus's weight reaches 4 kg is also considered a factor (5).

Age emerges as a crucial determinant as most individuals experiencing UI (regardless of gender) within the studied population are advanced in age (6). UI has a higher prevalence among older females. Over a ten-year period, the accumulative UI incidence in postmenopausal women was 37.2% (7).

Various studies have established that estrogen and progesterone receptors are distributed throughout the lower urinary tract in females. Numerous tissues associated with female continence have been identified as estrogen-sensitive. Estrogen receptors have been located in supportive structures of the pubocervical fascia, the uterosacral ligaments, and the levator ani muscles. Additionally, in the epithelial tissues of the bladder, urethra, trigone, and vaginal mucosa (8).

Some research study writers classify patients into three major groups, distinguishing between SUI, UUI, and MUI. SUI refers to the unintentional urine release as a result of increased abdominal pressure, as observed during physical activities or coughing. The primary causative factors involve a weakened urethral closure mechanism and a loss of anatomical urethral support. UUI is characterized by an abrupt, compelling urge to void. When women experiencing incontinence also exhibit coexisting stress and urgency symptoms, which are collectively referred to as MUI (6) (9).

Furthermore, obesity is another major factor, especially abdominal obesity. As previous studies indicated, obese women have a significantly higher chance, approximately four to five times greater, of experiencing urinary incontinence in comparison to women with healthy body weights. Infections of the urinary tract, recurrent constipation, diabetic neuropathy, medicines such as diuretics, anti-hypertensives, and anxiolytic drugs are among other factors; that can influence the incidence of UI; that are also overlooked or inappropriately handled (10).

An additional factor involves chronic respiratory disorders, particularly those caused by chronic coughs that induce an elevation in the intra-abdominal pressure (5). To our knowledge, this is the first study investigating the prevalence of urinary incontinence in Egyptian postmenopausal women and investigating the relation between urinary incontinence and type of delivery, number of vaginal deliveries as well as BMI.

## 2. Patients and Methods

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#### 2.1. Study Design

The study was designed as a cross-sectional study. It was conducted under the purview of the Ethical Committee, designated with the identifier P.T.REC/012/002718, which operates within the Faculty of Physical Therapy at Cairo University. The study's protocol was elucidated for each patient, and informed consent was obtained before participation. All study participants were provided with a comprehensive understanding of the research objectives. They were made aware of their prerogative to withdraw from the study at any given moment. Data confidentiality was guaranteed throughout the study period, which extended from May 2020 to March 2021.

#### 2.2. Participants

This study was conducted on five hundred postmenopausal women selected from different hospitals and healthcare providers in Cairo and Giza. The study participants were selected through interviews with women. Subsequently, they underwent an evaluation based on the established criteria for eligibility. Their age ranged from 55 to 65 years old, their BMI ranged from 18.5 to less than 30 kg/m<sup>2</sup>, and their last menstruation was at least 12 months ago. In this research, subjects were excluded if they had experienced pelvic surgery, had a history of hormonal medications, or had intrinsic pelvic or uterine pathologies, urinary tract infections, or any bladder pathology or systemic disease, for example, hypertension or diabetes mellitus.

The demographic information of the female participants was gathered, including age, weight, height, and Body Mass Index (BMI). Also, the parity, mode of deliveries, and the number of vaginal deliveries were recorded.

#### 2.3. Materials:

**2.3.1. The Urinary incontinence questionnaire (UIQ)** was used to measure urinary leakage problems for all participants. It has acceptable psychometric characteristics and can be used as a valid outcome measure (11).

#### 2.4. Procedures:

##### 2.4.1. Evaluation procedures:

A comprehensive medical background was obtained from each participant before initiating the study.

##### 2.4.1.1- Body mass index:

To determine the Body Mass Index (BMI), the participant's weight and height were measured, employing the formula  $BMI = \text{weight}/\text{height}^2$  (in kilograms per square meter).

##### 2.4.1.2- The UIQ:

It was used to measure urinary leakage problems. It consisted of twenty-one questions about urinary

functions. The rating scale structure is individual for each item. It is a reliable and precise outcome measure for urinary leakage problems (11).

### Data analysis

In the presented study, descriptive statistics, such as mean, standard deviation, frequencies, percentages, and confidence intervals, were employed to illustrate the demographic and measured data of the participants. Quantitative variables (age and BMI) were summarized using mean and standard deviation. In contrast, categorical variables (weight status, type of delivery, and number of vaginal deliveries) were represented through frequencies and percentages. Chi-square statistics and logistic regression were utilized to examine the relationship between UI and risk factors. The statistical significance threshold was set at  $p < 0.05$ . All statistical analyses were conducted using the Statistical Package for Social Studies (SPSS) version 25 for Windows.

## 3. Results

### 3.1. Subjects' characteristics

Five Hundred postmenopausal women aged 55 to 65 years participated in this study. Their mean  $\pm$  SD age was  $59.54 \pm 3.28$  years, within the age range of 55 to 65. The research sample exhibited a mean body mass index (BMI) of  $24.65 \pm 2.87$  kg/m<sup>2</sup>, demonstrating a minimum BMI of 18.5 kg/m<sup>2</sup> and a maximum of 29.4 kg/m<sup>2</sup>. (Table 1)

### 3.2. Prevalence of UI among participants

289 (57.8%) subjects suffered from UI. Out of them, 30% had urge incontinence, 40% had stress incontinence, and 30% mixed. The prevalence of UI in this study was 57.8%, with a 95% CI of 53.42-62.05%. The prevalence of urge incontinence was 17.4%, with a 95% CI of 14.32-20.96%. The prevalence of stress incontinence was 23.2%, with a 95% CI of 19.71-27.1%. The prevalence of mixed incontinence was 17.2%, with a 95% CI of 14.14-20.75%. (Table 2)

### 3.3. Association between UI and subject characteristics (Different types of deliveries):

There was a significant increase in UI prevalence in women who had both vaginal and CS deliveries compared to those who had each type of delivery alone ( $p = 0.0001$ ). There was a significant increase in the UI prevalence in women who had 4-10 vaginal deliveries compared to those who had 0-3 vaginal deliveries ( $p = 0.02$ ). There was no significant difference between women with normal and women with overweight in the prevalence of UI ( $p = 0.48$ ). (Table 3)

### 3.4. Prediction of UI in the participants

To identify the variables that predict urinary incontinence among the participating postmenopausal women, a binary logistic regression analysis was conducted. Univariate analysis showed that BMI did not have a significant association with UI. The number of vaginal deliveries and type of delivery were associated with UI.

UI-related variables were integrated into a multivariate logistic regression analysis to identify the significant predictors for UI. Individuals who have experienced 4 to 10 vaginal births displayed a 1.57-fold increased likelihood of encountering urinary incontinence (UI) compared to those who had 0 to 3 vaginal deliveries (Odds Ratio = 1.57, 95% CI 1.06-2.32,  $p = 0.02$ ). Subjects with both VD & CS had a 2.4-fold increased likelihood of encountering urinary incontinence (UI) compared to those without delivery (Odds Ratio = 2.4, 95% CI = 0.37-15.26,  $p = 0.35$ ). (Table 4).

**Table 1. Participants' characteristics**

	N	%
<b>Weight status</b>		
Normal (18 to 24.9 kg/m <sup>2</sup> )	235	47%
Overweight (25 to 29.9 kg/m <sup>2</sup> )	265	53%
<b>Type of delivery</b>		
Vaginal delivery	329	66%
CS	60	12%
Mixed (vaginal & CS)	106	21%
None	5	1%
<b>Number of vaginal deliveries</b>		
No vaginal delivery	65	13%
1-3 Vaginal delivery	277	55.4%
4-10 Vaginal delivery	158	31.6%

**Table 2. Prevalence of UI of the study group.**

Type of UI	Prevalence of UI	95% CI
UI	289 (57.8%)	53.42- 62.05%
UUI	87 (17.4%)	14.32-20.96%
SUI	116 (23.2%)	19.71-27.1%
MUI	86 (17.2%)	14.14-20.75%

CI, Confidence interval

**Table 3. The frequency distribution of UI and association between UI and risk factors.**

General characteristics	Presence of UI		$\chi^2$ value	P value
	Yes	No		
<b>Weight status</b>				
Normal (18 to 24.9 kg/m <sup>2</sup> )	132 (56.2%)	103 (43.8%)	0.48	0.48
Overweight (25 to 29.9 kg/m <sup>2</sup> )	157 (59.2%)	108 (40.8%)		
<b>Type of delivery</b>				
Vaginal delivery	173 (52.6%)	156 (47.4%)	24.71	0.001
CS	30 (50%)	30 (50%)		
Mixed (vaginal & CS)	83 (78.3%)	23 (21.7%)		
None	3 (60%)	2 (40%)		
<b>Number of vaginal deliveries</b>				
1-3 Vaginal delivery	186 (54.4%)	156 (45.6%)	5.17	0.02
4-10 vaginal deliveries	103 (65.2%)	55 (34.8%)		

$\chi^2$ , Chi-squared value; p-value, Probability value

**Table 4. Predictors of UI among participants.**

Variables	Univariate analysis			Multivariate analysis		
	Odds ratio	95% CI	p-value	Odds ratio	95% CI	p-value
<b>BMI</b>	<b>0.98</b>	0.92-1.05	<b>0.71</b>			
<b>Number of vaginal deliveries</b>	1.57	1.06-2.32	0.02	1.84	1.2-2.8	0.005
<b>Type of delivery</b>			0.001			0.0001
<b>None</b>						
<b>Vaginal delivery</b>	0.73	0.12-4.48	0.74	0.64	0.1-3.95	0.63
<b>CS</b>	0.66	0.1-4.28	0.66	0.75	0.11-4.91	0.77
<b>Both (vaginal &amp; CS)</b>	2.4	0.37-15.26	0.35	2.29	0.35-14.72	0.38

CI, Confidence interval; p-value, Probability value

#### 4. Discussion

Urinary incontinence, a widespread issue, significantly impacts the well-being and quality of life of numerous females globally. This condition holds substantial economic implications for healthcare systems (12). This research sought to

determine the prevalence of UI among Egyptian postmenopausal women. The study found that the overall prevalence of UI was 57.8%. Furthermore, the prevalence of SUI was 23.2%, UUI was 17.4%, and MUI was 17.2%. In comparison, Senturk and Kara (3) reported a UI prevalence of 45.6% in Turkey and the prevalent type was mixed urinary incontinence, accounting for 68.4% of cases. Also, Sakondhavat et al. (13) documented a UI prevalence of 38.86% among Khonkaen women with the most common type being MUI with a prevalence of 80.02% of the cases, SUI was (12.36%), and UUI was 5.62%. However, Kirss et al. (14) found a UI prevalence of 18.12% in postmenopausal Estonian women with SUI was diagnosed in 78.83% (95% CI: 73.32 - 84.33), while Urge or mixed incontinence occurred in 21.17% (95% CI: 15.67 - 26.68). Additionally, Townsend et al. (10) reported a 14% UI prevalence in Mexican women. These findings highlight the varying prevalence of UI types and underscore the importance of tailored management strategies for affected individuals.

Our study demonstrated that subjects with mixed delivery types (vaginal and cesarean) experienced a significantly higher prevalence of UI compared to each type individually. Pregnancy itself is identified as a risk factor for postpartum UI, irrespective of labor and delivery method (15, 16). This increased UI prevalence can be attributed to factors associated with both vaginal and cesarean deliveries. During vaginal delivery, the pelvic floor muscles and surrounding tissues may be stretched and damaged, leading to weakened support for pelvic organs, which can contribute to stress urinary incontinence (17). Moreover, the surgical incision in a cesarean section may pose a risk for incontinence due to surgical trauma, potentially damaging the pelvic floor's muscles, nerves, or tissues essential for bladder control. Additionally, scar tissue formation and postoperative complications, such as infections or other unforeseen issues, can indirectly impact bladder control (18). Therefore, women with mixed delivery experiences may have an elevated risk of UI due to the combined effects of physical stress on the pelvic floor and urinary system during both vaginal and cesarean deliveries.

Our study findings indicate a significant increase in the prevalence of urinary incontinence (UI) among subjects with 4-10 vaginal deliveries (VD) (65.2%) compared to those with 0-3 VD (54.4%). These results align with Deshmukh et al.'s research, which also demonstrated a significant association between UI and parity, specifically highlighting that parity  $\geq 3$  raises the risk by 64% (4). Furthermore, corroborating evidence from previous

studies involving women, Singh et al. in Indian women (19), Senturk and Kara's study in postmenopausal women residing in Turkey (3), and Islam et al. in Bangladeshi women (20), as well as Townsend et al. in postmenopausal Mexican women, supports this finding (10). This may be due to the increased likelihood of recurring stretching and damaging the pelvic floor muscles. Schreiber Pedersen et al. (17) also supported this, stating that with age and VD, the risk of UI has increased significantly.

The prevalence of UI had no significant difference in subjects with a BMI of 30 kg/m<sup>2</sup>, a poor correlation between UI and BMI. While Deshmukh et al. (4) stated that having a BMI of 25-29 kg/m<sup>2</sup> appeared to increase the risk of UI. Additionally, Townsend et al. found that women with a BMI  $\geq$ 30 have a higher risk of UI compared to those with a BMI <22 kg/m<sup>2</sup> (10). The discrepancy might be because they compared obese individuals with normal weight, while we focused on comparing normal weight with overweight individuals.

## 5. Conclusion

It can be concluded that a higher prevalence of UI was found in Egyptian postmenopausal women. Moreover, the UI prevalence increases with the increasing number of vaginal deliveries. Furthermore, there is no significant difference between normal and overweight status in the prevalence of UI.

## Conflict of Interests

The authors have no conflict of interest, financial interest, or benefit from this research.

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## Abbreviations:

**UI:** Urinary incontinence, **UIQ:** Urinary incontinence questionnaire, **BMI:** body mass index, **SUI:** Stress urinary incontinence, **UUI:** Urge urinary incontinence, **MUI:** Mixed urinary incontinence, **VD:** Vaginal delivery, **CS:** cesarean section.

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