Original Article

Risk Factors and Impact of Urinary Incontinence among Menopausal Women in Sulaimani City: A Cross-Sectional Study

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Abstract

Background: Urinary incontinence (UI) significantly affects the quality of life (QOL) in menopausal women. **Objectives:** to evaluate UI prevalence and risk factors impact among menopausal women in Sulaimani City. **Materials and Methods:** A cross-sectional design enrolled 200 menopausal women (45–65 years) via purposive sampling. Data on socio-demographic, reproductive, and medical factors were collected through validated questionnaires. Chi-square tests and Pearson's correlation analyzed associations between variables and UI severity. **Results:** The most prevalent severity of UI among women was moderate, observed in 101 (50.5%) menopausal women. This was followed by severe incontinence in 52 (16%) women, and mild incontinence in 47 (25.5%) women. There was a direct and significant relationship between age, change in employment status, social status, parity, and the number of vaginal deliveries with the types, degree, and duration of UI ($P \leq 0.001$). Conversely, there was a negative and significant relationship between increased age at marriage, increased time since hysterectomy, diabetes mellitus, urinary tract infections (UTI), and genital prolapse with the type, severity, and duration of incontinence ($P \leq 0.005$). **Conclusion:** As age increased, menopausal women experienced an increase in the type, severity, and duration of incontinence. However, with increased age at marriage, longer time since hysterectomy, diabetes mellitus, UTI, and genital prolapse, the type, severity, and duration of incontinence decreased.

Keyword: Estrogen, Pelvic Floor, Quality of Life.

Introduction

Menopause, defined as the permanent cessation of menstruation resulting from the loss of ovarian follicular activity, typically occurs between the ages of 45 and 55 years. This natural biological transition is marked by a significant decline in estrogen levels, which has profound implications for pelvic floor integrity and urogenital health.[1] Among the myriad challenges faced by menopausal women, urinary incontinence (UI) emerges as a prevalent yet under-addressed condition, with far-reaching consequences for quality of life (QOL).[2] Studies indicates that prevalence rates may vary from 25% to over 50% among this group, highlighting the need for enhanced awareness and comprehension of the problem.[3] Urinary incontinence (UI) is the involuntary expulsion of urine, leading to a lack of control over urination.[4] The etiology of UI in menopausal women is multifactorial, encompassing demographic, reproductive, and clinical variables. Advanced age is a well-established risk factor, with studies demonstrating a direct proportional relationship between age and UI incidence. [5] This illness is not just a result of aging but is exacerbated by endocrine alterations linked to menopause. Estrogen is essential for

preserving the health and structural integrity of urogenital tissues, such as the urinary bladder, urethra, and pelvic floor muscles.[2] With the reduction in estrogen levels, these tissues may undergo atrophy and lose elasticity, resulting in decreased pelvic support for the bladder. This can lead to stress incontinence (leakage during physical activity) and urge incontinence (sudden urgency followed by leakage). [2] Obesity, is another critical determinant, as increased intra-abdominal pressure exacerbates stress incont-inence. [6] Parity, particularly vaginal delivery, is strongly associated with pelvic floor dysfunction, with each additional childbirth elevating UI risk. [7] The influence of UI during menopause transcends just physical symptoms. A multitude of women express sentiments of humiliation, apprehension, and social seclusion associated with their status. These psychological impacts might result in reduced self-esteem and hesitance to participate in social or physical activities, consequently profoundly impacting their overall well-being and lifestyle.[8] Given the rising prevalence of UI in aging populations and its profound psychosocial consequences, there is an urgent need for localized, evidence-based insights to inform targeted interventions. This study aims to fill critical knowledge gaps by evaluating socio-demographic, reproductive, and medical risk factors among menopausal women in Sulaimani City.

Materials and Methods

Study Design and Participants

This study employed a descriptive cross-sectional design to assess risk factors and the impact of UI among menopausal women in Sulaimani City. The study was conducted at Sulaimani Obstetric Teaching Hospital. Data collection occurred over a 10-week period, from October 15, 2024, to February 1, 2025.

The target population comprised menopausal women aged 45–65 years experiencing UI. Participants were recruited from outpatient clinics and caregiver attendants at the hospital. A total of 200 women meeting the inclusion criteria were enrolled.

Inclusion criteria required participants to be naturally menopausal (cessation of menstruation for ≥12 months), reside in Sulaimani City, and self-report UI symptoms.

Exclusion criteria included women with neurological disorders (e.g., multiple sclerosis), pelvic organ prolapse surgeries within six months, or UI secondary to acute infections or malignancies. A non-probability purposive sampling technique was employed to select participants who met the eligibility criteria. The sample size of 200 was determined based on similar studies, [9] and feasibility considerations, ensuring adequate statistical power to detect associations. Participants were approached consecutively during clinic visits, and informed consent was obtained prior to enrollment.

Data Collection

Data were collected using a structured questionnaire developed through a compre-hensive review of literature and validated tools from prior studies. The instrument comprised four sections: socio-demographic characteristics (age, residential area, educational level, occupation, BMI, and economic status), reproductive history (age at marriage, parity, delivery types, and history of abortions or curettage), medical history (chronic conditions such as diabetes and hypertension, surgical history including hysterectomy, and UI-related factors like genital prolapse), and UI characteristics (types: urge, stress, mixed; severity: mild, moderate, severe; and duration). Trained female researchers administered the questionnaire via face-to-face interviews to

ensure participant comprehension and data accuracy. A pilot test with 20 participants was conducted to refine the tool, leading to minor adjustments that improved readability and clarity prior to full implementation.

Ethical Considerations

Ethical review approval for this study will be obtained from Sulaimani Polytechnic University's ethical committee. This ensures that the research meets the necessary ethical standards and adheres to institutional and regulatory guidelines. Participants provided written informed consent, with assurances of confidentiality and the right to withdraw without penalty.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY). Descriptive statistics (frequencies, percentages, means ± SD) summarized socio-demographic, reproductive, and clinical variables. Chi-square tests assessed associations between categorical variables (e.g., UI types and parity). Pearson's correlation coefficient evaluated relationships between continuous variables and UI severity or duration. Statistical significance was set at $p < 0.05$.

Results

Out of 200 menopausal women, the age group with the highest frequency was 45-50 years 63 (31.5%) and 61-65 years 63 (31.5%). All participants resided in rural areas. The most frequent educational level was secondary school 42 (21%), and the majority were formally employed 95 (47.5%). Regarding social status, 125 (62.5%) were married. BMI categories showed Obese Class I (30–34.99 kg/m²) as the most common at 67 (33.5%). Economically, 106 (53%) had insufficient status, and for smoking, 95 (47.5%) were non-smokers (Table 1).

Table 1: Socio-demographic characteristics in menopausal women

Variable		Frequency	%
Age	45-50	63	31.5
	51-55	30	15.0
	56-60	44	22.0
	61-65	63	31.5
Residential area	Rural	200	100.0
Educational level	Illiterate	6	3.0
	Read and write	20	10.0
	Primary School Graduate	35	17.5
	Intermediate School Graduate	12	6.0
	Secondary School Graduate	42	21.0
	Institute Graduate	53	26.5
	Higher Education Graduate	32	16.0
Occupational status	Formal employment	95	47.5
	Private employment	26	13.0
	Retired	22	11.0
	Housewife	57	28.5
Social status	Married	125	62.5
	Divorced/Separated	16	8.0
	Widow	59	29.5
BMI	Underweight (<18.5 kg/m²)	22	11.0
	Normal range (18.5–24.99 kg/m²)	30	15.0
	Overweight (25–29.99 kg/m²)	43	21.5
	Obese Class I (30–34.99 kg/m²)	67	33.5
	Obese Class II (35–39.99 kg/m²)	38	19.0
Economic status	Sufficient	6	3.0
	Barley sufficient	88	44.0
	Insufficient	106	53.0
Smoking	Non-smoker	95	47.5
	Passive smoker	70	35.0
	Active smoker	35	17.5

The mean age at marriage was 19.97 ± 3.61 years, with the majority 105 (52.5%) marrying between ages 15-19. The mean age of first pregnancy was 22.36 ± 4.09 years, with 81 (40.5%) having their first pregnancy between 16-20 years. Parity analysis showed a mean of 5.26 ± 2.54, with 101 (50.5%) being grand

multiparous. For vaginal deliveries, the mean was 3.77 ± 3.04, with 75 (37.5%) having 1-3 deliveries. Cesarean sections had a mean of 1.15 ± 1.28, with 94 (47%) having none. Instrumental deliveries had a mean of 0.38 ± 0.52, with 64.5% having none. Miscarriages showed a mean of 2.16 ± 1.52, with 90 (45%) having none, while curettage had a mean of 2.38 ± 1.58, with 116 (58%) having no history (Table 2).

Table 2: Reproductive characteristics in menopausal women

Variable		Frequency	%
Age at marriage	15 - 19	105	52.5
	20 - 24	69	34.5
	25 - 29	20	10.0
	≥ 30	6	3.0
	x̄ = 19.97 ± 3.61		
Age at first pregnancy	16-20	81	40.5
	21-25	76	38.0
	26-30	37	18.5
	31-35	6	3.0
	x̄ = 22.36 ± 4.09		
Parity	Nulliparous (no children)	2	1.0
	Primiparous (one child)	4	2.0
	Multiparous (more than one child)	93	46.5
	Grand multiparous (five or more children)	101	50.5
	x̄ =5.26 ± 2.54		
No. of Normal Vaginal delivery	None	36	18.0
	1 - 3	75	37.5
	4 - 6	36	18.0
	7 -10	53	26.5
	x̄ = 3.77 ± 3.04		
No. C/S	None	94	47.0
	1	30	15.0
	2	38	19.0
	3	28	14.0
	4	10	5.0
	x̄ = 1.15 ± 1.28		
No. instrumental (forceps/vacuum).	None	129	64.5
	1	67	33.5
	2	4	2.0
	x̄ =0.38 ± 0.52		
No. of abortion	None	90	45.0
	1 - 3	96	48.0
	4 – 6	12	6.0
	7 -10	2	1.0
	x̄ = 2.16 ± 1.52		
No. of curettage	None	116	58.0
	1 - 3	74	37.0
	4 – 6	6	3.0
	7 -10	4	2.0
	x̄ =2.38 ± 1.58		

Comorbidities among women showed 36 (18%) had a hysterectomy, 42 (21%) had a myomectomy, 64 (32%) had diabetes mellitus, 77 (38.5%) had hypertension, 111 (55.5%) had a UTI, 66 (33%) had a chronic cough, 93 (46.5%) had chronic constipation, 67 (33.5%) had genital prolapse, 170 (85%) had prolonged delivery, and 77 (38.5%) had obstructed delivery (Table 3).

Table 3: Surgical and medical disorders in menopausal women

Variable	Frequency	%
Hysterectomy	36	18.0
Myomectomy	42	21.0
Diabetes Mellitus	64	32.0
Hypertension	77	38.5
UTI	111	55.5
Chronic Cough	66	33.0
Chronic Constipation	93	46.5
Genital prolapse	67	33.5
Prolonged delivery	170	85.0
Obstructed delivery	77	38.5

The study on types of UI among menopausal women revealed that mixed incontinence was the most prevalent, observed in 98 (49%) women. Stress incontinence was present in 62 (31%) women, while 40 (20%) women experienced urge incontinence. The most common severity of UI was moderate, affecting 101 (50.5%) menopausal women, followed by severe

incontinence in 52 (26%) women and mild incontinence in 47 (23.5%) women. The duration of incontinence exceeded 10 years for 87 (43.5%) women, while 76 (38%) women had experienced incontinence for 7-10 years, and 37 (18.5%) women for 5-6 years (Table 4).

Table 4: Types, degree and duration of UI in menopausal women

Variable		Frequency	%
Types of UI	Urge incontinence	40	20.0
	Stress incontinence	62	31.0
	Mixed incontinence	98	49.0
	Total	200	100.0
Degree of UI	Mild	47	23.5
	Moderate	101	50.5
	Severe	52	26.0
Duration of incontinence	5–6 years	37	18.5
	7-10 years	76	38.0
	More than 10 years	87	43.5

Age demonstrated a significant positive correlation with the types (R=0.358, P≤0.001), degree (R=0.626, P≤0.001), and duration (R=0.775, P≤0.001) of UI. Educational level was positively correlated with the types (R=0.193, P≤0.006) and degree (R=0.205, P≤0.002) but inversely with the duration (R=-0.194, P≤0.006). Occupational status showed significant positive relationships with the types (R=0.193, P≤0.006), degree (R=0.205, P≤0.002), and duration (R=0.775, P≤0.001). Social status had significant positive associations with the types (R=0.157, P≤0.026), degree (R=0.246, P≤0.001), and duration (R=0.256, P≤0.002). Economic status showed no significant correlations. Age at marriage (R=-0.211, P≤0.003), age at first pregnancy (R=-0.252, P≤0.001), and obstructed delivery (R=-0.207, P≤0.002) exhibited inverse relationships with some measures. Parity (R=0.340–0.511, P≤0.001) and vaginal deliveries (R=0.287–0.584, P≤0.001) showed strong positive correlations, while hysterectomy (R=-0.283 to -0.429, P≤0.001), diabetes mellitus (R=-0.213 to -0.405, P≤0.001), UTIs (R=-0.204 to -0.338, P≤0.001), and genital prolapse (R=-0.232 to -0.502, P≤0.001) were inversely related to incontinence measures.

Table 5: Correlation coefficient between demographic and Reproductive characteristics & UI variables

Variable	Types of UI		Degree of UI		Duration of incontinence	
	R	Sig. (2-tailed)	R	Sig. (2-tailed)	R	Sig. (2-tailed)
Age	0.358**	<0.001	0.626**	<0.001	0.775**	<0.001
Educational Level	-0.118	0.09	-0.133	0.06	-0.194**	0.006
Occupational status	0.193**	0.006	0.217**	0.002	0.205**	0.002
Social status	0.157*	0.026	0.246*	<0.001	0.256**	<0.001
Economic status	-0.12	0.86	0.117	0.098	0.039	0.58
Age at marriage	-0.211**	0.003	-0.337**	<0.001	-0.311**	<0.001
Age at first pregnancy	-0.252**	<0.001	0.343**	<0.001	-0.313**	<0.001
Parity	0.340**	<0.001	0.511**	<0.001	0.444**	<0.001
No. of vaginal delivery	0.287**	<0.001	0.573**	<0.001	0.584**	<0.001
Hysterectomy	-0.283**	<0.001	-0.429**	<0.001	-0.349**	<0.001
Diabetes mellitus	-0.213**	0.003	-0.405**	<0.001	-0.363**	<0.001
UTI	-0.204**	<0.001	-0.332**	<0.001	-0.338**	<0.001
Genital prolapse	-0.232**	0.001	-0.459**	<0.001	-0.502**	<0.001
Obstructed delivery	-0.107	0.133	-0.119	0.094	-0.207**	0.002

Sig=Significant

**Person's Correlation is significant at the 0.01 level (2-tailed).

* Person's Correlation is significant at the 0.05 level (2-tailed).

Discussion

This study aimed to investigate the prevalence of UI and its associated risk factors among menopausal women. The findings revealed a significant and direct relationship between demographic variables such as age, employment status, and social status with UI variables, including type, severity, and duration. As age increased, or changes in employment and social status occurred, the type, severity, and duration of incontinence also increased. Conversely, the relationship between educational level and the

type, severity, and duration of incontinence was inverse, indicating that higher education levels were associated with a decrease in these variables. Additionally, the reproductive factors of parity and the number of vaginal deliveries were directly and significantly related to the type, severity, and duration of incontinence, with increases in these factors leading to increases in incontinence.

Reproductive characteristics such as age at marriage, hysterectomy, diabetes mellitus, urinary tract infections (UTI), and genital prolapse were inversely related to the type, severity, and duration of incontinence. Higher age at marriage and longer time since hysterectomy, as well as the presence of diabetes, UTI, and genital prolapse, were associated with reduced severity and duration of incontinence. Age at first pregnancy was inversely related to the type and duration of UI, meaning that older age at first pregnancy was associated with a decrease in these aspects, although it was directly related to the severity of incontinence. Moreover, obstructed delivery had an inverse relationship with the duration of incontinence, showing that as the duration of incontinence increased, the incidence decreased.

The present study found that mixed and stress UI were the most prevalent types among menopausal women. This aligns with Kołodyńska et al. [1], who identified mixed and stress incontinence as the most common types among menopausal women, as well as a study in Italy, which showed similar findings for older and menopausal women, indicating that these incontinence types can significantly impact women's QOL. [3]

The severity of incontinence was moderate to severe in most menopausal women, consistent with findings by Suardi et al. [10], and a systematic review and meta-analysis by Karaçam et al. [11], both of which reported moderate to severe incontinence in the majority of cases. The duration of UI was over five years for all women, with most experiencing it for more than seven years. Shabani et al. [12], in Iran found similar results, with incontinence duration exceeding five years in most women, consistent with this study's findings. [13]

The current study demonstrated that with increased age, the type, severity, and duration of incontinence also increased. A review by Allafi et al. [2], confirmed that aging in women is associated with increased UI in type, severity, and duration. Alizadeh et al. [14], also found that older age and menopause are predictive factors for UI, with significant increases in type, severity, and duration as age advances.

Employment status showed a significant relationship with UI among menopausal women, with employment being associated with increased incontinence. Ghaly et al. [15], examined stress UI in relation to employment status among women with chronic cough, revealing that job status can significantly influence the type, severity, and duration of incontinence. In Spain, another study indicated that UI in women is affected by job type and physical activity level, with more physically demanding jobs correlating with increased incontinence.[16]

Social status and marital status were also correlated with UI among menopausal women, with a direct relationship to increased type, severity, and duration. Alharbi et al. [17], found lower UI risk among unmarried women compared to married menopausal women, with marital status directly correlating with increased incontinence. Similarly, Alonezy et al. [18], showed a positive correlation between social status and marital status with UI.

A positive correlation between parity and UI in menopausal women was evident in this study. Seshan et al. [5], confirmed that increased parity correlates with greater type, severity, and duration of incontinence. A study in Pakistan, also supported this finding, showing a positive relationship between parity and UI. [19] Increasing the number of vaginal deliveries was associated with heightened UI among menopausal women. Wei et al. [20], demonstrated that vaginal delivery increases UI, and Mahmoud et al. [21], showed that more frequent vaginal deliveries lead to increased incontinence in menopausal women. The present study indicated an inverse relationship between age at marriage and UI, with older age at marriage associated with reduced incontinence. Studies in Turkey [22] and Taiwan [23] also found that age at marriage is an important factor in UI among menopausal women, with increased age at marriage correlating with decreased incontinence. While this study showed an inverse relationship between hysterectomy and UI, most other studies have found a direct relationship, with hysterectomy increasing incontinence. [24] The correlation between diabetes and UI among menopausal women was negative, with diabetes associated with decreased incontinence, contrary to other studies showing a positive relationship. [25,26] This study also found a negative correlation between UTIs and UI, while other studies reported a positive link. [27] Despite most research indicating a positive relationship between genital prolapse and UI [28] this study showed a negative correlation, possibly due to differences in sample size and methodology.

Conclusions

The study concluded that with increasing age, changes in employment status, and social status, the type, severity, and duration of UI among menopausal women increased. The relationship between parity and the number of vaginal deliveries with incontinence type, severity, and duration was direct and significant. Conversely, age at marriage, hysterectomy, diabetes mellitus, UTIs, and genital prolapse were inversely related to the type, severity, and duration of incontinence. Increased age at first pregnancy correlated inversely with the type and duration of UI. Furthermore, mixed and stress UI were the most common types among menopausal women.

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