Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(6), 154-161 | ISSN:2251-6727

Urinary Incontinence and Its Risk Factors Among Women Residing at Rural Village Vayalanallur: A Hospital Based Study

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(Received: 27 September 2025 Revised: 05 October 2025 Accepted: 01 November 2025)

KEYWORDS

Urinary incontinence, risk factors, stress urinary incontinence, mixed urinary incontinence, urge urinary incontinence

ABSTRACT:

Introduction: Urinary incontinence (UI) is a widespread condition that is often under reported and has a considerable impact on women's well-being. Causes of incontinence may include weakening pelvic floor muscles, nerve damage, medical issues, and aging. In rural settings, UI can be under reported due to stigma, limited awareness, and healthcare access barriers. Age, obesity, multiparity, menopause, comorbidities, and surgical history are risk contributors.

Objectives: To find out the proportion of rural women having urinary incontinence and its risk factors among women residing in rural village vayalanallur.

Methods: This is an observational, cross-sectional study conducted among 201 participants at Sri Ramachandra Hospital, Vayalanallur. The three types of UI - stress urinary incontinence (SUI), mixed urinary incontinence (MUI), and urge urinary incontinence (UUI) were reported based on self-reported symptoms. For the study, demographic data were collected along with the QUID [questionnaire for urinary incontinence diagnosis]. The obtained data were statistically analysed using chi square test.

Results: In our study, the overall prevalence of UI was 41% in the 201 participants. Of the different types of UI, SUI was the most common (22%), followed by MUI (11%) and UUI (8%). Significant associations were observed with older age ($p = 0.001$), (BMI) body mass index ($p = 0.03$), and postmenopausal women ($p = 0.028$).

Conclusions: UI was significantly correlated with age, BMI, and menopause, with SUI being the predominant type. Awareness programs and early detection may have a positive impact on UI prevention.

1. Introduction

The International Continence Society (ICS) defines urinary incontinence (UI) as the involuntary loss of urine that is clinically observable and constitutes a significant social and hygienic concern [1]. Between 2008 and 2018, the number of women in Asia impacted by UI rose from 250 million to 303 million, with prevalence rates varying between 8% and 40% across different studies worldwide [2]. UI ranging from Moderate to severe impacts 7% of women aged 20-30, rising to 19% for those aged 40-59, reaching 23% for women aged 60-79, and peaking at 32% for those aged 80 and above [3]. In India, the overall prevalence ranges from 5–35% among women and 1-29% in men. UI is not just about the constant discomfort from feeling wet and irritated, but it also has serious emotional impacts.

In elderly people, stress urinary incontinence (SUI) is the most dominant form, with mixed urinary incontinence (MUI) and urge urinary incontinence (UUI) trailing behind. Symptoms include involuntary urine leakage during physical activities like coughing, laughing, or sneezing in cases of SUI, as well as a sudden and intense urge to urinate in cases of UUI. Apart from the mentioned physical symptoms, issues concerning

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JCHR (2025) 15(6), 154-161 | ISSN:2251-6727

psychological impact significantly diminish the quality of life (QOL) for the patients. This condition can lead to feelings of social isolation and even depression, making it more than just a physical issue [4]. Predisposing factors of UI include advancing age, obesity, multi-parity, vaginal deliveries, surgeries like hysterectomy, respiratory problems, smoking, type 2 diabetes mellitus, hypertension. The primary mechanisms underlying the reaction involve inadequate support of the urethra by the pelvic floor muscles and a deficiency in the function of intrinsic sphincter [5]. UUI typically occurs due to involuntary and untimely contraction of detrusor muscles in the bladder wall. A deficiency in oestrogen and collagen leads to reduced elasticity of the pelvic floor, causing atrophic changes and UI [6]. UI often remains untreated as many women are reluctant to consult healthcare professionals or disclose their symptoms, primarily due to its sensitive and socially stigmatized nature [7].

More information, early diagnosis, and access to suitable medical and physiotherapeutic therapies are all necessary to address this expanding health issue. Therefore, understanding the Incidence of UI and identifiable contributing factors will aid in the formulation of health policies designed to enhance the well-being of women affected by UI.

2. Objectives

1. To determine the prevalence of urinary incontinence among rural women residing in Vayalanallur.

2. To identify the major risk factors associated with urinary incontinence.

3. Methods

Site of study: Sri Ramachandra hospital, vayalanallur

Study design: Observational Cross-Sectional study

Sampling method: Convenient sampling

Sample size: 201

With a confidence level of 95% and margin error of 5%, the sample size was computed as 201.

Period of study:

July 2024 to December 2024

Inclusion criteria:

1. Women aged between 40 to 70 years.

2. Women who give consent to participate in this study.

3.Capable to understand and complete the questionnaire.

Exclusion criteria:

1. Pregnant women.

2. Presence of severe cognitive impairment

4. Uterine prolapse

5. Severe urinary tract infection and vaginal infection

Women who visited Sri Ramachandra Hospital, vayalanallur for regular check-ups were included in the study. Informed consent was obtained. The study included all women aged between 40 and 70 years. The study contained 2 sections such as A and B. Section A contained questions to gather the demographic data such as name, age, occupation, education, and possible risk factors such as menstrual history (menarche), menopausal history, marital status, personal habits, obstetric history, co-morbidities, surgical history, weight, height, BMI, and WHR (waist & hip ratio). Section B contained the questionnaire for female urinary incontinence diagnosis (QUID). Following the initial assessment, the subjects were asked to complete a self-reported questionnaire to evaluate UI. The QUID consists of 6 questions, which helps in assessing the types of UI. Which is a valid and reliable tool.

The obtained data were statistically analysed using chi square test.

4. Results

The results were analysed using SPSS-24 software. Descriptive statistics are used to analyse study variables such as age, BMI, comorbidity, surgical history, WHR, menopause, and incontinence status. Among this age ($p = 0.001$), BMI ($p = 0.03$), and menopause ($p = 0.028$) showed a significant association with UI.

This study revealed that almost 41% of women suffer from UI; the most predominant type is SUI affects 22% MUI makes up to 11% while UUI accounts for 8% [FIGURE 1.1].

Urinary incontinence develops and progresses due to several risk factors. Increasing age, a higher BMI,

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JCHR (2025) 15(6), 154-161 | ISSN:2251-6727

underlying comorbidities, surgical history, parity and WHR are a few of these [table 1.4]. These factors can weaken the pelvic floor muscles, impair bladder control, and contribute to the worsening of symptoms over time.

Table [1.1-1.3] presents the chi-square test values, while figures [1.4-1.6] illustrate the graphical representations of age, BMI, and menopause, with UI respectively.

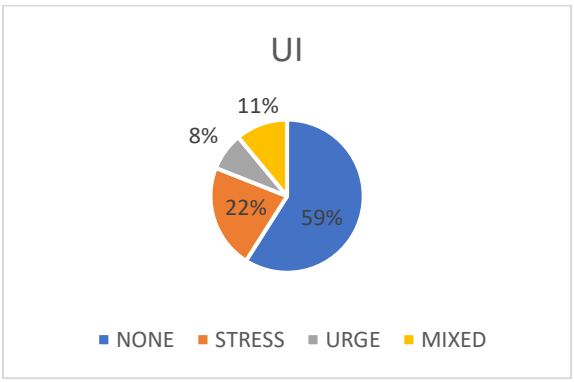

FIGURE 1.1 - Prevalence of types of Incontinence

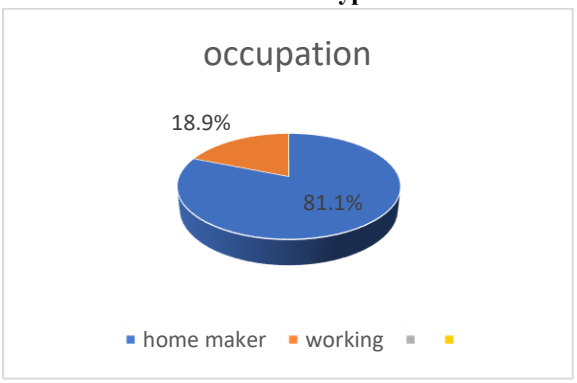

FIGURE 1.2 - Occupation

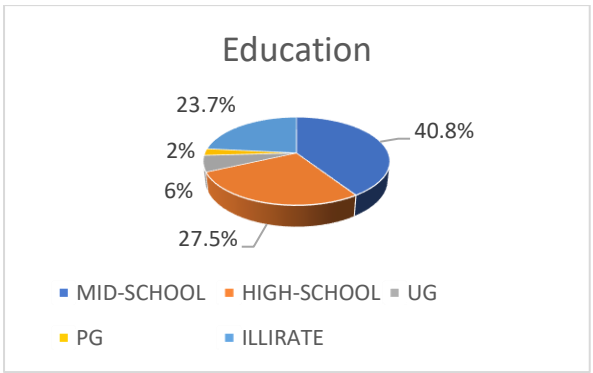

FIGURE 1.3 Educational status

TABLE 1.1 - Age and Urinary Incontinence

AGE	40-50	51-60	61-70	P VALUE
UI+	15(25)	32(40.51)	35(56.45)	0.001
UI-	45(75)	47(59.49)	27(43.55)	

SIGNIFICANT AT *p <0.05, CHISQUARE TEST

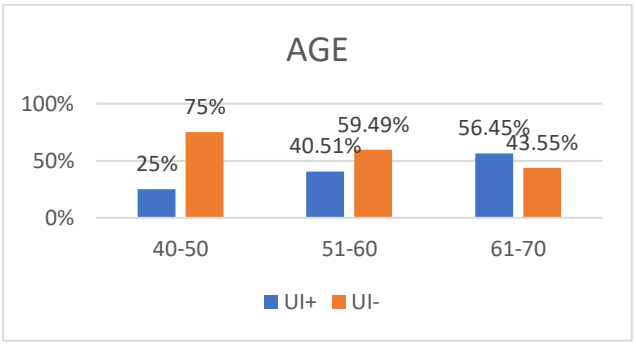

FIGURE 1.4 – Graphical representation of Age and UI

TABLE 1.2 – BMI and Urinary Incontinence

BMI	UNDER	NORMAL	OVERWEIGHT	OBESE	P VALUE
UI+	2(28.57)	20(33.89)	26(33.33)	32(56.14)	0.03
UI-	5(71.42)	39(66.10)	52(66.66)	25(43.85)	

SIGNIFICANT AT *p <0.05, CHISQUARE TEST

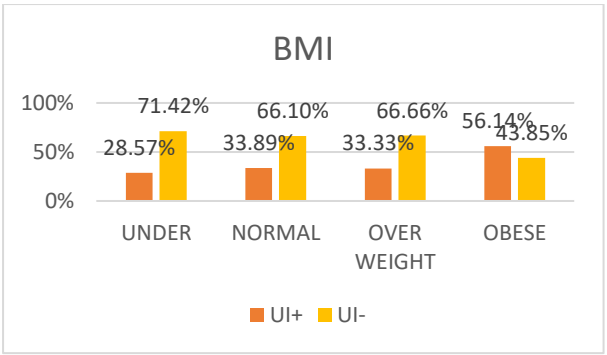

FIGURE 1.5 - Graphical representation of BMI and UI

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JCHR (2025) 15(6), 154-161 | ISSN:2251-6727

TABLE 1.3 – Menopause and Urinary Incontinence

MENOPAUSE	ATTAINED	NOT ATTAINED	P VALUE
UI+	63 (45.98)	19(29.68)	0.028
UI-	74(54.01)	45(70.31)	

SIGNIFICANT AT *p <0.05, CHISQUARE TEST

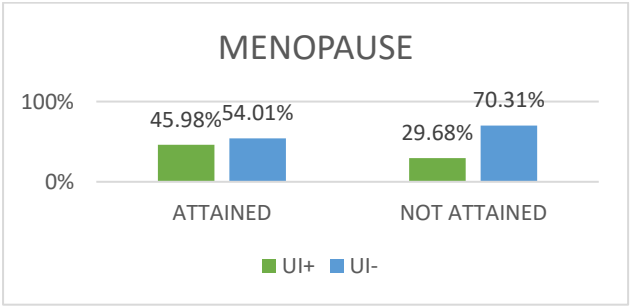

FIGURE 1.6 - Graphical representation of Menopause and UI

TABLE 1.4 – DEMOGRAPHIC ANALYSIS OF INCONTINENCE IN POPULATION

N-201; Variables	SUI%	UUI%	MUI%
AGE n(%)			
40-50 60(29.9)	8(4.0)	3(1.5)	4(2)
51-60 79(39.3)	17(8.5)	6(3.0)	9(4.5)
61-70 62(30.8)	19(9.5)	7(3.5)	9(4.5)
BMI n(%)			
Under [17.5-18.5} 7(3.5)	1(0.5)	0	1(0.5)
Normal [18.6-25] 59(29.4)	11(5.5)	4(2.0)	5(2.5)
Overweight [26-30] 78(38.7)	14(7.0)	5(2.5)	7(3.5)
Obese [30-40] 57(28.4)	18(9.0)	6(3.0)	8(4.0)
MENOPAUSE n(%)			
Attained 137(68.2)	34(16.9)	11(5.5)	18(9.0)
Not attained 64(31.8)	10(5.0)	5(2.5)	4(2.0)
SURGICAL HISTORY n(%)			
Abdominal surgery 60(29.8)	13(6.47)	5(2.48)	6(2.99)
Pelvic surgery 14(7)	3(1.49)	1(0.49)	2(0.99)
Other surgery 43(21.4)	10(4.98)	3(1.49)	5(2.48)
Nil 84(41.8)	18(8.94)	7(3.49)	9(4.48)
WHR n(%)			
<0.85 60(29.8)	14(6.96)	5(2.48)	9(4.48)

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JCHR (2025) 15(6), 154-161 | ISSN:2251-6727

>0.85 141(70.2)	30(14.92)	11(5.47)	13(6.46)
CO-MORBIDITIES n(%)			
DM 111(55.5)	20(9.95)	8(3.98)	14(6.96)
HTN 11(5.5)	1(0.49)	1(0.49)	1(0.49)
DM+HTN 1(0.5)	1(0.49)	0	1(0.49)
OTHERS 16(8)	8(3.98)	3(1.49)	6(2.98)
NONE 62(30.5)	14(6.96)	4(1.99)	0

5. Discussion

41% of women suffer from some kind of urine incontinence; the highly prevalent kind, SUI [22%], MUI [11%], and UUI account for [8%] [fig 1.1].

One of the most disregarded yet growing health issues in the world, especially for women, is UI. Prevalence of UI among the 322 participants was 55.3% (95% CI: 0.50 to 0.60). SUI was the most prevalent category, with MUI coming in second. UI was more common in women in the intermediate age group (33–48 years), according to the adjusted analysis [1].

UI affects over 40% of women aged 70 years and beyond; with prevalence of UI increases with age. As life expectancy rises, the burden of UI is expected to rise accordingly [8]. In similar to that Susan K. Davis et al.2009 reported that UI is common among women, with SUI most prevalent between 25 and 49 years [9]. The Present study also highlights a clear age-related trend, with SUI (9.5%) emerging as the predominant type of UI in older women, particularly in the 61-70 years followed by MUI (4.5%). In line with findings, a study among Jordanian women reported a UI prevalence of 64.1%, with MUI & SUI being the predominant types in women under 60 years [10]. In this study, a statistically significant association was observed between age and UI ($p = 0.001$). The association between UUI is relatively explained by ultrastructural changes in the bladder and altered receptor sensitivity associated with aging. whereas the mechanism underlying age-related SUI remains unclear, they may involve pelvic floor muscle atrophy, denervation from childbirth, hormonal alterations, and other unidentified factors [11].

As stated by Vik Khullar et al., (2015) obesity (BMI ≥30) and overweight (BMI 25-29.9) are linked to an increased risk of UI, with subtypes indicating reasons other than mechanical stress [12]. Notably, the current investigation revealed that 56.14% of individuals classified as obese experienced UI compared to only 28.57% among those who were underweight, indicating a clear upward pattern with increasing BMI. Increased intra-abdominal pressure is considered to be the major pathophysiological link between obesity and UI [13]. Furthermore, SUI emerged as the most prevalent subtype across all BMI categories, particularly among overweight (7%) and obese (9%) individuals, while MUI and UUI were comparatively less frequent. Rising body weight appears to have a stronger association with prevalent and incident SUI, including mixed subtypes compared to UUI. In addition, evidence from interventional studies shows that weight loss, whether surgical or nonsurgical, significantly reduces the symptoms of urine incontinence [14]. In contrast, Debansu Sarkar et al. (2023) found that those with a higher BMI are more likely to experience UUI, as well as anxiety and sadness, compared to those with SUI [15]. Izci et al. (2009) stated that diabetes is correlated with a 2.5-fold increased risk of UI, with diabetic women exhibiting a higher prevalence (41% vs. 22.1%). Age, BMI, and diabetes were found to be distinct risk variables for UI. Nondiabetic women had a higher likelihood of experiencing UUI, but diabetic women were more prone to experience SUI & MUI [16]. In this study as well, patients with diabetes mellitus (DM) have a higher rate of SUI (9.96%) and MUI (6.97%), compared to UUI (3.98%). Keath P et al. (2023) concluded that there was no evident link between having a history of hypertension and UI among both males and females [17]. UI is a frequent complication among female patients with respiratory conditions, including those with chronic cough. Contributing factors include advanced age, severe coughing episodes, a higher

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JCHR (2025) 15(6), 154-161 | ISSN:2251-6727

prevalence of chronic sinusitis and a cough that is easily triggered by physical exertion [18]. The risk of stress UI was found to have a statistically significant association with obstetric events, in contrast to the risk of urgency UI. Furthermore, multiparity was linked to a higher likelihood of both SUI and UUI [19].

Parazzini et al. (2003) reported that across all surgical history groups, constant trend of SUI being the most common form, followed by MUI and UUI. Vaginal birth raised the chance of mixed UI and stress UI but not urge UI. Women with higher BMIs and a history of hysterectomy, UTIs, and perineal injuries are more likely to experience UI [20]. Although participants with a history of abdominal surgery (29.8%) and other surgeries (21.4%) showed slightly higher percentages of UI compared to those with no surgical history (41.8%), but not statistically significant. These findings align with the known physiological impacts of such surgeries on pelvic floor integrity. A cohort study on Northern Finland women found no significant difference in UI incidence or surgeries between hysterectomy and non-hysterectomy groups [21].

Following hysterectomy, 2.2% of women required surgical intervention for stress urinary incontinence (SUI). SUI operations were more than twice as common following vaginal hysterectomy compared to abdominal hysterectomy, while the higher risk was partially attributed to pre-existing pelvic organ prolapse (POP) [22].

UI is a complex condition that extends beyond medical concerns, affecting economic and social well-being. Postmenopausal women are more likely to experience UI compared to other common chronic conditions such as diabetes, hypertension, and depression [23]. Our findings revealed UI in postmenopausal women (45.98%) compared to premenopausal women (29.68%) ($p=0.028$). SUI (16.9%) was observed as the most frequent type among postmenopausal women, followed by MUI (9%). Estrogen maintains urogenital structure and function, and its decline during menopause [typically between 45–55 yrs] leads to atrophy, reduced elasticity, and weakened bladder support. These changes contribute to SUI during exertion and UUI from involuntary bladder contractions often causing psychosocial burden such as embarrassment, anxiety, and reduced social participation. While estrogen deficiency is associated with higher UI prevalence, its effect on specific subtypes such as UUI or SUI remains inconsistent [24]. Conversely, Trutnovsky et al., reported that among 382 women, 62% were postmenopausal, with 76% experiencing SUI and UUI by 72%. Their findings suggest that hormone deficiency post-menopause plays a limited role in UI and menopause age was linked to UUI but not SUI [25]. In middle-aged women, urinary incontinence is linked more to mechanical factors than to menopause [26].

UI symptoms increased with higher waist-to-hip ratio (WHR), but statistically not significant. Hunskaar et al., found that abdominal obesity, assessed using WHR, independently elevated the risk of UI in women [27]. Among individuals with WHR ≤ 0.85, UI prevalence was lower SUI (6.96%), MUI (4.48%), and UUI (2.48%). Similarly, Sarah Hjorth et al., reported that higher BMI and waist circumference were associated with greater likelihood of all UI subtypes, particularly mixed UI (MUI) [28]. In individuals with WHR > 0.85, the prevalence of UI increased notably, with SUI remaining most common (14.92%), followed by MUI (6.46%) and UUI (5.47%). Haohao Sun et al. also identified an association between a higher weight-adjusted waist index (WWI) and UUI, suggesting it may be a stronger risk indicator than BMI or waist circumference alone [29].

Conclusion:

The risk of incontinence is raised with age, BMI and menopause and SUI is found to be the most common kind of UI across all population.

Clinical implication:

- Early detection and diagnosis
- Reduction of stigma
- Policy and resource allocation
- Better Access to Care

Limitation:

- Cultural norms and stigma surrounding women's health may restrict a few participants from discussing their symptoms openly.

Acknowledgement:

We would like to express our sincere gratitude to all the participants who willingly took part in the study.

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JCHR (2025) 15(6), 154-161 | ISSN:2251-6727

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