

Prevalence, Risk Factors, and Statistical Analysis of Urinary Incontinence in a Tertiary Care Hospital in India

☉ Sunil Kumar Salkapuram¹, ☉ Karthikeyan Elumalai², ☉ Helen Williams³, ☉ Srinivasan Sivannan⁴,
☉ Sivaneswari Srinivasan⁵, ☉ Shanmugam Anandakumar⁶

¹Santhiram College of Pharmacy, Department of Pharmacy Practice, Nandyal, India

²Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Department of Pharmaceutical Chemistry, Chennai, India

³Bharath Institute of Higher Training and Research, Faculty of Pharmacy, Chennai, India

⁴Togari Veeramallappa Memorial College of Pharmacy, Department of Pharmacy Practice, Ballari, India

⁵K.K. College of Pharmacy, Department of Pharmaceutics, Gerugambakkam, Chennai, India

⁶Dr. A.L.M. PG Institute of Basic Medical Sciences, University of Madras, Department of Microbiology, Chennai, Tamil Nadu, India

ABSTRACT

Introduction: Urinary incontinence (UI) is a prevalent condition that significantly affects quality of life, particularly in women. This cross-sectional study aimed to investigate the prevalence, types, and associated factors of UI among female patients at a specialized healthcare facility in India.

Methods: The investigation was conducted from November 2022 to April 2023 in the obstetrics and gynecology department, where all female participants aged 18 years and above were queried regarding their UI history. The generalizability of this study may be limited due to the clinic's focus on women seeking specialized gynecological or obstetric care.

Results: The generalizability of this study may be limited due to the clinic's focus on women seeking specialized gynecological or obstetric care. This research may overrepresent health-conscious women or those with severe UI symptoms, potentially biasing results and underrepresenting women with mild to moderate UI or those from disadvantaged populations. Furthermore, tertiary care settings may disproportionately attract patients with complex conditions requiring specialized treatment, influencing the study's outcomes. Disparities in socioeconomic status, health literacy, and awareness regarding UI treatment across various demographic groups can also affect patient selection and consequently impact the study results.

Conclusion: Our research conducted at an Indian tertiary care hospital revealed a significant prevalence of UI among female patients, underscoring the necessity for further investigations into preventive measures and treatment modalities. The psychological implications and social stigma associated with UI highlight the critical need for comprehensive support systems and intervention programs for affected individuals. The findings demonstrated that obstetric risk factors were directly correlated with the incidence of UI, as evidenced by the study outcomes. Healthcare practitioners should advocate for lifestyle modification to mitigate UI.

Keywords: Urinary incontinence, stress incontinence, diabetes, and prevalence rates

Introduction

Urinary incontinence (UI) is a common disease that has a significant impact on patient lives. It can lead to feelings of awkwardness, embarrassment, and low self-esteem in social situations. The stigma associated with discussing incontinence with a medical professional means that many women with the issue do not receive appropriate treatment. It has been estimated that as much as 30% of the population suffers from UI (1). Hospital-based research indicates a high number of unreported cases in the general population. UI is a burden that can be alleviated with a better understanding of the variables that put people at risk of developing the disorder (2). UI has been linked to a number

of different characteristics, including age, parity, mode of delivery, history of hysterectomy, smoking, obesity, diabetes, chronic cough, constipation, drug use, tea consumption, caffeine consumption, alcohol use, and lack of physical activity (3-5). Several forms of urine incontinence have been observed, including stress incontinence, urge incontinence, and mixed incontinence, in which both stress and urge incontinence coexist. Laughing, sobbing, coughing, climbing stairs, lifting heavy objects, bending over, and vigorous exercise are all examples of behaviors that could trigger stress incontinence. Symptoms of urge incontinence include a need to use the toilet more often and an inability to hold urine until you get there (6-9). UI is a



Address for Correspondence: Karthikeyan Elumalai MD, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Department of Pharmaceutical Chemistry, Chennai, India

E-mail: karthikeyane.scop@saveetha.com **ORCID ID:** orcid.org/0000-0002-6259-5332

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common issue among adults, and women are more susceptible. The two most common types of UI in women are stress UI (involuntary leakage with physical activity) and urgency UI (involuntary leakage linked with a sudden, strong need to void). Mixed incontinence is common in women, with increased incidence during pregnancy and postpartum, with stress being more prevalent (10-12).

UI, defined as the involuntary loss of urine, is a prevalent and frequently underreported medical condition. It has been recognized as a significant global public health concern owing to its substantial impact on quality of life, particularly among elderly and female populations (11). In India, the prevalence of UI is high; however, it remains largely neglected in the public health discourse because of social stigma and limited awareness. Research conducted in India has revealed the prevalence and risk factors of UI. A comprehensive community-based study by Aggarwal et al. (13) found that approximately 26.8% of women aged 35 years and older in North India experienced UI. The study also revealed that the incidence of UI increased with age, with more than 40% of women aged 60 years and above experiencing moderate-to-severe forms of the condition. These findings are consistent with global statistics but underscore the necessity for region-specific investigations to elucidate the unique demographic and cultural factors contributing to UI in India. A separate investigation conducted by Kumar et al. (14) revealed that 24.6% of women in a South Indian sample experienced UI. The investigators identified obesity, childbirth trauma, and menopause as major contributing factors to UI onset (14). Notably, the study revealed that only a small proportion of affected women sought medical attention, indicating issues with healthcare access and patient awareness.

Additionally, researchers, conducted a population-based survey in urban regions of Northern India and found that 21.3% of adult females suffer from UI (15). This study categorized UI types, with stress urinary incontinence (SUI) being the most prevalent, affecting 12.5% of the surveyed individuals, followed by urge and mixed incontinence. Researchers, emphasized the significance of lifestyle factors in the development and progression of UI, including insufficient physical activity, tobacco use, and dietary practices, which are particularly relevant to India's urban population. The International Continence Society estimates that 10-20% of Indians experience some form of UI, with higher rates observed in women, especially postmenopausal women (16). These statistics are likely underestimated because of widespread social stigma and hesitancy to seek medical assistance. This issue is further exacerbated in rural regions, where limited healthcare infrastructure contributes to the condition that remains largely unaddressed. Given these findings, UI is evident as a significant yet often overlooked public health issue in India (14). The high prevalence of UI is compounded by social taboos, which prevent many individuals, particularly women, from seeking timely diagnosis and treatment. This reluctance leads to decreased quality of life, increased mental distress, and social isolation. Therefore, it is essential to examine not only the epidemiology of UI but also the cultural and socioeconomic factors influencing help-seeking behaviors in India (13). This study aimed to explain how often, where, and what causes UI in women who visit a tertiary care center for care.

Methods

The study was approved by the Ethics Committee of Santhiram College of Pharmacy (approval number: SCOP/PDV/2022/18, date: 25.10.2022).

From November 2022 to April 2023, a cross-sectional study was conducted at the department of obstetrics and gynecology at a tertiary care hospital. All women aged over 18 years who visited the obstetrics or gynecology outpatient department were interviewed about their history of urine incontinence.

Sample Size and Generalizability

The clinic primarily serves a demographics of women seeking specialized care for gynecological or obstetric issues. Therefore, the sample size may not represent the general population. It is important to consider this limitation when attempting to generalize findings from studies conducted at this clinic.

One significant limitation of this study is that it may include a higher number of women who are more health conscious or have more severe UI symptoms, as they are more inclined to seek specialized treatment in tertiary care facilities. This may introduce bias in the study, potentially leading to underrepresentation of women with mild-to-moderate UI or those from disadvantaged groups, such as low-income individuals or marginalized communities, which could skew the representation of specific groups in the study (17). This study may disproportionately represent patients with complex conditions because tertiary care centers tend to attract cases requiring specialized interventions and advanced medical care, potentially influencing the study outcomes. Furthermore, variations in income levels, disparities in health literacy, and diverse levels of understanding about UI treatment among different demographic groups can influence patient selection at these clinics and subsequently impact the study results (18). Furthermore, the exclusive focus on women attending gynecology and obstetrics clinics excludes individuals who may seek care at primary care or urology clinics, narrowing the study's scope and potentially limiting the diversity of patient perspectives. Additionally, not including male patients in the study overlooked important information about the experiences of men with UI, even though it is common in older men and those with conditions like benign prostatic hyperplasia (BPH), which increase the risk of UI. The inclusion of male patients in this study would offer a more comprehensive perspective on UI across genders, thereby enhancing the generalizability of the findings (19).

SEAPI Staging System Overview

The SEAPI staging system, used by healthcare professionals, is widely recognized in clinical practice as a methodology for assessing and classifying UI. Instability healthcare professionals can use this system to accurately document specific characteristics, such as the type, severity, triggers, and frequency of UI episodes. Moreover, it helps in developing an individualized treatment plan by identifying the root causes of UI and tailoring interventions to address the specific type of UI (20).

Stress (S): The "stress" element pertains to SUI, which is characterized by involuntary urine leakage during activities that increase intra-abdominal pressure (18). This condition manifest during activities

that increase intra-abdominal pressure, such as coughing, sneezing, laughing, heavy lifting, and exercise routines like running or jumping. In this study, individuals exhibiting SUI symptoms, notably prevalent among women with compromised pelvic floor muscles or those who have experienced parturition, were classified under this category. SUI has been extensively documented in the Indian population, particularly among postmenopausal women, due to hormonal alterations and trauma from childbirth affecting pelvic support structures, leading to a higher prevalence in this demographic (21).

Emptying (E): The “emptying” element assesses the bladder capacity for effective evacuation. In some individuals, incontinence may arise from voiding dysfunction, where the bladder fails to empty fully because of obstruction or an underactive detrusor muscle. These conditions contribute to difficulties in bladder emptying due to voiding dysfunction and are commonly observed in males with BPH and females with bladder outlet obstruction (17). This component of the SEAPI system aids in distinguishing between UI caused by filling problems, such as stress or urge incontinence, and issues related to bladder emptying dysfunction. A systematic evaluation was conducted using uroflowmetry and measurements of post-void residual urine (20).

Anatomical (A): Anatomical irregularities that contribute to incontinence are included in this classification. For instance, pelvic organ prolapse (POP), which is prevalent among elderly women, can lead to significant UI. The “anatomic” element in this framework facilitates the identification of structural alterations in pelvic organs that may directly affect continence (21). The study participants underwent a comprehensive evaluation to identify potential factors contributing to UI, focusing on pelvic floor disorders like prolapse or urethral hypermobility through detailed assessments and diagnostic tests. This component is crucial as it plays a vital role in distinguishing between UI caused by functional issues, such as muscle weakness, and those arising from anatomical abnormalities, like POP, guiding appropriate treatment strategies (19).

Protection (P): The “Protection” component encompasses the use of protective devices, such as pads, diapers, and catheters, to address UI. Individuals who required external assistance due to the severity of their symptoms were categorized under the protection category (21). This classification provides valuable insights into the severity of their condition and its significant impact on daily activities. During our investigation, we meticulously recorded the types and frequency of external protection used by the participants, offering valuable insights into how UI affects their quality of life and the social challenges they face due to their condition (17).

Instability (I): The “Instability” element refers to urge incontinence or detrusor overactivity, which is characterized by involuntary bladder contractions that cause an unexpected, strong urge to urinate that is challenging to suppress. Urge incontinence, which is commonly known as overactive bladder, is prevalent among elderly individuals (19). The bladder instability component assesses the presence of bladder instability, often through urodynamic testing.

In our study cohort, subjects who experienced frequent urination, urgency, and nocturia were classified under this category.

Understanding detrusor instability is crucial for developing effective treatment strategies, especially pharmacological interventions like antimuscarinic medications. In our study, we applied the SEAPI staging system to comprehensively evaluate UI in our patient cohort, allowing for a detailed analysis of its various aspects. Our research employed the SEAPI staging system to comprehensively evaluate UI in our patient cohort. Applying this comprehensive five-domain classification to each participant provided a detailed understanding of the different facets of UI, leading to a more accurate characterization of the condition in our study group. Due to the diverse causes and symptoms of UI, including stress incontinence in postmenopausal women and voiding issues in men with prostatic diseases, the SEAPI system offers a thorough classification that extends beyond the typical two-part classification of UI (stress versus urge) (20). Furthermore, the implementation of this staging system ensured a standardized approach to diagnosing and categorizing UI, enabling comparisons among patients and across different studies. This systematic classification helped identify the primary type of incontinence in each patient and played a crucial role in determining appropriate treatment strategies tailored to individual needs (18).

Women answered a questionnaire about their demographics, including age, education, menopausal status, parity, number of home births, obstetric events like prolonged second stages of labor, birth weight, urinary frequency, diurnal as well as nocturnal voids, associated symptoms like burning micturition, and medical history (including hysterectomy, cesarean delivery, incontinence surgery, and activity limitations). Stress, urge, and mixed types of incontinence were identified. Women were diagnosed with stress incontinence if they experienced uncontrollable leakage of urine while laughing, sneezing, or carrying heavy objects. Those who experienced an urgent need to urinate that occurred suddenly were referred to as suffering from “urge symptoms.” Epi Info was used for the data analysis (22). All participants signed an informed consent form before participating in the study. Participants were informed in their native language of the study’s aims and procedures. It was made clear to those surveyed that their refusal to participate in the poll was not reflective of the standard of treatment they received.

Statistical Analysis

The study used IBM SPSS Statistics software to analyze relationships between pre- and post-counseling outcomes. The chi-square test was used to determine significant differences between pre- and post-counseling outcomes. The software provided tools for data analysis and calculating p-values for comparisons, where a p-value <0.05 is considered statistically significant (23).

Results

The majority of respondents were between the ages of 41 and 50. Figure 1 and the survey results indicate that 371 out of 500 women (74.2%) were continent and 129 (25.6%) are incontinent. Stress incontinence (57.3%), urge incontinence (5.4%), and mixed incontinence (3.1%) were the three most prevalent types among the 129 women who were incontinent. Women with incontinence had a mean age of 43 years and a mean

parity of 14.33 Table 1. We also looked into the various risk factors these women were dealing with, such as the fact that 38.7% of them were postmenopausal and that 8.5% of them had diabetes or asthma. The calculated percentage is displayed in Table 2. Incontinence affected 56.5% of women who drank tea regularly. Table 3 summarizes the types of births experienced by incontinent women, with normal vaginal births, abnormal vaginal births, and cesarean sections accounting for 37.9%, and cesarean sections accounting for 28.6%. Patients' symptoms are listed in Table 4. Over the course of the 14-month study, women who were incontinent and had trouble with daily tasks reported having UI with coughing and sneezing (57.3%), UI with urgency (33.3%), UI with coughing and sneezing (14.7%), and other symptoms. Seventy-four people had stress incontinence with urinary leakage during coughing and sneezing, although 37.8% only had minor leakage on occasion, scoring 1 (Table 5). There were 12 cases of mixed incontinence (9.3%) and 43 cases of urge incontinence (33.3%). The incontinence rate was significantly higher among consulters (115/420; 27.3%) than among non-consulters (14/80; 17.5%; $p=3.88$). Of the 129 women, 2.32% had undergone abdominal hysterectomy, 4 (3.1%) had undergone vaginal

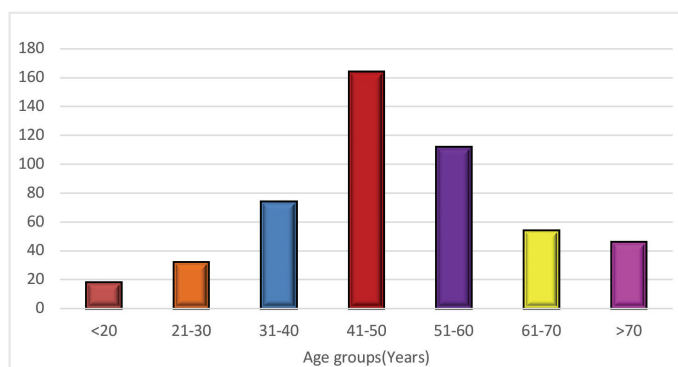


Figure 1. Age-related (years) distribution of urinary incontinence (%)

Table 1. Baseline characteristics of risk factors (n=129)

Risk factor	Range	Mean
Age	19-71	43
Parity	1-12	2.94
Height (cm)	132-176	152
Weight (kg)	43-76	43
BMI	15-29	25.8
Pad weight gain	1-32	4.9
Post-void residue	5-108	21.5

BMI: Body mass index

Table 2. Other risk factors

Risk factor	Consulters, (n=115)	Non-consulters, (n=14)	(n, %)
Diabetes	9	2	11 (8.5%)
Asthma	7	1	8 (6.2%)
Tea	67	6	73 (56.5%)
Tobacco	14	2	16 (12.4%)
Postmenopausal	42	8	50 (38.7%)

hysterectomy, 2 (1.55%) had undergone anterior colporrhaphy, and 4 (3.1%) had undergone posterior colporrhaphy (Table 6). Among those who performed the Valsalva procedure, the average Q-tip angle deviation was 63.40° out of 129 participants. UI is strongly correlated with consultative behavior and certain risk factors. The study found that stress incontinence was more common among women who had given birth vaginally, whereas urge symptoms were more prevalent among women who had undergone hysterectomy. The results suggest that different types of incontinence have different risk factors and require tailored treatment approaches.

Discussion

Healthcare providers should consider a woman's reproductive history and surgical interventions when developing a treatment plan for UI. Differentiating between stress and urge symptoms is crucial because they may have distinct underlying causes (24). Further research could explore the effectiveness of targeted interventions for each type of incontinence, potentially leading to more successful management and improved quality of life for women experiencing these symptoms. Lifestyle factors, such as diet, exercise, and medication, can also play a

Table 3. Mode of delivery

Mode of delivery	Number	%
Normal vaginal delivery		
0	2	1.5
1	11	8.52
2	21	16.2
3	11	8.52
>4	4	3.1
Total	49	37.98
Cesarean section		
1	19	14.7
2	12	9.3
3	6	4.6
Total	37	28.6
Abnormal vaginal delivery		
Prolonged first stage	23	17.8
Prolonged second stage	11	8.52
Instrumental delivery	6	4.6
Birth weight >4 kg	3	2.3
Total	43	33.3

Table 4. Symptoms

Symptoms	Number	%
Urine leakage with cough and sneeze	74	57.3
Urine leakage with urgency	43	33.3
Urine leakage with cough and sneeze	19	14.7
Urgency alone	26	20.1
Urgency with frequency	18	13.9
Burning micturition	14	10.8
Nocturnal frequency	7	5.42

Table 5. Frequency of urinary incontinence

Type	Rarely score 1, (%)	Score 2 (%)	Often score 3 (%)	Most of the time, score 4 (%)	All the time, score of 5 (%)
Stress incontinence	37 (28.6)	28 (21.7)	6 (4.65)	4 (3.1)	0
Urge incontinence	7 (5.4)	12 (9.3)	17 (13.1)	7 (5.4)	0
Mixed incontinence	4 (3.1)	3 (2.3)	2 (1.5)	3 (2.3)	0

Table 6. Statistical test analysis

Test	Calculated t-value	p-value
Unpaired Student's t-test	3.88	<0.00014

crucial role in managing incontinence (25). Certain foods and beverages, like caffeine and alcohol, can exacerbate symptoms, whereas regular physical activity can strengthen pelvic floor muscles and improve bladder control. Psychological aspects of incontinence, such as embarrassment, isolation, and decreased self-esteem, should also be considered (26). Addressing these emotional issues alongside physical interventions can result in a holistic treatment approach. Education and lifestyle modification are essential components of a holistic approach to treating incontinence. Encouraging women to avoid bladder irritants, practice timed voiding, and avoid bladder irritants can also help reduce the frequency and severity of incontinence episodes (27). By addressing the multifaceted nature of incontinence, healthcare professionals can significantly improve women suffering from this condition.

Understanding the causes of stress, incontinence, and urge symptoms in relation to vaginal childbirth and hysterectomy is crucial for effective management and treatment (28). Factors such as weakened pelvic floor muscles and nerve damage can contribute to stress incontinence. The removal of the uterus can disrupt the normal communication between the bladder and brain, leading to sudden and uncontrollable urges to urinate (29). Healthcare professionals can tailor treatment plans that include pelvic floor exercises, medication, and behavioral interventions to manage and alleviate symptoms, ultimately improving the overall well-being of affected women (30). Hysterectomy can also result in a decrease in estrogen levels, which can further contribute to the development of urge symptoms. Hormone replacement therapy may help restore hormonal balance and reduce urge symptoms. Healthcare professionals can provide comprehensive care to women who have undergone hysterectomy, including hormone replacement therapy, pelvic floor exercises, lifestyle modifications, and counseling to address emotional or psychological factors that may be exacerbating urge symptoms (31). A holistic approach focusing on both physical interventions and mental and emotional well-being can help women manage and alleviate the symptoms associated with hysterectomy-induced urge symptoms. By combining pelvic floor exercises, lifestyle modification, and counseling, healthcare professionals can empower women to regain control over their bladder function and improve their overall quality of life (32). Research on lifestyle factors and dietary habits that contribute to urge symptoms could help educate women on how to modify their behaviors to lower their risk. Understanding genetic and hormonal factors can lead to targeted interventions or medications to prevent the onset of symptoms, particularly for women at a higher risk of developing incontinence after a hysterectomy. The risk of

incontinence can be reduced by adopting a healthy lifestyle, including regular exercise and maintaining a healthy weight. Hormonal therapy or alternative surgical techniques can also help prevent the onset of symptoms in high-risk individuals (33). Comprehensive understanding and targeted interventions empower women to take control of their health and mitigate potential challenges associated with incontinence after a hysterectomy. Regular exercise and maintaining a healthy weight can also contribute to overall pelvic floor health, such as with kegel exercises (34). Education and awareness about pelvic floor health should be prioritized, as early intervention and preventive measures can significantly improve women's quality of life post-hysterectomy. Pelvic floor physical therapists can also greatly contribute to pelvic floor health. They are trained to assess and treat pelvic floor dysfunction, offering personalized treatment plans and techniques to address specific issues (30). Incorporating these therapies into post-hysterectomy care can help women recover faster and improve their overall well-being. Pelvic floor therapy plays a crucial role in the holistic recovery process after a hysterectomy, promoting physical, emotional, and sexual well-being for women (16).

This study explored the pros and cons of various treatments for UI, enabling informed decisions by patients and healthcare providers (35). The study also explores the long-term outcomes and cost-effectiveness of these interventions, providing valuable insights into sustainable strategies. This comprehensive examination of treatment options can lead to improved patient quality of life and efficient healthcare resource allocation (18). By tailoring treatments to individual patients' needs and preferences, healthcare providers can increase patient satisfaction and adherence to treatment plans, ultimately improving treatment outcomes (36). Learning about the long-term effects and cost-effectiveness of these interventions can help shape healthcare policies and guidelines, making better use of resources and possibly easing the strain on the healthcare system (28). This holistic approach can lead to better patient care, enhanced health outcomes, and a more efficient and sustainable healthcare system. Incorporating patient feedback and involving patients in decision-making processes can also improve treatment outcomes (37). Empowering patients and fostering better communication between healthcare providers and patients can improve treatment outcomes and overall patient satisfaction. By combining these strategies, healthcare systems can achieve a more patient-centric, effective, and sustainable approach to care.

Study Limitations

One limitation of this study is the small sample size, which may limit the generalizability of the findings to other populations. Additionally, the study relied on self-reported data, which may introduce recall bias and underreporting of UI cases. Furthermore, this study only included

patients from one tertiary care hospital, which may not be representative of the overall population in India. Future research should include larger sample sizes and diverse populations to obtain more comprehensive and accurate results regarding the prevalence and risk factors of UI in India.

Conclusion

A cross-sectional analysis was conducted to examine the prevalence, types, and associated factors of UI among female patients at a specialized medical center in India between November 2022 and April 2023. The study's generalizability may be limited due to the clinic's focus on women seeking specialized care, potentially oversampling health-conscious individuals or those with severe UI symptoms. Disparities in socioeconomic status, health literacy, and awareness regarding UI treatment across different demographic groups could influence patient selection and affect the study outcomes. Despite these limitations, the present study contributes to our understanding of the prevalence, types, and risk factors of UI among women attending a tertiary care facility in India, highlighting the need for further research and interventions to address this significant public health issue.

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Ethics Committee Approval: The study was approved by the Ethics Committee of Santhiram College of Pharmacy (approval number: SCOP/PDV/2022/18, date: 25.10.2022).

Informed Consent: Written informed consent was obtained from the participants of the study.

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