A Cross-sectional Study on Urinary Incontinence and Associated Factors among Elderly Females in a Rural area of Singur, West Bengal

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Abstract:

Introduction: Urinary incontinence (UI) is a chronic debilitating disease affecting a significant proportion of elderly women. However, due to its social and hygienic issues, it often remains underreported in rural areas of India. It has the potential to significantly impact an individual's quality of life, thus highlighting its public health importance. **Objective:** To find out proportion of rural women having UI and its associated risk factors. **Method:** A cross-sectional study was conducted in a rural area of Singur among 120 elderly women aged ≥60 years selected by cluster sampling technique. A pre-designed questionnaire was utilized for data collection which included Questionnaire for Urinary Incontinence Diagnosis (QUID) questionnaire for assessing UI. Data were analysed with SPSS version 16.0.Chi-square test and logistic regression analysis was applied to find out any association between variables. **Results:** Around 42(35%) out of 120 women were found having UI among which the most prevalent type of UI was stress UI 22(18.3%), followed by mixed UI 13(10.8%) and urge UI 7(5.8%). Multivariable logistic regression analysis showed hypertension (AOR = 2.15, 95%CI=1.13–4.75), chronic cough (AOR= 4.50, 95%CI=1.24–16.30), constipation (AOR= 8.58, 95%CI=2.06–35.65), physical activity (AOR= 4.35, 95% CI=1.30–15.35), mental stress (AOR= 8.50, 95% CI=2.07–35.60)were factors significantly associated with presence of UI among the study participants. Only 25(59.5%) had sought healthcare for their issues. **Conclusion:** This study revealed that a significant proportion of rural older women are suffering from UI. Proper medical management of the risk factors associated with UI will help to decrease the burden of UI and improve health status of rural elderly women.

Keywords: Elderly, Risk factors, Rural, Urinary Incontinence

Introduction:

Urinary incontinence (UI) is a very common distressing problem among elderly adults in the community which often affects women due to anatomical and physiological changes with age.[1] According to the International Continence Society (ICS), UI has been defined as: the complaint of any involuntary loss of urine that is a social or hygienic problem.[2] Worldwide, over 200 million people are living with urinary incontinence and it has been observed that UI is three times more common in women than men.[3,4] Urinary incontinence is a troublesome and probably underreported disorder specially in women.

Numerous epidemiologic studies have shown that the incidence of UI increases with age, elderly women are the most affected with a mean prevalence of 30%.[5] It has been estimated that women of different age groups have involuntary urine loss and a major proportion of women over 60 years of age report daily urinary leakage. The prevalence of urinary incontinence is gradually increasing day by

day and may deteriorate the quality of life and disrupt their daily routines. Recently, as the average life expectancy of women has increased and women maintain various social roles, UI has become an important medical and social issue. During normal physiological processes, bladder pressure remains lower than urethral closure pressure which helps in containing the urine, while in any type of bladder or urethral impairment where closure pressure becomes lower than the bladder pressure, urinary leakage occurs.[6] Among elderly women who are mostly in their post-menopausal phase, the genitourinary tract undergo atrophy due to endocrinal changes thus predisposing to the development of UI.[7]Basically there are three types of incontinence: stress urinary incontinence (SUI); urge urinary incontinence (UUI), and mixed urinary incontinence (MUI).

UI upsets persons' freedom and ability to function in everyday life. It has therefore become a significant public health problem having a high economic and human impact. Although different modalities of investigation, treatment, and management of incontinence have developed rapidly over the past decade, its prevalence in the general population has so far been based on estimates made in selected groups of people of different ages.[8] Despite its high prevalence, little is known about its associated risk factors and aetiology. Various factors associated with lifestyle are thought to precipitate lower urinary tract symptoms and urinary incontinence, for example, ageing, pregnancy, vaginal delivery, obesity physical forces (exercise, work), smoking, caffeine and fluid intake, constipation, posture.[9] Most studies on UI have been carried out in developed countries and in hospital-based settings. Scarce data exist on the prevalence in India, especially in rural women in the community or in those of lower socioeconomic status. The condition is usually under reported as many women hesitate to seek help or report symptoms to medical practitioners due to the embarrassing and culturally sensitive nature of this condition. An updated picture of UI in rural women will be of great importance in helping formulating strategies of prevention and control for UI and furthermore in reducing disease burden in India. With this backdrop, this study assessed the prevalence of UI among elderly women in a rural area do West Bengal and elicited its associated risk factors.

Method:

This community-based cross-sectional study was conducted from May to July 2022 among elderly women (age ≥ 60 years)[10] in a rural area of Singur, West Bengal. Participants who did not give written informed consent, were critically ill or were diagnosed with any psychiatric illness were excluded from the study.

A study conducted in rural West Bengal by Biswas B et al. demonstrated the prevalence of urinary incontinence among elderly women to be 27.7%.[11] Considering P = Prevalence of Urinary Incontinence (UI)=27.7%, Z= 1.96 (95% confidence interval), an absolute error of precision (L) to be 10% the minimum sample size estimated using standard Cochran formula came to be 75.71. Considering a design effect of 1.5 for cluster sampling, the sample size came = (75.51 1.5)= 113 and taking 5% non-response rate, final sample size came 120.

A two-stage cluster sampling was done to select study participants. In study area there were 64 villages, from this villages at first stage 12 villages or cluster were selected randomly (Each village was denoted as a cluster). With the help of local maps and local people after going to the centre of each village, at first one direction was chosen randomly by rotating bottle head. Going in the direction of bottle head the first house was selected to find the study participant satisfying the inclusion criteria. If not, then next adjacent house was visited until 10 participants were selected from each village (At the second stage 10 elderly women were selected from each cluster (120/12=10). When there was end of road, next lane was taken to complete sample size. Same procedure was repeated in rest 11 clusters. Thus, in total 120 study participants were included in the study.

Face-to-face interview of the participants were done with the help of pre-designed pre-tested questionnaire. The questionnaire was translated into local language (Bengali). Pretesting of the

questionnaire was performed among 30 elderly women in a separate study setting who were not included in the study. Internal consistency of the questionnaire was checked by Cronbach's alpha (α=0.72). Face and construct validity of the questionnaire was checked by public health experts. In addition, certain anthropometric measurements, clinical examination and review of past medical records were also done. The questionnaire consisted of the following domains:

a. Socio-demographic characteristics of the study participants which included age(in completed years), level of Education (in completed years), religion, caste, family type, socio economic class of the family (Modified B.G. Prasad Scale, 2020),[12] occupational status

b. Reproductive variables- Normal vaginal delivery(NVD), history of abortion, age of first child birth, history of gynae operation, Lower urinary tract symptoms, fecal incontinence;

c. Behavioural characteristics of the study participants which included physical activity (assessed by International Physical Activity Questionnaire-Short Form questionnaire), mental stress (assessed by Perceived stress scale PSS-4). Physical activity was categorized as "Low", "Moderate" and "high" activity as per IPAQ-SF[13] (International Physical Activity Questionnaire- short form).

d. Morbidity status assessed for the presence of comorbidities (e.g.) hypertension, diabetes mellitus), mental stress. Presence of comorbidities was identified with the help of clinical examination (including blood pressure measurement) and review of past medical records. Body mass index was estimated and categorized as per WHO standards. Presence of mental stress was assessed by the Perceived Stress Scale-4 (PSS-4) in which the total scores ranged from 0-16. Cut-off for high mental stress was taken to be 50% of the attainable total scores (=8). [14]

e. The outcome variable of the study was presence of Urinary incontinence (UI) among the study participants which was assessed by the QUID Questionnaire.[15] It is a 6-item questionnaire designed to distinguish between stress UI and urge UI. QUID identifies the presence and frequency of stress and urge UI symptoms. Three items focus on stress UI and another three items focus on urge UI. Each item includes 6 frequency-based options ranging from none of the time to all of the time, which are scored from 0 to 5 points. Scores are calculated in additive fashion, resulting in separate stress and urge scores, each ranging from 0 to 15 points. QUID scoring indicates if stress score ≥ 4 it is Stress UI (SUI) and urge score ≥ 6 it is urge UI (UUI).

Data were analysed using Microsoft Excel (version 2019) and SPSS software (version 16 IBM Corp. USA). Continuous variables were denoted as mean±(standard deviation) or median (interquartile range) while categorical variables were denoted by frequency with percentages. After checking for multicollinearity among the variables (variance inflation factor>10), factors associated with the outcome variable were analysed using univariate logistic regression analysis. All the biologically plausible significant variables (p-value<0.05) at 95% confidence interval in the univariate analysis were then included in the final multivariable model.

Ethical clearance was obtained from Institutional Ethics Committee of All India Institute of hygiene & Public Health, Kolkata. The purpose of the study was described and the study was conducted after taking written informed consent from the participants. Data confidentiality and privacy were maintained throughout the study. All other ethical principles as per Declaration of Helsinki were strictly adhered to.

Results:

Majority of the study participants (44.2%) belonged to age group 70 years or above. The median (Inter-quartile range) of the age of the study

participants was 69(73-65) years. Majority (95%) of the study participants were Hindu. About 52.5% participants were with no formal education. Most of the study participants (64.2%) belonged to other caste. Among the elderly women majority (58.3%) belonged to socio economic class IV according modified BG Prasad classification. About 78.3% were homemaker by occupation. Nearly 64.2% elderly women stay in the joint family. (Table 1)

Reproductive health profile:

Nearly 22.5% of them had a history of gynecological operation. Among them 53.3% had three or less than three normal vaginal delivery (NVD), while 21.7%

had a history of abortion. Around 35.8% had history of fecal incontinence (double incontinence). About 37.5% of them were suffering from anyone of the Lower Urinary Tract Symptoms (LUTSs). (Table 2)

Behavioral characteristics and morbidity profile of the study participants:

Nearly 32.5% of them were diabetic while 36.7% of them were hypertensive. Among the study participants 36.7% had chronic cough and 35% had history of constipation. Among them 36.7% elderly women had low physical activity and 35% with high mental stress. According to BMI 25.8% were overweight and 2.5% were obese.

Table 1: Distribution of study participants according to Socio-demographic characteristics (N=120)

Variables	Categories	N (%)
Age (In completed years) Median(IQR)=69,(73-65)	60-64	28(23.3)
	65-69	39(32.5)
	≥ 70	53(44.2)
Religion	Hindu	114 (95.0)
	Muslim	6 (5.0)
Educational Level	Illiterate	63(52.5)
	Below primary	18(15.0)
	Primary	29(24.2)
	Middle	6(5.0)
	Secondary	4(3.3)
Caste	General/ Others	77(64.2)
	SC (Scheduled Caste)	38(31.6)
	OBC(Other backward classes)	5(4.2)
Socio-economic Status*	Class I	4(3.3)
	Class II	6(5.0)
	Class III	19(15.8)
	Class IV	70(58.3)
	Class V	21(17.6)
Occupation	Homemaker	94(78.3)
	Cultivator/ Biri binder	26(21.7)
Family Type	Nuclear	43(35.8)
	Joint	77(64.2)

According to Modified B.G Prasad classification[12]

Table 2: Distribution of study participants according to Risk factors characteristics (N=120)

Variables	Categories	N (%)
Diabetes	Present	39(32.5)
	Absent	81(67.5)
Hypertension	Present	44(36.7)
	Absent	76(63.3)
Chronic cough	Yes	44(36.7)
	No	76(63.3)
Constipation	Yes	42(35.0)
	No	78(85.0)
NVD (Normal Vaginal Delivery)	≤3	64(53.3)
	>3	56(46.7)
LUTS (Lower Urinary Tract Symptoms)	Yes	45(37.5)
	No	75(62.5)
H/O Gynaecological Operation	Yes	27(22.5)
	No	93(77.5)
Faecal Incontinence	Yes	31(25.8)
	No	89(74.2)
H/O Abortion	Yes	62(51.7)
	No	58(48.3)
BMI(Body Mass Index)	Underweight(<18.5)	2(1.7)
	Normal(18.5-24.9)	84(70.0)
	Overweight (25-29.9)	31(25.8)
	Obese (≥30)	3(2.5)
Physical activity level	Low	48(40.0)
	Moderate	42(35.0)
	High	30(25.0)
Mental stress	Low	78(65.0)
	High	42(35.0)

Estimation of Urinary Incontinence among the study participants:

Forty two (35%) out of 120 women were found having UI. The most prevalent type of UI was stress UI (52%); followed by mixed UI (31%) and urge UI (17%). (Figure 1) It has been seen that 44.2% of elderly aged 70 years and above; 32.5% of aged 65-69 years elderly women and 23.3% elderly women aged 60- 64 years had urinary incontinence. Only 30.6% sought treatment for UI.

Factors associated with cardiovascular risk among the study participants:

In univariate logistic regression analysis, study participants who were with no formal education, having a history of gynecological operation, NVDs(>3), diabetic, hypertension, chronic cough, constipation, LUTS, low physical activity, high mental stress had shown significantly greater odds of having UI. (Table 3) In multivariable model hypertension (adjusted odds ratio [AOR]=2.15 [1.13–4.75]),

Table 3: Factors associated with presence of UI among the study participants:
**Univariate Logistic Regression Analysis (N=120)**

Variables	Category	Total N (%)	Present of UI N (%)	Unadjusted Odds ratio (95% CI#)
Age (In Years)	Below 65	28(28.3)	8(28.6)	1(Ref)
	65 and Above	92(76.7)	34(37.0)	1.47(0.58-3.68)
Religion	Hindu	114(95.0)	38(33.3)	0.25(0.04-1.42)
	Muslim	6(5.0)	4(66.7)	1(Ref)
Caste	Gen/Others	77(64.2)	27(35.1)	1.08(0.46-2.20)
	SC/OBC	43(35.8)	15(34.9)	1(Ref)
Education	No Formal Education	63(52.5)	34(54.0)	**7.18(2.92-17.60)***
	With formal education	57(47.5)	8(14.0)	1(Ref)
Occupation	Homemaker	94(78.3)	37(39.4)	2.72(0.94-7.86)
	Cultivator/ Biri-binder	26(21.7)	5(19.2)	1(Ref)
Socio-economic Status	Below SE Class IV	29(24.2)	6(20.7)	1(Ref)
	SE Class IV and above	91(75.8)	36(39.6)	2.50(0.93-6.76)
Type of Family	Nuclear	43(35.8)	6(14.0)	1(Ref)
	Joint	77(64.2)	36(46.8)	1.08(0.46-2.20)
Diabetes	Absent	81(67.5)	14(17.3)	1(Ref)
	Present	39(32.5)	28(71.8)	**12.18(4.93-30.09)***
Hypertension	Absent	76(63.3)	11(14.5)	1(Ref)
	Present	44(36.7)	31(70.5)	**14.09(5.67-34.99)***
Chronic cough	No	76(63.3)	11(14.5)	1(Ref)
	Yes	44(36.7)	31(70.5)	**14.09(5.67-34.99)***
Constipation	No	78(85.0)	10(12.8)	1(Ref)
	Yes	42(35.0)	32(76.2)	**21.76(8.23-57.31)***
LUTS (Lower Urinary Tract Symptoms)	No	75(62.5)	15(20.0)	1(Ref)
	Yes	45(37.5)	27(60.0)	**6.00(2.63-13.65)***
NVD (Normal Vaginal Delivery)	≤3	64(53.3)	9(14.1)	1(Ref)
	>3	56(46.7)	33(58.9)	**8.76(3.62-21.20)***
H/O Gynaecological Operation	No	93(77.5)	25(26.9)	1(Ref)
	Yes	27(22.5)	17(63.0)	**4.62(1.86-11.43)***
Physical Activity	Low	44(36.7)	11(14.5)	**14.09(5.67-34.99)***
	Moderate/High	76(63.3)	31(70.5)	1(Ref)
Mental Stress	Low	78(65.0)	10(12.8)	1(Ref)
	High	42(35.0)	32(76.2)	**21.76(8.23-57.31)***
Faecal Incontinence	No	77(64.2)	36(46.8)	1(Ref)
	Yes	43(35.8)	6(14.0)	1.08(0.46-2.20)
H/O Abortion	No	94(78.3)	37(39.4)	1(Ref)
	Yes	26(21.7)	5(19.2)	2.72(0.94-7.86)
BMI	Under nutrition/Normal	86(71.7)	30(34.8)	1.08(0.46-2.20)
	Overweight/Obese	34(28.3)	12(35.2)	1(Ref)

*p<0.05 is considered as significant, #CI= Confidence interval

Table 4: Multivariable Logistic Regression Analysis of Factors associated with presence of UI among the study participants (N=120)

Variables	Category	Total N (%)	UI present N (%)	Unadjusted Odds ratio (95% CI#)	Adjusted Odds ratio (95% CI#)
Education	No Formal Education	63(52.5)	34(54.0)	7.18(2.92-17.60)	1.18(0.96-3.26)
	With formal education	57(47.5)	8(14.0)	1(Ref)	1(Ref)
Diabetes	Absent	81(67.5)	14(17.3)	1(Ref)	1(Ref)
	Present	39(32.5)	28(71.8)	12.18(4.93-30.09)	2.28(0.56-9.26)
Hypertension	Absent	76(63.3)	11(14.5)	1(Ref)	1(Ref)
	Present	44(36.7)	31(70.5)	14.09(5.67-34.99)	2.15(1.13-4.75)*
Chronic cough	No	76(63.3)	11(14.5)	1(Ref)	1(Ref)
	Yes	44(36.7)	31(70.5)	14.09(5.67-34.99)	4.50(1.24-16.30)*
Constipation	No	78(85.0)	10(12.8)	1(Ref)	1(Ref)
	Yes	42(35.0)	32(76.2)	21.76(8.23-57.31)	8.58(2.06-35.65)*
LUTS	No	75(62.5)	15(20.0)	1(Ref)	1(Ref)
	Yes	45(37.5)	27(60.0)	6.00(2.63-13.65)	0.73(0.17-3.01)
NVD	≤3	64(53.3)	9(14.1)	1(Ref)	1(Ref)
	>3	56(46.7)	33(58.9)	8.76(3.62-21.20)	2.35(0.62-8.83)
H/O Gynaecological Operation	No	93(77.5)	25(26.9)	1(Ref)	1(Ref)
	Yes	27(22.5)	17(63.0)	4.62(1.86-11.43)	0.52(0.09-2.73)
Physical Activity	Low	44(36.7)	11(14.5)	14.09(5.67-34.99)	4.35(1.30-15.35)*
	Moderate/High	76(63.3)	31(70.5)	1(Ref)	1(Ref)
Mental Stress	Low	78(65.0)	10(12.8)	1(Ref)	1(Ref)
	High	42(35.0)	32(76.2)	21.76(8.23-57.31)	8.50(2.07-35.60)*

*p<0.05 is considered as significant, #CI= Confidence interval, Hosmer-Lemeshow test of significance=0.12 , Cox & Snell's R^2=0.28, Nagelkerke's R^2=0.37

Figure 1: Distribution of study participants according to types of UI (N=42)
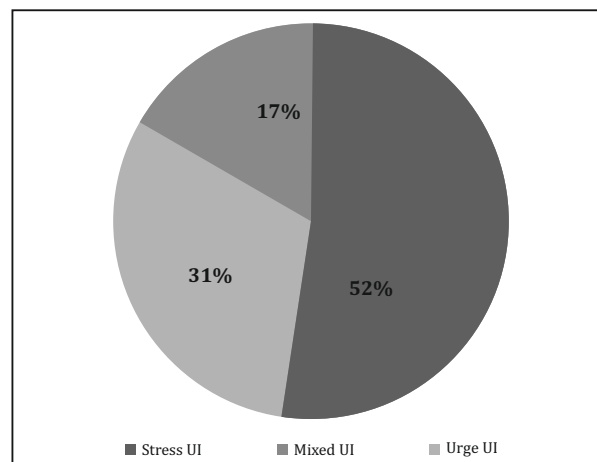
chronic cough (AOR= 4.50[1.24–16.30]), constipation (AOR = 8.58 [2.06–35.65]), low physical activity (AOR = 4.35 [1.30–15.35]) and high mental stress (AOR = 8.50 [2.07–35.60]) remained significant after being adjusted with other significant variables. (Table 4) The non-significant Hosmer-Lemeshow test (p-value>0.05) indicated goodness of fit of the model while 28-37% of the variance of the outcome variable could be explained by this model.

Discussion:

About 35% of the study population was found to have UI. The findings were consistent with findings of Prabhuand Shanbhag[16] (25.5%), Ansar et al [17] (23.9%), and Seshan and Muliira[18] (33.8%), Abha et al[19](34.0%), Kılıç[20] (37.2%), and Sensoyet al[21] (44.6%) have reported like this. Singh et al[22] (21.8%), Ge et al[23](22.1%), Sumardi et al[24](13.0%), Abiola et al [25](12.6%), and Bodhare et al[26](10.0%) have reported less. This variance in the prevalence may be due to different study population, settings, and definition of UI used.

In present study, prevalence of urinary incontinence was more in women aged 70 and above (44.2%), women between 65 and 69 years (32.5%) and 60 and 64 years (23.3%). In a study done by Nojomiet al, urinary incontinence was higher among age group > 55 years. Another study done by Singh et al. showed a low prevalence in age groups < 20 (7.6%), 31–40 years (11.6%) and > 70 years (20%) and the highest incidence among 61–70 years (42.8%).[30]

The study revealed that illiterate women are at more risk. Hence educational level plays a vital role in this regard. Sensoy et al,[21] Seshan and Muliira[18] and Ge et al[23] had similar findings. A history of prolonged labor or h/o gynaecological operation is an established cause of urinary tract injury thus increases the risk of UI. The study had identified a history of prolonged labor as a risk factor for UI similar to Bodhare et al[22] and Kılıç[20] with increase in number of childbirth chance of trauma to the urinary tract also increases. The study established NVD as a risk factor for UI similar as Singh et al,[22] Ge et al[23] Seshan and Muliira[18] and Sensory et al.[21]

A history of gynecological operation imposes risk of iatrogenic trauma to the urinary tract, thus increasing risk of UI. The study revealed that also which is similar to findings of Prabhu and Shanbhag[16], Sensoy et al[21], Ge et al[23] and Singh et al.[22] Diabetes causes polyuria which laid additional burden on sphincters of urinary tract resulting in UI. The current study also establishes the fact same as Prabhu and Shanbhag[16], Kılıç[20], Ge et al[23] and Singh et al[22] Constipation and chronic cough create additional stress on both the anal and urethral sphincter resulting into UI. The studies by Prabhu and Shanbhag[16] Bodhareet al[26] and Sensoy et al[21] identified constipation and chronic cough both as risk factors of UI while Ge et al[23] found constipation and Sumardi et al[24] identified chronic cough as a risk factor. The study establishes LUTS as one of the most important risk factors for UI similar to Sumardi et al,[24] Sensoy et al,[21]Geetal,[23]and Kılıç.[20] Chronic cough has a direct association with urinary incontinence. If there is a sudden increase in the intra-abdominal pressure that may produce the exhaustion of pelvic floor muscles. Even a momentary relaxation of thesemuscles may leak urine. Recurrent UTIs may be treated as a trivial matter by the community for which they resort to home remedies and drinking fluids in plenty and hardly taken seriously as a medical condition.

The most prevalent type of UI was stress UI (18.3%), followed by mixed UI(10.8%) and urge UI(5.8%). This finding further corroborated earlier reports from epidemiological studies of UI in India in which stress incontinence was the most common type of UI among women with UI.[16,19,22] Only 30.6% sought treatment for UI which is better compared to Prabhu and Shanbhag[16](14.4%), Sarici et al[27](10.7%), Jokhio et al[28](15.7%) and worse compared to Lasserre et al[29](39.7%).

Present study has shown that no formal education, diabetes, hypertension, Normal vaginal delivery (≥3) and history of gynaecological operation, chronic cough, constipation, low physical activity and high mental stress had a positive association with urinary incontinence.

Limitations:

Since this study was of cross-sectional in nature, causality of the factors could not be established. Some of the information collected was recall based, hence bias might be possible.

Conclusion:

Prevalence of UI is high in rural women. Most prevalent one is stress UI. Majority of them did not sought treatment for UI which is matter of concern. Generating awareness regarding UI may help to improve health-seeking behavior. In the current study, increasing level of education among the rural female population will help to decrease the risk of Urinary incontinence that will lead to improve mental and social health of elderly women. Several treatment choices for UI are now available with greater effectiveness. Proper medical management of the comorbid conditions (hypertension, chronic cough, high mental stress) and other risk factors (constipation, low physical activity) will help to decrease the burden of urinary incontinence and that will improve level of living among rural elderly women.

Declaration:

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