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Original Research Article

Prevalence and assessment of the risk factors of stress urinary incontinence in gynaecology out patients in a tertiary care centre

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ABSTRACT

Background: Stress urinary incontinence (SUI) is the complaint of involuntary leakage of urine during increased abdominal pressure in the absence of detrusor contraction. Although not a life-threatening condition, stress urinary incontinence causes various physical, psychological, and sexual problems for millions of women and their families. Although these conditions are highly prevalent, they are not often reported by patients. This was the reason for the study; to find out the prevalence and the associated risk factors.

Methods: A total of 400 patients presenting in the gynaecology outpatient department with various complaints were studied. A detailed history was taken, and examination was done. Urine microscopy and culture studies were done and whenever found positive; the infection was treated. Bonney's test was done on full bladder.

Results: Stress urinary incontinence was diagnosed in 41 (10.30%) of the women. The most common co morbidity was found to be tuberculosis and other lung diseases. Among the study population, 4% of women had culture positive urinary tract infection.

Conclusions: Stress urinary incontinence was seen in 10.30% of the study population. It was seen more commonly among the elderly. Urine routine and microscopy was done for all patients complaining of leakage of urine or any other urinary complaints.

Keywords: Stress urinary incontinence, Urine microscopy, Culture

INTRODUCTION

The prevalence of stress urinary incontinence (SUI) in women is relatively low in early life, has a peak around the time of menopause, and then rises steadily between the ages of 60 to 80 years. As we already know, stress urinary incontinence is the complaint of involuntary leakage of urine during increased abdominal pressure in the absence of detrusor contraction.¹ Prevalence of SUI is 10-45% among women.^{2,3} Incontinence was found to be positively increasing with parity.⁴ Moreover, urinary incontinence has a major impact on the health economy and is increasingly recognized as a global health concern.⁵

Although, these conditions are highly prevalent they are often not reported by patients. There are several explanations for this: the leakage may not be a problem to the individual, it may be considered a part of normal ageing, expectations of successful treatments are low, patients may think they can manage on their own, or they may be too embarrassed to seek help.⁶ Therefore, identification of risk factors causing stress incontinence is of prime importance in suspecting the condition. Impact of factors such as aging, rise in BMI, pregnancy, route of delivery, ethnic heritage, smoking, obesity, diabetes, and other conditions that may be comorbidities or may affect the development and/or progression of stress incontinence. Not all these factors are completely

understood in their causal relationship and magnitude, so this study aims at evaluating the risk factors along with knowing the prevalence of this condition in our tertiary care center.

METHODS

Study type

Observational, prospective, descriptive study.

Study place

King Edward Memorial hospital.

Study period

From October 2016 to October 2018.

Inclusion criteria

Inclusion criteria were, women of all age groups above the age of 18 years complaining of leaking of urine, married women, women who have been taking prior treatment in private hospital for the same, women registering for the first time in gynaecology OPD.

Exclusion criteria

Women less than 18 years of age.

A detailed history of the patient was taken by the investigator to elicit the presence, type and nature of urinary incontinence. History was taken to elicit risk factors that can precipitate or worsen her incontinence. Examination of the patient was done by one of the unit staff in the outpatient department. Routine per abdomen, per speculum and per vaginal examination of each patient giving complaint of urinary leakage were recorded. Cough impulse was checked, and Bonney's test was performed on the patients suspected to have incontinence by a qualified staff member and was documented. Urine routine microscopy was done for all and those with positive pus cells in the report were followed up with a urine culture examination. Urodynamic studies if done as and when indicated were recorded. Whenever urine microscopy and urine culture reports were found to be positive in a patient with clinically demonstrable SUI, urinary tract infection was treated, and patient was re-examined to rule out urinary tract infection (UTI) as the cause for her symptoms.

Bonney's test was performed on a full bladder. The patient was in dorsal position with her legs and abdomen covered with a drape.

The urethral opening was exposed with two gloved fingers. The patient was asked to cough. If drops of urine or spurt of urine leaked, this was recorded as cough impulse positive.

If seen, the two gloved fingers were placed in the anterior vaginal wall on either side of the urethra with care being taken not to compress the urethra. The anterior vaginal wall was lifted up to elevate the urethro-vesical junction.

The patient was asked to cough again. If there are no drops of urine expressed, Bonney's test was positive.

Positive Bonney's test signifies presence of stress urinary incontinence.

Ethical approval

The study commenced after obtaining approval from the IEC (institutional ethics committee).

1) The study population was women above 18 years of age registering in the gynaecology OPD 2) written, valid and informed consent of the patient was taken in the language the patient understands.

Statistical methods

SUI was considered as primary outcome variable. Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Data was also represented using appropriate diagrams like bar diagram, pie diagram and box plots.

All Quantitative variables were checked for normal distribution within each category of explanatory variable by using visual inspection of histograms and normality Q-Q plots. Shapiro-wilk test was also conducted to assess normal distribution. Shapiro wilk test p value of >0.05 was considered as normal distribution.

For non-normally distributed quantitative parameters, medians and interquartile range (IQR) were compared between study groups using Mann Whitney u test (2 groups). Univariate binary logistic regression analysis was performed to test the association between the explanatory variables and outcome variables. Unadjusted Odds ratio along with 95% CI is presented. Variables with statistical significance in univariate analysis were used to compute multivariate regression analysis. Adjusted odds ratio along with their 95% CI is presented.

P value <0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.

RESULTS

A total of 400 subjects included in the final study. The mean age of the study population was 37.37 ± 13.52 years, with a minimum age of 18 years and maximum age of 88 years. The mean duration of married life was 15.43 ± 12.83 years, ranging from 1 to 62 years.

The most common co morbidity reported was tuberculosis & Other lung diseases among 16 (4.0%) women. Among the study population 103 (25.75%) women had attained menopause.

LSCS in the past was reported by 16 (4%) women and 46 (11.5%) women reported Instrumental delivery in the past. Leakage of urine was reported by 74 women in the study.

In the study population of 400, 9 (2.25%) had complaints of leaking of urine along with the urge to urinate at the same time. Leakage of urine was found to be associated with activities like coughing, sneezing, laughing or straining in 74 (18.50%) patients. Among the study participants, 18 women had reported post void leakage of urine.

Out of 74 women with leakage of urine 3 women had complained leakage all the time, 2 women reported the need to use sanitary pads and 8 women reported interference with day to day activities (Table 1).

Table 1: Descriptive analysis of leaking urine all the time in study population (n=74).

Parameter	Frequency	Percentage
Does it leak all the time?		
Yes	3	4.05%
No	71	95.94%
Do you need to wear sanitary pads to prevent soakage?		
Yes	2	2.70%
No	72	97.29%
Does it interfere with your day to day activities?		
Yes	8	10.81%
No	66	89.19%

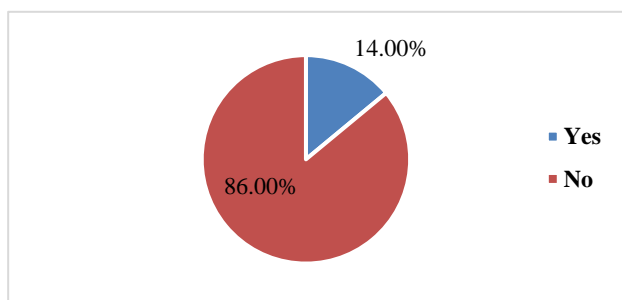


Figure 1: Cough impulse distribution in study population (n=400).

Among 74 women with urinary leakage, only 5 had reported consulting a doctor for the complaint. The most common reason for not taking treatment was women not considering it as significant complaint (30.4%), followed by personal and financial reasons (21.7 & 13%).

Cough impulse was positive among 56 women (Figure 1).

Total 45 patients had positive Bonney's test. Out of these, three had growth in culture. One Klebsiella and two E. coli and post treatment for UTI, they didn't show leakage.

Culture was done for the 112 patients out of 400; as these 112 patients had positive pus cells in their urine microscopy report.

Among the study population 16 (4%) women were found to had culture positive UTI. E. coli was the most common organism isolated among 9(2.3%) women. Whenever urine culture was found to show growth of an organism, treatment was given, and patient was re-examined for SUI (Table 2).

Table 2: Descriptive analysis of Bonney's test in study population (n=400).

Bonney's test	Frequency	Percentage
Positive	45	11.25%
Negative	355	88.75%

Among the 74 women complaining of urinary leak 12 (16.2%) had culture positive UTI (Table 3).

Table 3: Comparison of UTI with complaints of leaking urine (n=400).

Do you leak urine?	UTI		Chi square	P-value
	UTI	No UTI		
Yes (N=74)	12 (16.2%)	62 (83.8%)	35.28	<0.001
No (N=326)	4 (1.2%)	322 (98.8%)		

Among the study population, stress urinary incontinence (SUI) was diagnosed in 41 (10.30%) of the women (95% CI 7.5% to 13.7%) (Table 4).

Table 4: Descriptive analysis of stress urinary incontinence in the study population (n=400).

Stress Urinary incontinence	Frequency	Percentages (95% CI)
SUI	41	10.30% (7.5% to 13.7%)
No SUI	359	89.80% (86.3% to 92.3%)

Factors associated with sui among the study population

The median age was higher among the women with SUI as compared to women without SUI with statistically significant difference (<0.001) (Table 5).

Table 5: Comparison of mean age between the study groups (n=400).

Parameter	Stress urinary incontinence		Mann-Whitney U test (P value)
	Yes (N=41)	No (N=359)	
Age (median (IQR))	56 (46.50, 71.50)	32 (26, 42)	<0.001 (significant)

The median duration since marriage was higher among the women with SUI as compared to women without SUI, with statistically significant difference (<0.001).

The median weight, systolic BP were also higher among women with SUI. Even though the median diastolic BP was similar in women with and without SUI, the interquartile range was different between the two groups (Table 6).

Table 6: Comparison of marital status between the study groups (n=400).

Parameter	Stress urinary incontinence		Mann-Whitney U test (P value)
	Yes (N=41)	No (N=359)	
Married since (In years)	32 (25, 41.50)	10 (5, 20)	<0.001(significant)

Table 7: Comparison of SUI with menstrual history (n=400).

Menstrual history	Stress urinary incontinence		P-value
	Yes (N=41)	No (N=359)	
Pre-menopausal (N= 297)	8 (2.7%)	289 (97.3%)	<0.001 (significant)
Post-menopausal (N= 103)	33 (32.0%)	70 (68.0%)	

Table 8: Univariate logistic regression analysis to analyse factors associated with SUI (n=400).

Factor	Un adjusted odds ratio	95 % CI of odds ratio	P value
Age	1.113	1.082 - 1.145	<0.001 (significant)
Married since (In years)	1.119	1.086 – 1.115	<0.001 (significant)
Menstrual history (baseline= Pre-menopausal)			
Post-menopausal	17.030	7.536 – 38.487	<0.001 (significant)
Mode of delivery (baseline = Normal vaginal)			
Instrumental	2.89	1.311 – 6.388	0.009 (significant)
LSCS	ND	ND	ND
TB/ Lung disease (baseline = No)			
Yes	8.950	0.549- 145.861	0.124 (not significant)
Hypertension (baseline= No)			
Yes	4.204	1.234 – 14.320	0.022 (significant)
Diabetic mellitus (baseline= No)			
Yes	4.743	1.363 – 16.508	0.014 (significant)

ND= Not done, Odds ratio could not be computed as there were "0" number of subjects with outcome in this category

Table 9: Multi variate logistic regression analysis of factors associated with SUI (n=400).

Parameter	Adjusted odds ratio	95% C.I. for adjusted odds ratio		P value
		Lower	Upper	
Age	1.092	1.045	1.142	<0.001
Menstrual history (Baseline= Premenopausal)	1.917	0.529	6.953	0.322
Instrumental delivery (baseline = No)	2.04	0.793	5.267	0.139
Hypertension (baseline= No)	0.730	0.177	3.008	0.663
Diabetic mellitus (baseline= No)	1.579	0.297	8.409	0.592
Smoking lung disease (baseline= No)	1.209	0.283	5.177	0.798

Among women with history of LSCS, none had reported SUI. Among the 46 women with instrumentation, 10 (21.7%) had SUI. Among the 338 women who never had

instrumental delivery or LSCS in the past, 31 (9.2%) had reported history of SUI. The difference in the proportion of SUI, between women with instrumentation and normal

delivery was statistically significant (p value 0.012) (Table 8).

In multi variate logistic regression analysis the only factor, which had shown statistically significant association was age of the women, after adjusting for the effect of potential confounders (Table 9).

DISCUSSION

Urinary incontinence is a debilitating condition frequently found in the general population affecting men and women of all ages. It primarily affects women.⁷ UI is associated with profound adverse effect on quality of life (QoL) including social, physical, sexual and mental functional impairment.⁸ If women at high risk of UI in later life are identified before onset of the condition, however, it might be possible to implement effective preventive measures. Hence this study was aimed at assessing the prevalence of UI and evaluating the risk factors among women attending a tertiary care center. A total of 400 women constituted the study population.

Prevalence of stress urinary incontinence

The mean age of the study population was 37.37±13.52 years. Of the total 400 participants, 74 (18.5%) were diagnosed with urinary incontinence. Cerruto MA et al in a systematic review reported the prevalence of UI among Europeans ranged between 16.1–68.8%.⁷ There were no large-scale studies conducted in Indian subcontinent about the prevalence of UI. A study done by Singh U et al reported the overall prevalence of UI as 21.7%.⁴ But this was slightly higher compared to our study. The possible explanation for this is that even though study by Singh U et al was a hospital-based study they have also included non-consulters in their study group.⁴ Whereas our study was conducted among outdoor patients attending the tertiary care center. The problem of urinary incontinence is more pronounced in India, where women usually do not seek treatment for their reproductive health problems and do not vocalize their symptoms. There is a trend of not visiting the doctor and low consultation rate among Indian women regarding such problems.⁹

Another study by Seshan B et al reported the prevalence of self-reported UI as 33.8% among community dwelling adult women.¹⁰ Biswas B et al reported the prevalence of UI as 27.7% among women aged >50 years in rural area.¹¹ Walker JH et al in a review on incidence of urinary incontinence (UI) in developing countries reported it as 28.7% (range 5.2-70.8%).¹²

In our study, out of the total 400 women's, the prevalence of stress urinary incontinence was found to be 10.3% (41/400). Among the remaining 359 patients, 9 (2.25%) had urge urinary incontinence and 16 (4%) had urinary tract infection. A higher proportion of the participants (10.3%) with urinary tract infection were mistaken as having UI. UI exhibits as a 'tip of the iceberg

phenomenon'. Subramaniam J et al reports that one in every four incontinent patients had UTI and almost half of them suffered from previous episodes of UTI.¹³ Thus, appropriate treatment of the existing UTI can help in the treatment of UI. Most of the participants stated that they leak urine occasionally (62%), followed by often (23%). In the current study Bonney's test was positive for 45 (11.25%) in the entire study population. However, after treating UTI in the detected cases, it was found to be 10.30%.

Stress UI is an involuntary loss of urine on effort or physical exertion (e.g. sporting activities), or on sneezing or coughing. SUI is a challenging condition that affects between 16% and 35% of adult women.¹⁴ The prevalence of SUI in the current study was 41 (10.3%). But this was far less compared to the prevalence rate reported by Singh U et al, Prabhu SA et al, Bodhare TN et al and Kumari S et al conducted among Indian population.^{4,9,10,15} The prevalence of UI varies across regions due to variations in definitions used, study setting, age groups and populations studied.¹⁶ Contreras O et al reported a 50% prevalence of SUI in a review.¹⁷ In a systematic review by De Mattos Lourenco TR et al reported the prevalence of SUI ranged between 10.88% to 80%.¹⁸ Howard D et al suggested that functional and morphologic differences exist in the urethral sphincter and support system of nulliparous black and white women resulting in varying SUI mechanism and thereby prevalence of SUI.¹⁹

Risk factors of SUI

Age

The mean age of the study population was 37.37±13.52 years. When the age was compared with the incidence of SUI, the current study found significant higher odds (Unadjusted odds ratio: 1.113;95 parameters increased age was associated with significantly (p value<0.001) higher odds (1.092; 95% CI: 1.045-1.142) of SUI. This finding was like that reported by Guin G et al (age 60 years or above: 83%). Minassian VA et al reported that the prevalence of SUI peaked at the fifth decade.^{20,21} Hijaz A et al concluded that the advanced maternal age clearly represents an independent risk factor for postpartum SUI.²²

Instrumental delivery

In the current study SUI incidence was significantly (<0.05) higher among women when instruments 10 (21.7%) were used for delivery compared to deliveries without use of instruments (normal vaginal delivery) 10 (2.8%). The chance of having SUI is 2.89 (1.311-6.388) times higher in deliveries with instrumentation compared to without. Guin G et al reported that incidence of SUI was significantly higher (p value<0.001) in normal vaginal delivery (24.83%) compared to LSCS (0%). In a cohort study by Wesnes SL et al incontinence was most

common among women with an instrumental (36%) or spontaneous (34%) vaginal delivery, and lowest among women with acute (17%) or elective (13%) caesarean section with the prevalence of SUI being about twice that of UI. This risk increased with assisted delivery and perineal laceration.^{20,23,24} Roetviet G et al also reported that the risk of urinary incontinence is higher among women who have had caesarean sections than among nulliparous women and is even higher among women who have had vaginal deliveries.

Urinary tract infection

In the current study urine culture was positive for 16 (4%) of the participants. The current study found a significantly (p value <0.001) higher incidence of UI among UTI patients 12 (16.2%) vs 4 (1.2%). This was similar to that reported by Subramaniam J et al where the author reports that one in every four incontinent patients had UTI and almost half of them suffered from previous episodes of UTI.¹²

Comorbidity

In the current study the overall prevalence of various comorbidities was TB (3.5%), asthma (0.5%), HTN (3.25%), diabetes (3%), jaundice (0.25), renal problem (0.25). 4 (30.8%) participants with HTN had SUI compared to 9 (69.2%) of the participant without HTN and no SUI. The p value was <0.05 and thus found to be statistically significant.

Further the study found that HTN is associated with 4.743 times higher odds (95 % CI (1.234-14.32)) of SUI (p value <0.05). Sensoy et al reported that hypertension, diabetes, family history are risk factors associated with UI. Similarly, among the participant with history of diabetes, 33.3% had SUI.⁹ This was found to be statistically significant. (p value <0.05). Singh U et al reported that UI was significantly (p value <0.05) found in diabetics 49 (79.1%) vs 13(20.9) compared to non-diabetics.⁵ Stothers et al in a systematic review reported that incontinence may be a more common consequence of hyperglycemia than other microvascular complications and that other unknown processes also may underline risk factors for the development of incontinence in women with impaired glucose.¹³ In the current study smoking was associated with 6.36 (95% CI: 1.717-23.56) times higher odds and asthma with 8.95 (5% CI: 0.549-145.86) times higher odds of having SUI. In chronic respiratory diseases such as asthma, chronic obstructive pulmonary disease, cystic fibrosis and bronchiectasis, chronic cough has been implicated as a trigger of episodes of involuntary urine loss caused by successive increases in intra-abdominal pressure. We could not find any association with other comorbid factors and SUI in the current study due to low sample size.

Several other risk factors were also associated with SUI. But assessing these were beyond the scope of current study.

Overall, the current study concludes that SUI is highly prevalent among women in India. One in every ten women have complaints of leaking of urine. The most important risk factors associated with SUI in them were diabetes, hypertension, smoking, overweight, instrumentation during delivery, advanced age.

Limitations

Even though SUI is the most common type of UI found among women, only a few studies had so far assessed the prevalence of SUI and its risk factors in India. This was the major strength of the study. However, current study has many limitations. Firstly, we could not assess the association of parity with SUI, which is found to be a significant factor leading to SUI. Secondly, owing to the cross-sectional study design, we could not assess the actual association between various risk factors and SUI. The key limitation of the study is, its evaluation of the limited number of covariants, which can be associated with stress urinary incontinence among the study population. The generalizability of the study findings is limited, as the study was conducted in a single center catering to a limited geographical area.

CONCLUSION

In our study we saw that a total of 74 patients, among the 400 subjects had complained of leakage of urine. However, most of these patients had complained of leaking urine only on direct questioning. Only a few had come with leaking of urine as the chief complaint. Hence, it is concluded that it will be a better tool if leading questions for SUI were used as a part of routine history taking. It was also found that most of these patients who had the complaints of leaking of urine were actually diagnosed to have UTI. They had not come with any complaints of UTI like burning micturition, dysuria or pain in the lower abdomen. Hence, it was incidentally found. As UTI is a major risk for renal compromise, this method of questionnaire and examination and investing the patients helped to decrease that risk.

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