Original Research Article

Study of risk factors associated with the prevalence of urinary incontinence in women of an urban slum in Mumbai

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Abstract

Background: Urinary incontinence (UI) defined by the International Continence Society as the complaint of any involuntary leakage of urine, is a social or hygienic problem. The purpose of this study was to determine the association between some obstetric and medical risk factors and the prevalence of UI in women of an urban slum in Mumbai. **Methods:** A preformed, pre-tested, semi-structured questionnaire was designed to collect information from 1200 eligible and willing women, in a centre based study, over a duration of 6 months from June to December 2013 at tertiary care teaching hospital in Mumbai. Symptoms of urinary incontinence and the presence of obstetric and medical risk factors were assessed for any association. The sample size was calculated taking a prevalence of UI as 30%. The sampling method used was systematic random sampling. The data was entered in MS Excel and analysed. **Results:** The prevalence of UI in the study sample was 30.08%. Prevalence of UI was 39.9% in those who had more than 5-6 vaginal deliveries. 36.30% of the women with UI had their first delivery when of <18 years of age. The UI prevalence was significantly less in those women who had an episiotomy. Those giving history of DandC and obstructed labor and other pelvic surgeries such as hysterectomy had higher prevalence of UI. Chronic cough, chronic constipation and UTI were significantly associated with a higher prevalence of UI. UI was found to be more prevalent in hypertensives (44.81%) and in those with high BMI (38.46%) **Conclusion:** The potential obstetrical risk factors for urinary incontinence were high body mass index, number of vaginal deliveries, age at first child birth. Other associated risk factors were history of obstructed labor, dilatation and curettage, urinary tract infection, pelvic inflammatory disease, hysterectomy and chronic constipation.
Key Word: Urinary Incontinence (UI), Prevalence, Obstetric and Medical Risk Factors of UI

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INTRODUCTION

Urinary incontinence (UI), defined by the International Continence Society as "the complaint of any involuntary leakage of urine that is a social or hygienic problem (International Continence Society, 1973)" is a common and distressing medical condition[1,2]. Women are at a high risk of UI mainly because of the damage to the pelvic floor caused by pregnancy and the child birth process.[3,4] With prevalence ranging from 10% to 34%, 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.[5-7] Little data exists on the prevalence and causative risk factors of UI in India with only a few being community-based epidemiological studies.[8] There is need to continuously study the UI prevalence and associated factors as both of these are likely to change as countries economy and standards of living change. Although some risk factors for incontinence have been studied, still several important predictors of incontinence remain

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uninvestigated. So we conducted this study to know the burden of UI in our women population and to determine its associated risk factors.

MATERIALS AND METHODS

This was a single centre, interview based, cross sectional epidemiological study was conducted in tertiary care teaching hospital, Mumbai over a period of 6 months from June to December 2013. Twelve hundred women having at least one vaginal delivery, or one caesarean section or an abortion (medical/surgical) attending OPD in urban health centre (UHC), residing in the community around UHC, were interviewed for this study. With expected attendance of 100 eligible women per day and following systematic random sampling method every 10^{th} eligible woman was included in the study. A preformed, pre-tested, semi-structured questionnaire was designed to collect information from eligible and willing women, about existence of symptoms of UI in them and their medical and obstetric history .Their BMI was also calculated. At the end of interview each woman, was given health education regarding the causes and risk factors for UI and how they can prevent UI by simple lifestyle modifications. Those who were suffering from UI were educated about doing kegel's exercise, and other treatment options available like, medications and surgery. The research was approved by the institute ECARP.

Statistical Analysis - Data was entered in MS Excel and analysed using X^2 test of significance to find association if any between UI and various risk factors.

RESULTS

Prevalence of UI: In this study, diagnosis of UI was based on answers to leading questions about symptoms of urinary incontinence. Thus the prevalence of UI was determined in the participants using standard methods for recording symptoms. Out of 1200 women, 361 women reported UI and prevalence was 30.08%.

UI and risk factors: (As seen from Table 1)

BMI: Prevalence of UI increased significantly as the BMI of the subjects increased. Only 15(9.55%) in underweight subjects, 181(27.42%) in normal BMI subjects while 110(38.46%) in overweight subjects had UI (p-0.000).

No. of vaginal deliveries: (As seen from Table 2) - Increased prevalence of UI was seen to be significantly associated with increase in the number of vaginal deliveries (p=0.000). (Table 2) Prevalence of UI in $\leq$2 vaginal deliveries was only 20.74% but after $5^{th}$and 6^{th}deliveries it was 39.90%.

Age at first child birth: UI was significantly higher in subjects who had younger (<18 years) age at first child birth (p=0.000). In our study, of 573 women under 18 years age,at first childbirth, 208(36.30%) had UI as compared to 153 (24.4%)of 627 who were older .

History of episiotomy: UI was significantly less [217 (27.43%)] in subjects who had history of episiotomy (p-0.005)as compared to those without episiotomy 144/409 (35.2%)

History of obstructed labor: There was higher prevalence of UI [89/162 (54.94%)] in subjects who had history of obstructed labor (p-0.000) as compared to those without history of obstructed labor 272/1038(26.2%) No. of LSCS (As seen from Table 3) -There was no significant association between UI and the no. of lower segment caesarean section delivery (p-0.517).Of those having 0-1 LSCS done, only 29%(335/1122) had UI as compared to 26/78 (33.3%) of those who had more than 2 LSCS done

Dilatation and curettage procedure: UI was significantly higher in subjects who had more no. of dilatation and curettage procedure (p-0.022). Only 29.89% of those who had undergone <2 DandC (353/1181) had UI as compared to 8/19 (42.1%) who had > 2 DandC done.

History of Pelvic Surgeries (TL/LSCS/Hysterectomies/Prolapse/Hernia) (As seen from Table 4) -UI prevalence was significantly higher in those who had undergone any form of pelvic surgery. 164/418(39.2%) as compared to 197/782 (25.1%)

History of Urinary tract infection (UTI): UI was significantly higher in those with past history of UTI 179/475(37.68%) as compared to those without past history of UTI 182/725(25.1%) (p-0.000). In this study Stroke **(**100%) was an obvious risk factor for UI (p=0.008).All 4 subjects with stroke had UI. UI was significantly higher in subjects who had lumbar disc disease [63.64% (7/11) (p-0.015)]

Prevalence of UI in chronic conditions: 105 had UI of 193 suffering from chronic constipation (54.4%) as compared to 256/1007 who did not have constipation. Prevalence of UI was significantly higher in subjects who had chronic constipation [54.40% (p=0.000)]. Of 29 who had chronic cough 17 had UI (58.9%) as compared to 344/1171 in those without chronic cough. (29.38%) There was significant association between UI and chronic cough [58.62% (p-0.001)].

Prevalence of UI in medical conditions: 108/241 hypertensives had UI (44.8%) as compared to 26.38% prevalence in non hypertensives**.** UI was significantly higher in subjects who had hypertension [44.81% (p-0.000)]. (36.25%) 58 of 160 diabetics had UI as compared to 29.13% of non-diabetics. There was no significant association between UI and diabetes mellitus (p-0.068)

Table 1: Prevalence of urinary incontinence as per body mass index

Body Mass Index		Total Urinary Incontinence		Total
		Yes	No	
Underweight	Count	15	142	157
	%	9.55	90.45	100%
Normal	Count	181	479	660
	%	27.42	72.58	100%
Overweight	Count	110	176	286
	%	38.46	61.54	100%
Obese grade-1	Count	43	40	83
	%	51.81	48.19	100%
Obese grade -2	Count	12	2	14
	%	85.71	14.29	100%
Total	Count	361	839	1200
	%	30.08	69.92	100%

(p- 0.000, df-3, chi square test significant)

Table 2: Prevalence of urinary incontinence as per the number of vaginal deliveries

Number of Vaginal Deliveries		Total Urinary Incontinence		Total (%)
		Yes (%)	No (%)	
0 - 2	Count	95 (20.74)	363(79.26)	458 (100%)
3 - 4	Count	167 (33.81)	327(66.19)	494 (100%)
5 and above	Count	99 (39.90)	149(60.10)	248 (100%)
Total	Count	361(30.08)	839(69.92)	1200 (100%)

(p- 0.000, df-3, chi square test significant)

Table 3: Prevalence of urinary incontinence with respect to type of pelvic surgery

Type of pelvic surgery		Total urinary incontinence		Total (%)
		Yes (%)	No (%)	
Bilateral tubal ligation	Count	126 (37.06)	214 (62.94)	340 (100%)
Cesarean section	Count	10 (40)	15 (60)	25 (100%)
Hysterectomy	Count	24 (53.33)	21 (46.67)	45 (100%)
Hernia	Count	4 (66.67)	2 (33.33)	6 (100%)
Prolapse	Count	0 (0)	2 (100)	2 (100%)
No	Count	197 (25.19)	585 (74.81)	782 (100%)
Total	Count	361	839	1200
	%	30.08	69.92	100%

(p - 0.000, df-3, chi square test-significant)

Table 4: Prevalence of urinary incontinence with respect to pelvic surgery undergone

Pelvic Surgery	UI Positive (%)	UI Negative (%)	Total (%)
Yes	164 (39.2)	254 (60.8)	418 (100)
No	197 (25.1)	585 (74.9)	782 (100)
	361	839	1200

DISCUSSION

Prevalence of UI: Diagnosis of UI was based on answers to leading questions about symptoms of urinary incontinence .Thus the prevalence of UI was found to be 30.08% .In a study conducted in Coimbatore (India), out of 598 participants, a total of 202 (33.8%) reported that they had UI.[9] In other studies from India, prevalence was 10% and 21.87% .[8,10] Many international studies viz. Australian study, Buckley and Lapitan (2010) had prevalence ranging from 32–64%. [11-14] Prevalence in European countries was higher than our study population, 23% in Spain (an exception), 44%, 41% and 42% for France, Germany and the UK, respectively.[15] This variation in prevalence of UI is due to differences in definitions used, population surveyed, survey type, response rate, age, availability and efficacy of health-care, and other factors. In India, chronic and less life threatening UI is still impacting women's health at proportion that requires public health interventions.

UI with respect to the various risk factors

BMI: As the age advances progressive loss of muscle tone, decreased contractility, changes in the hormonal stimulation may lead to increase chances of UI. UI increased as the BMI of the subjects increased, 15(9.55%) in underweight subjects, 181(27.42%) in normal BMI subjects while 110(38.46%) in overweight (p-0.000).(Table 1) In most of published studies UI and BMI had significant association. [10,16,19,20] Subak *et al* found that for every 5-unit increase in BMI there is a 20–70% increase in the risk of UI. It was proposed that the added weight of the person increases the abdominal pressure, leading to pelvic muscle weakness. A population-based, age-stratified postal survey in Washington State showed that higher BMI increased the odds of having UI.[14] Higher BMI leads to persistent weight on the pelvic tissues causing chronic strain, stretching and weakening of the muscles, nerves, and other structures. Very few studies showed no significant association between UI and BMI such as study from Karimnagar district of India.[8] There was no significant association between BMI of the respondents and the outcome of UI. Differences in association might be because of difference in cultural, geographical and behavioral pattern of study subjects.

No, of vaginal deliveries: Increased prevalence of UI was seen to be significantly associated with increase in the number of vaginal deliveries (p=0.000).(Table 2) Prevalence of UI in ≤2 vaginal deliveries was 20.74% and after 5thand 6thdeliveries it was 39.90%. Many studies showed significant association between UI and number of vaginal deliveries. [10,16] This could be explained by the fact that labor and delivery process may cause pelvic floor dysfunction as a result of nerve damage, muscular damage, and direct tissue stretching and disruption which is more with more deliveries.

Age at first child birth: UI was significantly higher in subjects who had younger (<18) age at first child birth (p=0.000). Many studies showed the similar results, younger the age at first child birth more the chances of getting UI. [8-10,17.] This could be explained by the fact that immaturity of the reproductive system and child bearing below the age of 18 years may predispose a woman for UI. In India, marriage and childbearing are traditionally at younger ages. In our study, 36.30% of the incontinent women had their first childbirth at an age less than 18 years.

History of episiotomy: UI was significantly less [217 (27.43%)] in subjects who had history of episiotomy (p-0.005). Large study from China showed episiotomy as potential risk factor for UI. [16] Episiotomy given during child birth decreases the chances of damage to pelvic floor and reproductive tract which leads to less prevalence of UI. The difference in study results could be due to the difference in obstetric practices in the countries..

History of obstructed labor: There was higher prevalence of UI [89 (54.94%)] in subjects who had history of obstructed labor (p-0.000). Similarly study by Bondhare *et al* showed, among the obstetrical factors, history of forceps delivery, and prolonged labor were significant risk factors for outcome of UI. [8] This could be because of damage to reproductive tract (pelvic floor, nerves, tissues, ligaments) during attempt to deliver baby forcefully.

No. of LSCS: There was no significant association between UI and the no. of lower segment caesarean section delivery (p-0.517).(Table 3) A population-based, postal survey in Washington State revealed having had only caesarean deliveries decreased the odds of having UI. [14] Another large study from China showed caesarean deliveries had been potential risk factor for UI. [16] Differences in the results could be because of the type of LSCS, either elective or emergency section. In elective section being planned there is no trial of labor therefore less risk of UI. In the study from China, emergency sections were probably done after prolonged attempt at vaginal delivery.

Dilatation and curettage procedure: UI was significantly higher in subjects who had dilatation and curettage procedure (p-0.022). No literature is available on whether this procedure is a risk factor for UI. During dilation and curettage, injury to reproductive tract and nerves might lead to UI in women.

History of Pelvic surgeries: UI was significantly higher in subjects who had any pelvic surgeries (39.2%) in the past (p-0.000). Hysterectomy was one of the significant risk factor in many studies.[10,14,18.] During surgery there could be chances of damage to pelvic structures leading to UI.

History of Urinary tract infection (UTI): 37.68% was significantly associated with the prevalence of UI. Very few studies had showed UTI as risk factor for UI.[19] UI was seen to be higher in subjects who had pelvic inflammatory disease (PID) (33.27%) in the past. No literature is available for PID as a risk factor for UI. This could be because of inflammatory process leading to formation of fibrosis and scars in reproductive tract and tissues surrounding it, thus causing UI. In this study Stroke **(**100%) was an obvious risk factor for UI. Only few studies mention about stroke as a risk factor for UI. [11] UI was significantly higher in subjects who had lumbar disc disease (63.64%). Neurological damage in stroke and lumbar disc disease is responsible for urinary leakage in subjects.

Prevalence of UI in chronic conditions: Prevalence of UI was significantly higher in subjects who had chronic

constipation (54.40%). Similarly study by Bondhare *et al*, India showed chronic constipation as a significant risk factor for UI.[8] Another study from China revealed chronic constipation as potential risk factor for UI. [18] There was significant association between UI and chronic cough (58.62%). Similar results had been seen in other studies.[8,11] This could be explained by the fact that chronic constipation and chronic cough both increased intra-abdominal pressure, increasing pressure on pelvic floor lead to weakness of muscles.

Prevalence of UI in medical conditions: UI was significantly higher in subjects who had hypertension (44.81%). Similar finding was seen in a large study from China.[16] This could be explained by the fact that hypertension is mostly seen in advancing age. Similarly UI was also seen to be increasing as age advances. This could be confounding factor. There was no significant association between UI and diabetes mellitus (p-0.068). This risk factor was not studied in many studies of UI. This suggests diabetes has no effect on UI.

CONCLUSION

BMI, vaginal delivery, age at first child birth were the potential obstetrical risk factors for UI, whereas episiotomy protected them from developing UI. In our study LSCS was not a risk factor. Other associated risk factors were, history of obstructed labor, dilatation and curettage, urinary tract infection, pelvic inflammatory disease, stroke and lumbar disc disease. Hysterectomy was seen to be the most common type of pelvic surgery to be significantly associated with UI. Prevalence of UI was seen to be significantly higher in subjects who had long standing constipation and cough. Prevalence of UI was seen to be significantly higher in subjects who had medical condition like hypertension. Diabetes mellitus had no significant association with UI.

Recommendations: High prevalence rate of UI reflects an urgent need for starting an interventional program for prevention and control. Many risk factors of UI are modifiable and can be addressed as part of other health promotion programs such as reproductive health and family planning (MCH services) or routine health check-up. In this study, risk factors such as young age at childbirth (<18 years), multiple vaginal deliveries, suggest our family planning policy needs more stringent implementation. Using the risk factors identified in this study, health care providers in the community can provide targeted health education such as performing Kegel's exercises and can be made aware of available interventions which they could communicate to community women.

The finding of study will be helpful for health planners and executors to design proper future policies for urban areas and plans for improving women health. It may also provide a baseline as well as scientific endeavor to the future researchers working on this crucial area of women health.

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