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ORIGINAL ARTICLE

Prevalence of Urinary Incontinence and Associated Gynecological Risk Factors Among Middle-Aged Women: A Cross-Sectional Study

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ABSTRACT

Background: Urinary incontinence is an underreported pelvic floor disorder that can impair quality of life. Middle-aged women may be vulnerable because of obstetric trauma, menopause, obesity, and pelvic organ prolapse.

Objective: To assess the frequency, intensity, classifications, and gynecological risk factors linked to urine incontinence in middle-aged females.

Methods: This cross-sectional study included 120 females aged 40 to 60 years who visited the Department of Gynecology and Obstetrics at Nishtar Medical University in Multan, Pakistan, between June 2022 and June 2023. Individuals were enlisted in a sequential manner. Urinary incontinence was evaluated utilizing the International Consultation on Incontinence Questionnaire–Urinary Incontinence Short Form. Obstetric and gynecological parameters were documented, and multivariable logistic regression was employed to ascertain independent correlating factors.

Results: Urinary incontinence was detected in 43 individuals, resulting in a prevalence rate of 35.8%. Stress urine incontinence constituted the predominant subtype at 55.8%, followed by urgency at 25.6% and mixed urinary incontinence at 18.6%. Moderate symptoms were observed in 53.5% of the women impacted. Independent variables linked to urinary incontinence included advancing age (adjusted odds ratio [aOR] 1.08; 95% confidence interval [CI] 1.01–1.16), obesity (aOR 2.24; 95% CI 1.00–5.03), having three or more vaginal births (aOR 2.61; 95% CI 1.12–6.09), severe perineal laceration (aOR 4.32; 95% CI 1.01–18.52), and stage II or higher pelvic organ prolapse (aOR 4.89; 95% CI 1.41–16.95).

Conclusion: Urinary incontinence affected more than one-third of middle-aged women. Routine screening and early pelvic floor interventions are warranted, particularly for women with repeated vaginal deliveries, obesity, perineal trauma, or pelvic organ prolapse.

Keywords: urinary incontinence; middle-aged women; vaginal delivery; pelvic organ prolapse; obesity; perineal trauma

INTRODUCTION

One of the most common pelvic floor conditions is urinary incontinence, which is the unintended leakage of urine[1]. It is not typically life-threatening, but can significantly impact physical function, emotional health, social engagement, sexual function, sleep and quality of life. Many women who have urinary leakage do not seek help from their doctors, as they think it is a common or normal symptom of childbirth or grow old, embarrassed to discuss with their doctors, or don't know that effective treatment is available. Thus, the actual picture of urinary incontinence may be missed in daily clinical practice[2].

Middle age is a critical time for the development and development of urinary incontinence[3]. At this point, the combined impact of pregnancy and childbirth can contribute to an increase in body weight, chronic medical conditions and loss of pelvic floor support. Stress urinary incontinence is usually associated with poor urethral support and commonly is associated with stress events, such as coughing, sneezing, lifting, exercising, or other activities that result in an increase in intra-abdominal pressure. Urgency urinary incontinence is characterized by an urgent need to get to the toilet in time and mixed urinary incontinence is a combination of stress and urgency incontinence[4,5].

Gynecological/obstetric conditions may predispose to urinary incontinence. When the vagina has been dilated, or even torn during repeated vaginal births, the levator ani muscles, pelvic fascia, connective tissues and pudendal nerves are also weakened or damaged[6]. Pelvic floor function might be further impaired by instrumental delivery, prolonged labor, episiotomy, severe perineal tears, and macrosomic infant. Higher parity may thus result in cumulative structural and neuromuscular injury, that is only becoming clinically obvious in the Middle Ages[7,8].

Lower urinary tract function may be further altered by the menopausal status. Low levels of oestrogen can cause alteration in the urethral mucosa, periurethral tissues, vaginal epithelium, the collagen composition and the pelvic floor musculature[9]. These changes can make the urethral closing mechanisms less effective and exacerbate urinary symptoms. Urinary incontinence often accompanies pelvic organ prolapse, as there are shared risk factors: age, vaginal delivery, multiparity, obesity and connective-tissue weakness. Bladder support, pelvic anatomy, and/or autonomic nerve function may also be altered if a hysterectomy or other pelvic surgery has been performed[10,11].

This prevalence of urinary incontinence is widely variable between populations due to the differences in age distribution, definition of incontinence, methods of assessment, cultural perspectives, and study settings[12]. In many low and middle-income countries, urinary incontinence is not routinely checked for in gynecological visits. Women can repeatedly visit with menopausal, prolapse or general gynecological complaints without being asked about any urinary leakage. This lost opportunity can lead to a delay in diagnosis, conservative care, pelvic floor rehabilitation and specialist referral[13].

There is limited evidence on the extent of urinary incontinence and its gynecological risk factors among the middle-aged women in many resources poor settings. Identification of high-risk women could facilitate earlier screening and prevention. This study was thus designed to establish the prevalence, clinical features and severity of urinary incontinence and to find gynecological and obstetric risk factors for urine leakage in middle-aged women.

MATERIALS AND METHODS

Study design and setting: A cross-sectional investigation was conducted from June 2022 to June 2023 at the Department of Gynecology and Obstetrics at Nishtar Medical University, Multan, Pakistan. The study aims to determine the prevalence of urine incontinence and identify any gynecological and obstetric risk factors linked to urinary incontinence in middle-aged women visiting the gynecology outpatient department.

Study population: All women aged 4060 years who presented at the gynecology outpatient department in the study period were screened for eligibility. To ensure minimisation of symptom-based selection and to provide a more representative estimate of the prevalence of urinary incontinence amongst the population

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attending, women were included regardless of whether urinary leakage was their main presenting complaint.

Women who were pregnant, up to six months postpartum, and/or had a clinically suspected or laboratory confirmed urinary tract infection were excluded. Women with a history of bladder dysfunction due to known neurologic disease, vesicovaginal fistula, a history of urinary incontinence surgery, a history of severe cognitive disease, congenital urinary tract abnormalities or who were unable to complete the questionnaire were also excluded.

Sampling size and sampling technique: The sample size for the single-population proportion was determined. Given an expected prevalence for urinary incontinence of 50%, a 95% confidence level and an absolute precision of 9%, the smallest sample size calculated was about 119 participants. The final sample was rounded to 120 women. The sample was recruited by consecutive non-probability sampling until the number of samples required was obtained.

Data collection procedure: The respondents were interviewed after getting the written informed consent in private interview setting by using a structured Data Collection Form. Information related to age, educational status, residence, body mass index, smoking status, diabetes mellitus, hypertension, chronic cough, chronic constipation and regular use of medication was obtained by using the questionnaire.

Obstetric and gynecological history was obtained that included gravidity, parity, mode and number of deliveries, instrumental vaginal delivery, prolonged second stage of labor, episiotomy, third or fourth degree perineal tear, delivery of a macrosomic baby, menopausal status, duration since menopause, previous hysterectomy, other pelvic surgery, and symptoms of pelvic organ prolapse. Where possible, relevant information was obtained from medical records.

The age 40-60 years was considered as middle age. Menopause was indicated as when a woman had not had her period for 12 months or more, with no other physiological or pathological cause. Multiparity was taken as having three or more previous deliveries. Body mass index (BMI), ≥ 30 kg/m2, was used to define obesity. Macrosomic delivery was defined as delivery of an infant at birth of ≥4 kg.

Assessment of urinary incontinence: The International Consultation on Incontinence Questionnaire - Urinary Incontinence Short Form was used to assess urinary incontinence. A survey was employed to evaluate the volume and frequency of urinary incontinence, its impact on daily activities, and the conditions that precipitated leakage. Total ratings ranged from 0 to 21 points, with higher values indicating more severe symptoms. Urinary incontinence was defined as any report of urine leakage, irrespective of the origin, that transpired at least weekly over the past three months. The classification of severity was determined by the score achieved in the questionnaire: mild (1-5), moderate (6-12), severe (13-18), and very severe (19-21). Stress urinary incontinence was characterized as the involuntary leakage occurring during coughing, sneezing, laughing, lifting, exercising, or engaging in physical activity. Urgency urinary incontinence is characterized by incontinence occurring with or immediately preceding a sudden need to reach the restroom. Mixed urine incontinence was defined as the presence of both stress and urgency-related leaking symptoms.

Clinical and gynecological examination: Uniform apparatus was employed for the assessment of height and weight, and body mass index was determined by dividing weight (in kg) by the square of height (in m). A comprehensive physical and abdominal assessment was conducted, along with a pelvic examination performed by a qualified gynecologist. Pelvic organ prolapse was evaluated at maximum straining in the lithotomy position with the Pelvic Organ Prolapse Quantification method. Clinically relevant pelvic organ prolapse (POP) was classified as stage II or above. Every woman suspected of having a urinary tract infection had a urine examination before categorization. The individuals requiring additional assessment or intervention were directed to appropriate gynecology and urology services.

Study variables and outcomes: The main outcome measured was urinary incontinence in middle aged women. Secondary outcomes were the distribution of stress incontinence, urgency incontinence and mixed urinary incontinence, symptom severity and association of urinary incontinence with gynecological and obstetric factors.

The possible risk factors were age, menopausal status, parity, number of vaginal deliveries, instrumental delivery, prolonged labour, episiotomy, severe perineal tear, macrosomic childbirth, pelvic organ prolapse, previous hysterectomy, obesity, diabetes mellitus, chronic cough and chronic constipation.

Statistical analysis: IBM SPSS Statistics 26 was used for data entry and analysis. The normality of continuous variables was assessed, and either the mean and standard deviation or the median and interquartile range were reported as suitable. Categorical data were presented as numerical values and percentages.

The participants were divided into groups based on urine incontinence and non-incontinence. The independent-samples t test or Mann–Whitney U test was employed to assess continuous variables, whereas the chi-square test or Fisher exact test was utilized for categorical variables.

Univariable logistic regression was employed to assess the relationship between each possible risk factor and urinary incontinence. All variables with a probability value of less than 0.20 in the univariable analysis were included into a multivariable logistic regression model alongside clinically significant covariate. Independent predictors of urinary incontinence were identified through the application of adjusted odds ratios accompanied by 95% confidence intervals. Multicollinearity was assessed before constructing the final models. Statistically significant variations were established as a two-tailed p-value of less than 0.05.

Ethical considerations: Prior to commencing the research, ethical authorization was obtained from the relevant institutional review board of Nishtar Medical University. Informed permission in writing was acquired from all subjects. Participation was optional, and individuals might disengage at any moment without affecting their medical treatment. To maintain anonymity, coded identifiers were used and the information was anonymized from the analytical dataset.

RESULTS

Participant characteristics: A total of 127 women were evaluated for eligibility throughout the study period. Seven women were excluded due to either an active UTI, the recent postpartum period, or incomplete assessment. A total of 120 middle aged women completed the study (94.5%).

The average age of the participants was 48.7 ± 5.6 years, and the average body mass index was 27.7 ± 4.6 kg/m². A total of 65 women (54.2%) were postmenopausal, 71 women (59.2%) had a parity of three or more, 58 women (48.3%) had experienced three or more vaginal births, and 45 women (37.5%) were classified as obese.

Out of 120 individuals, 43 were found to have urine incontinence, resulting in a prevalence rate of 35.8% (95% confidence interval [CI] 27.8%-44.7%). The average age of women with urine incontinence was much greater than that of their counterparts without the condition, and the average BMI was elevated among women with urinary incontinence. Women impacted by this condition had a higher propensity for obesity. Statistically, women with urine incontinence had a higher prevalence of diabetes mellitus, hypertension, chronic cough, and chronic constipation; however, these findings lacked statistical significance (Table 1).

Obstetric and gynecological characteristics: Urinary incontinence was significantly more common among the postmenopausal women than among the continent women. Likewise, having three or more parity and at least three vaginal

deliveries were significantly more prevalent in the urinary-incontinence group.

Urinary incontinence was also associated with instrumental vaginal delivery, prolonged second stage of labour and severe perineal trauma and clinically significant pelvic organ prolapse. Women who delivered a macrosomic infant and those with previous hysterectomy were more common among affected women, but this was not statistically significant (Table 2).

Pattern and severity of urinary incontinence: Stress urinary incontinence was the most common type of urinary incontinence with 24 women (55.8%) of the 43 women with urinary incontinence. Eleven women (25.6%) had urgency urinary incontinence, eight women (18.6%) had mixed urinary incontinence.

The mean score of the International Consultation on Incontinence Questionnaire – Urinary Incontinence Short Form was 9.0 ± 4.3. Out of the 43 affected women 10 (23.3%) had a slight urinary incontinence, 23 (53.5%) had moderate, 8 (18.6%) had severe and 2 (4.7%) had very severe urinary incontinence.

A total of 15 women with UI (34.9%) experienced leakage at least once per day and 13 women (30.2%) used absorbent pads regularly. Sixteen women (37.2%) reported that they had to limit their physical activity due to urinary leakage and 11 women (25.6%) had discussed urinary leakage with a healthcare professional previously.

Table 1: General characteristics according to urinary continence status

Characteristic	Total, n=120	Urinary incontinence, n=43	No urinary incontinence, n=77	p-value
Age, years, mean ± SD	48.7 ± 5.6	50.7 ± 5.7	47.6 ± 5.3	0.004
Body mass index, kg/m², mean ± SD	27.7 ± 4.6	29.4 ± 4.8	26.8 ± 4.3	0.004
Obesity	45 (37.5)	23 (53.5)	22 (28.6)	0.007
Diabetes mellitus	24 (20.0)	12 (27.9)	12 (15.6)	0.106
Hypertension	35 (29.2)	15 (34.9)	20 (26.0)	0.303
Chronic cough	15 (12.5)	8 (18.6)	7 (9.1)	0.131
Chronic constipation	28 (23.3)	14 (32.6)	14 (18.2)	0.074
Urban residence	76 (63.3)	27 (62.8)	49 (63.6)	0.927
Secondary education or higher	65 (54.2)	21 (48.8)	44 (57.1)	0.381

Table 2: Obstetric and gynecological factors according to urinary continence status

Characteristic	Total, n=120	Urinary incontinence, n=43	No urinary incontinence, n=77	p-value
Postmenopausal status	65 (54.2)	30 (69.8)	35 (45.5)	0.010
Parity ≥3	71 (59.2)	33 (76.7)	38 (49.4)	0.003
Three or more vaginal deliveries	58 (48.3)	29 (67.4)	29 (37.7)	0.002
Instrumental vaginal delivery	20 (16.7)	12 (27.9)	8 (10.4)	0.014
Prolonged second stage of labour	26 (21.7)	14 (32.6)	12 (15.6)	0.030
Third- or fourth-degree perineal tear	11 (9.2)	8 (18.6)	3 (3.9)	0.016
Previous delivery of a macrosomic infant	20 (16.7)	10 (23.3)	10 (13.0)	0.148
Pelvic organ prolapse stage II or greater	18 (15.0)	13 (30.2)	5 (6.5)	<0.001
Previous hysterectomy	14 (11.7)	8 (18.6)	6 (7.8)	0.077
Previous pelvic surgery other than hysterectomy	10 (8.3)	5 (11.6)	5 (6.5)	0.326

Table 3: Logistic regression analysis of factors associated with urinary incontinence

Factor	Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age, per one-year increase	1.10 (1.03–1.17)	0.005	1.08 (1.01–1.16)	0.031
Obesity	2.88 (1.32–6.25)	0.007	2.24 (1.00–5.03)	0.049
Postmenopausal status	2.77 (1.26–6.10)	0.010	1.76 (0.74–4.18)	0.199
Three or more vaginal deliveries	3.43 (1.56–7.53)	0.002	2.61 (1.12–6.09)	0.027
Instrumental vaginal delivery	3.34 (1.24–8.98)	0.014	—	—
Prolonged second stage of labour	2.61 (1.08–6.35)	0.030	—	—
Third- or fourth-degree perineal tear	5.64 (1.41–22.56)	0.007	4.32 (1.01–18.52)	0.049
Previous delivery of a macrosomic infant	2.03 (0.77–5.36)	0.148	—	—
Pelvic organ prolapse stage II or greater	6.24 (2.04–19.05)	<0.001	4.89 (1.41–16.95)	0.012
Previous hysterectomy	2.70 (0.87–8.40)	0.077	—	—
Diabetes mellitus	2.10 (0.85–5.20)	0.106	—	—
Chronic constipation	2.17 (0.92–5.14)	0.074	—	—

Factors associated with urinary incontinence: Univariable logistic regression showed that urinary incontinence was significantly associated with increasing age, obesity, postmenopausal status, three or more vaginal deliveries, instrumental vaginal delivery, prolonged second stage of labour, severe perineal tear and stage II or greater pelvic organ prolapse.

Due to the high correlation between number of vaginal deliveries and parity, parity was not entered at the same time as number of vaginal deliveries. Independent risk factors for urinary incontinence after adjustment included increased age, obesity, three or more vaginal deliveries, severe perineal tear and pelvic organ prolapse.

The adjusted odds of urinary incontinence were about 2.6 times higher in women who had three or more vaginal deliveries compared with women with fewer vaginal deliveries. Prior 3rd or 4th degree perineal tear was associated with greater than fourfold increased odds and stage II or greater POP was associated with nearly fivefold increased adjusted odds of urinary incontinence (Table 3).

This final multivariable model had good calibration with a nonsignificant Hosmer–Lemeshow test (p=0.624). The model accounted for about 38% of the variance in urinary incontinence, and correctly classified 75.8% of the participants, based on the Nagelkerke R^2.

DISCUSSION

Urinary incontinence was identified in 35.8% of middle-aged women in this study, indicating a substantial burden among patients attending gynecological outpatient care[1]. The most common type was stress urinary incontinence, then urgency and mixed urinary incontinence. Over half of the women affected had moderate symptoms, and age, severe perineal trauma, obesity, repeated vaginal delivery and pelvic organ prolapse were all independently associated with urinary leakage[2].

This prevalence was seen in this study, and could be a combination of childbirth, ageing, menopause, obesity and pelvic floor weakness[3]. Variations in the prevalence rates between

studies are often due to differences in the age range studied, the clinical setting, the definition of symptoms, the type of instruments used, and sampling procedures. This study took place in a hospital, so women who attended the gynecology department might have been more likely to have pelvic floor disorders than women in the general community[4,5].

Over half of all cases were of stress urinary incontinence. This is biologically reasonable as there may be anatomical changes due to repeated pregnancies and vaginal delivery, including damage to the levator ani muscles, the pelvic fascia and the pudendal nerves. The odds of urinary incontinence were significantly higher in women with three or more vaginal deliveries, indicating a cumulative effect of obstetric exposure to increasing pelvic floor dysfunction[6-8].

Another independent factor of great importance was severe perineal trauma. Third- or fourth-degree perineal tears can suggest significant damage to the pelvic floor muscles, connective tissues and nerve pathways. Instrumental delivery and prolonged 2nd stage of labour were only significant in the unadjusted analysis, which may be explained by, or mediated by, other variables such as perineal injury and multiple vaginal deliveries[9-11].

Urinary incontinence was most highly correlated with pelvic organ prolapses. The adjusted odds of urinary leakage were nearly five times as high for women with stage II or greater prolapse[12]. Increasing age, multiparity, vaginal delivery, obesity and weak pelvic floor are common risk factors in both conditions. The results of this study demonstrate the value of a dual evaluation of both urinary symptoms and pelvic organ prolapse during a general gynecological examination[13].

Urinary incontinence was also found to be independently associated with obesity. High intra-abdominal pressure, and intravesical pressure, could provide a constant mechanical strain on the bladder, on urethral supporting structures and on the pelvic floor[14]. Obesity being potentially modifiable, weight reduction may be an important part of prevention and conservative management[15].

Urinary incontinence was associated with increasing age, likely due to a decrease in urethral closure pressure, decreasing strength of the pelvic floor muscles, changes in bladder function, and accumulation of obstetric and metabolic risk factors[16]. Postmenopause was significant in unadjusted analysis but not in adjusted analysis, indicating that this effect may be related to age, obesity, parity and pelvic floor abnormalities[17].

Although symptoms were very prevalent, not many of the women affected had talked to a health care professional about urinary leakage before[18]. Delayed consultation may be due to embarrassment, the normalisation of leakage after childbirth or ageing and lack of knowledge of the treatment. A brief validated questionnaire might therefore be more useful for routine screening to help identify them early, especially in women who have had multiple vaginal deliveries, are obese, have prolapse or have suffered previous severe perineal injuries[19].

Treatment of constipation and chronic cough, modification of excessive caffeine intake, pelvic floor muscle training, and bladder training may be recommended as initial treatment. A specialist evaluation should be performed in women with severe symptoms, significant prolapse, voiding difficulty, a history of frequent urinary infections or suspected neurological disease[20].

A standardised urinary incontinence questionnaire was used and symptom sub-types and severity were determined as well as clinical assessment of pelvic organ prolapse[5-8]. But caused it to be untraced in cross section. Consecutive sampling and a single-center setting may restrict generalizability, and retrospective measurements of obstetric events could have caused recall bias. Because of the small sample, confidence intervals were also large for rare exposures, such as those with severe perineal tears. In addition, urinary incontinence subsets were assigned based on clinical, rather than urodynamic, criteria[10-13].

Larger multicenter, community-based, and longitudinal studies are needed to validate these results and assess the impact of screening, weight loss, and pelvic floor rehabilitation in high-risk women[18-20].

CONCLUSION

Urinary incontinence affected more than one-third of middle-aged women in this study, with stress urinary incontinence being the most common subtype. Older age, obesity, three or more vaginal deliveries, severe obstetric perineal trauma and stage II or greater pelvic organ prolapse were independently associated with urinary leakage. The majority of affected women experienced moderate symptoms and a small number of women had previously sought medical attention. Urinary incontinence should be part of all gynecological and primary care visits, especially for women who have had multiple vaginal deliveries, pelvic organ prolapses, obesity, and severe perineal trauma. Women with pelvic organ prolapse may experience improvement in their quality of life with early detection, lifestyle changes, pelvic floor muscle exercises and prompt referral to a specialist.

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