

Prevalence of urinary incontinence in nulliparous Indian sportswomen

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ABSTRACT

Introduction: A common gynaecological problem among women that leads to a negative impact on quality of life and causes distress is the involuntary loss of urine which is addressed as urinary incontinence (UI). Females involved in playing various types of sports perform high-intensity activities which can serve as risk factors for UI and pelvic organ prolapse. According to the available literature, there is a scarcity of information regarding data on the prevalence of UI in Indian female athletes. Therefore, the purpose of the present study was to evaluate the prevalence of UI in nulliparous Indian sportswomen. **Methodology:** For a duration of 6 months, a cross-sectional study was carried out in various sports centres across the states of Telangana, Maharashtra, Gujarat, and Delhi. A total of 560 nulliparous Indian female sportswomen were involved based on the selection criteria. The various sports involved were malkhamb, kabaddi, kushti, weightlifting, gymnastics, basketball, badminton, and athletics. All the participants were provided with a questionnaire for female UI diagnosis (QUID), which was the primary outcome measure. **Results:** Out of 560 women enrolled in the study, the highest prevalence was found for stress urinary incontinence (SUI), consisting of 126 (22.5%) women, followed by mixed urinary incontinence (MUI), involving 49 (8.8%) women, and urge urinary incontinence (UUI), including 47 (8.4%) women. Additionally, the prevalence of UI was highest in obese and overweight Indian sportswomen. Moreover, the highest prevalence of SUI among women was for weightlifting, whereas for UUI and MUI, malkhamb and kushti sports were the most prevalent, respectively. **Conclusion:** The present study concluded that the highest prevalence among nulliparous Indian sportswomen was for SUI, followed by MUI and UUI. Additionally, weightlifting sport showed the highest prevalence for SUI, followed by malkhamb for UUI and kushti for MUI. The prevalence of UI in Indian sportswomen is important as it imparts knowledge and awareness among women and benefits professionals in designing appropriate preventive and rehabilitative protocols for curtailing such problems in the near future.

Keywords: Body mass index, Indian sportswomen, nulliparous, physical activity, urinary incontinence

Introduction

The term urinary incontinence (UI) refers to the involuntary loss of urine. It is a frequent gynaecological issue that causes distress in women and degrades their quality of life.^[1,2] Women's health issues are often among the most overlooked and underreported

because most of them are either reluctant to disclose their symptoms or believe that they are a natural aspect of ageing.^[3] Globally, women with UI have a prevalence that varies from 8 to 45%; middle-aged women have a prevalence of 30% to 40%, and elderly women show a prevalence of roughly 50%.^[4-6] Based on the aetiology and pathophysiology, UI can be divided into three categories: mixed UI (MUI), urge UI (UUI), and stress UI (SUI). The International Urogynecological Association (IUGA) and the International Continence Society (ICS) both define SUI as a complaint of involuntary urine loss during exertion, or while laughing, sneezing, or coughing. Leakage of urine occurs due to physical exertion which increases intra-abdominal pressure. UUI is characterized by involuntary contractions of the bladder's

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detrusor muscles at inappropriate periods because of which it is also known as an overactive bladder. It is a complaint of involuntary leakage of urine associated with urgency. MUI is defined as the complaint of involuntary leakage of urine accompanied by a sense of urgency, physical exertion, effort, sneezing, or coughing. Ageing, obesity, vaginal deliveries, parity, pelvic surgeries, constipation, diabetes mellitus, chronic respiratory problems, and constipation are considered potential risk factors for UI.^[6,7]

According to the available literature, very scarce data are available in India regarding the prevalence of UI and other urological problems. Most of the women usually feel uneasy talking about it or think it is untreatable. Additionally, that is why it is among the ignored areas of concern for women’s health, not only in India but globally as well. Additionally, playing sports requires high-intensity activities which serve as risk factors for UI and pelvic organ prolapse. Because of this high-intensity activities there is a repeated increase in abdominal pressure, leading to chronic damage of the pelvic floor muscles, urethra-sacral and cardinal ligaments along with connective tissue of the perineum.^[8] Hence, the purpose of the present study was to determine the prevalence of UI in nulliparous Indian sportswomen as it benefits by increasing awareness among Indian sportswomen and primary care physicians for curtailing such problems in women in the near future by framing appropriate preventive and rehabilitative protocols.

Methodology

After approval from the Institutional Ethical Committee (IEC) with IEC-BH reference no. 14/2021, a cross-sectional study was conducted in various sports centres in Maharashtra, Gujarat, Delhi, and Telangana states for a duration of 6 months. The inclusion criteria consisted of female sportswomen aged 15–30 years, nulliparous and of Indian nationality, able to read English, and willing to participate for which informed consent was obtained from the women. However, pregnant and lactating women, women who participated previously in the survey, women who were not nulliparous, or were not willing to participate were excluded from the present study. A total of 560 participants were included based on the inclusion and exclusion criteria. For data collection, an online questionnaire was made available to the Indian female sports volunteers through Google Forms, which were sent randomly through social media. The various sports included were malkhamb, kabaddi, kushti, weightlifting, gymnastics, basketball, badminton, and athletes. All the participants were provided with a questionnaire for female UI diagnosis (QUID), which was the primary outcome measure.

All the participants gave their consent before participating in the survey. The survey was divided into three sections, which included an informed consent form, socio-demographic details, and the QUID questionnaire. The QUID is a six-item self-administered questionnaire which is a short, valid, and reliable tool developed to differentiate between UUI and SUI. The first three questions were

used to diagnose SUI, and the next three questions were used to diagnose UUI. Each item was given a score of 0–5 (5 representing all the time, 4 describing most of the time, 3 representing often, 2 demonstrating once in a while, 1 showing rarely, and 0 illustrating none of the time). Individuals with a total score of ≥ 4 for the first three questions were diagnosed with SUI, and ≥ 6 for the last three questions were diagnosed with UUI.^[9]

The data were collected and compiled in Microsoft Excel and presented as categorical variables illustrated as frequency and percentages of cases and represented as *n* (%). To statistically evaluate all the data the statistical package for the social sciences (SPSS), version 21 (Released 2012; IBM Corp., Armonk, New York, United States) for Microsoft windows was used.

Results

Overall, 560 Indian sportswomen were enrolled in the present study. The age-wise distribution of the prevalence of UI is demonstrated in Table 1 with statistically significant results. The highest prevalence of SUI was observed between 21–25 years with 56 (20.14%) participants, followed by 15–20 years of age 39 (21.0%), and 26–30 years of age 31 (32.3%). Additionally, the highest prevalence for UUI was seen in 21–25 years of age including 29 (10.4%) participants, followed by age 26–30 years of age 11 (11.5%), and 15–20 years of age 7 (3.8%). Furthermore, in participants with MUI, the highest prevalence was observed in the age group between 21–25 years of age consisting of 26 (9.4%) participants, followed by 26–30 years of age 21 (21.9%), and 15–20 years of age 2 (1.1%).

The distribution of participants for the prevalence of UI based on body mass index (BMI) is demonstrated in Figure 1 which shows that the maximum number of participants in SUI was obese and overweight followed by underweight and normal categories. Similarly, for UUI, most of the participants were overweight and obese followed by normal and underweight categories. Additionally, for MUI, the majority of the participants were in the obese category, followed by the underweight, normal, and overweight categories.

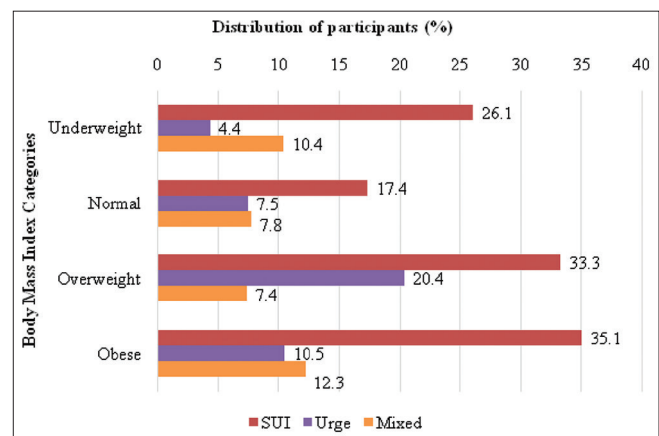


Figure 1: BMI-wise distribution of the prevalence of urinary incontinence

The distribution of participants based on types of UI is demonstrated in Table 2, and the maximum number of participants consisted of SUI involving 126 (22.5%) participants, followed by MUI including 49 (8.8%) participants, and UUI consisting of 47 (8.4%) participants.

The sport-wise distribution of the prevalence of SUI is demonstrated in Figure 2 which showed that the highest prevalence was observed in weightlifting, followed by badminton, basketball, gymnastics, kushti, athletics, kabaddi, and malkhamb.

The sport-wise distribution of the prevalence of UUI is demonstrated in Figure 3, which shows that the highest prevalence was observed in malkhamb, followed by weightlifting, kushti, kabaddi, gymnastics, basketball, athletics, and badminton.

The sport-wise distribution of the prevalence of MUI is demonstrated in Figure 4, which shows that the highest prevalence was observed in kushti, followed by kabaddi, malkhamb, badminton, basketball, athletics, weightlifting, and gymnastics.

Discussion

The present study evaluated the prevalence of UI among nulliparous Indian sportswomen aged 15 to 30 years. According to the present study, the most common form of UI among nulliparous Indian female athletes was SUI. Similarly, previous studies discovered that the most prevalent form of UI, leading to dysfunction of the pelvic floor muscle (PFM) in female athletes, was SUI. Moreover, it

is found that SUI affects 15% to 17% of women per day.^[10-12] The prevalence of SUI was found to be 126 (22.5%) participants in the present study followed by MUI 49 (8.8%) and UUI consisting of 47 (8.4%) participants which was similar to the prevalence of SUI reported by Pires *et al.*^[12] consisting of 20.7%. Moreover, a study given by Soni *et al.*^[6] demonstrated the highest prevalence of SUI, followed by MUI including, and UUI. Additionally, in a previous study, the prevalence was highest among women playing volleyball sports.^[12] However, in the present study, the highest prevalence was found for women performing weightlifting.

Numerous earlier research has found a significant relationship between physical exercise and SUI.^[11,13,14] These higher rates could be explained by the fact that prolonged, high-intensity physical activity raises intra-abdominal pressure, which can then weaken and stretch the PFM, consequently resulting in UI.^[12,15] Therefore, the rise in abdominal pressure deformation of connective tissue and ligaments occurs resulting in morphological and functional modifications. Urinary dysfunction has been reported to develop in young, nulliparous women without any other risk factors when this pressure rises above the PFM threshold.^[12,15-17]

In the present study, the BMI-wise distribution of participants reported that the prevalence of SUI was highest in the obese category, followed by overweight, underweight, and normal categories. Additionally, for UUI the prevalence was higher for overweight and obese categories, followed by normal, and underweight categories. Moreover, for MUI, the prevalence was higher among obese participants, followed by underweight, normal, and overweight categories. Comparably, a cross-sectional study

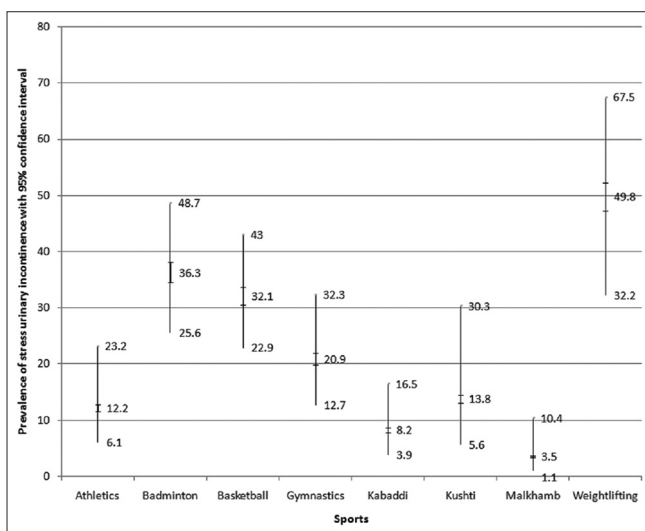


Figure 2: Sport-wise distribution of prevalence of stress urinary incontinence

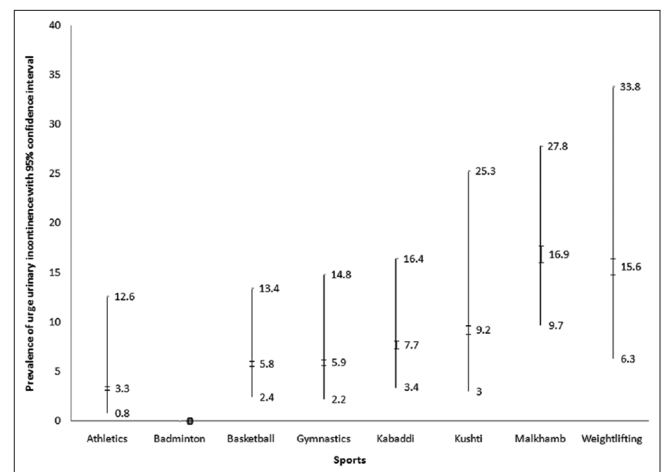


Figure 3: Sport-wise distribution of the prevalence of urge urinary incontinence

Table 1: Age-wise distribution of the prevalence of urinary incontinence

Age range	SUI=n (%)		UUI=n (%)		MUI=n (%)		Pearson's Chi-square test	P
	Yes	No	Yes	No	Yes	No		
15–20	39 (21.0%)	147 (79.0%)	7 (3.8%)	179 (96.2%)	2 (1.1%)	184 (98.9%)	6.4138	0.040
21–25	56 (20.14%)	222 (79.9%)	29 (10.4%)	249 (89.6%)	26 (9.4%)	252 (90.7%)	7.8611	0.020
26–30	31 (32.3%)	65 (67.7%)	11 (11.5%)	85 (88.5%)	21 (21.9%)	75 (78.1%)	34.5601	≤0.001

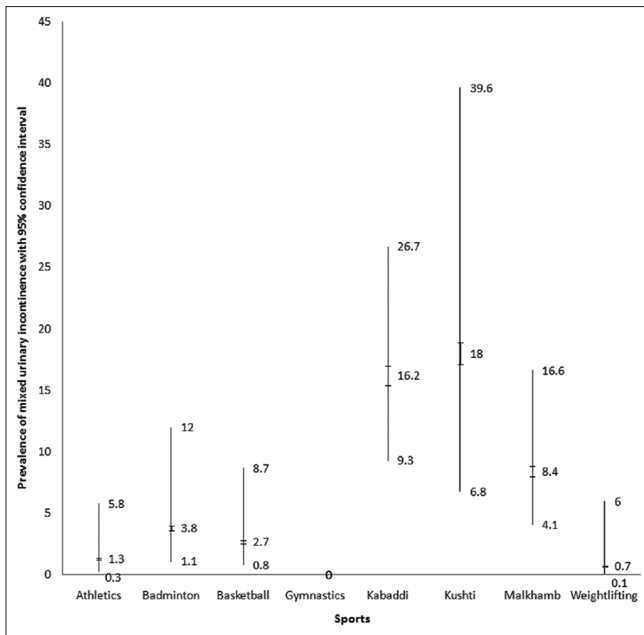


Figure 4: Sport-wise distribution of the prevalence of mixed urinary incontinence

carried out in Washington State on women aged 30 to 90 years revealed that those with a BMI of less than 30 kg/m² had nearly twice the likelihood of having UI as those with a BMI of less than 30.^[18] Furthermore, a previous study showed that women with a BMI less than 20 kg/m² demonstrated less probability of developing UI in comparison to women with a BMI of more than 30 kg/m² who were more probable to develop UI.^[19] Furthermore, in a study conducted to evaluate the association of BMI with UI in the 20–80 age range women, it was found that women with UI had a higher BMI and were more likely to have type I, II, or III obesity and overweight than those without UI.^[20] Overweight and obese individuals integrate additional pressure on the supporting systems of the pelvic organ, bladder and muscles surrounding the bladder as it raises intra-abdominal pressure, particularly in cases of central adiposity demonstrating a physiological correlation between the UI and BMI. The intensity of UI also increases when the abdominal pressure on the bladder rises. It has been observed that losing weight might lessen the severity of UI and sometimes even cure it.^[21]

The highest prevalence in the present study among women in SUI was for weightlifting. The two competition lifts in weightlifting are the clean and jerk and the snatch. Weightlifters perform various exercises during training in addition to the competitive lifts, like pulls and squats. During the snatch phase and in the clean and jerk phase, the feet of the athlete’s are likely to lose connection from the platform, which differentiates them apart from other lifts that are commonly used in sports that are strength-based. Usually, this occurs prior to the catch phase and following the triple extension. During this period of flight, athletes shift their feet to the posture of receiving the barbell from the posture of pull. This brief hop-like activity performed by the athletes as they land the jump may induce extra pressure on the urethra, other pelvic organs, and the bladder.^[22] When landing in the clean and jerk position,

Table 2: Prevalence based on the type of urinary incontinence

Type	Estimate=n (%)	95% CI
SUI	126 (22.5%)	19.1–26.2
UUI	47 (8.4%)	6.2–11.0
MUI	49 (8.8%)	6.5–11.4

SUI=Stress urinary incontinence, UUI=Urge urinary incontinence, MUI=Mixed urinary incontinence

there can be an increased intra-abdominal pressure due to the heavier load. Together, the high lifts and ground impact may put female weightlifters at higher risk for UI than other nonimpact strength-based sports like powerlifting.^[23] Malkhamb and kushti sports were most prevalent in UUI and MUI, respectively. These sports demand high-intensity workouts that are done often, along with sprinting, climbing, hanging, spurts, and bruising, all of which increase the pressures applied to the pelvic floor.^[24]

Athletes may feel anxious and frustrated that their fellow athletes will notice urinary leakage, in addition to the negative effect it may cause on their performance. However, the majority of athletes never communicate with anyone about their issues related to urine leakage or pursue assistance for treatment. The consequences of UI should be understood by the professionals participating in their training, and if required, the athletes should be referred for physiotherapy guidance and intervention.^[24,25] Athletes must, therefore, practice effective UI prevention and/or treatment techniques. Women’s engagement in sports and fitness activities is restricted by UI, which lowers athletes’ quality of life. For example, during training and competition, incontinent subjects used a range of self-care strategies to conceal or contain, minimize, and prevent urine leakage. These strategies included using a pad, wearing dark clothing, engaging the pelvic floor and core during lifts, and participating in pelvic floor exercises.^[23] Triggers for UI may not be the sole factor impairing performance. Reduced fluid intake is one strategy some women adopt to avoid UI, which can negatively affect the performance of the athletes. During continuous exercise, there is significant evidence to support the beneficial effects of intake of fluid, whereas, on resistance and intermittent exercises, and specific sport-related exercises there is limited research that has focused on the impact of fluid intake.^[23] Hence, the results of the study demonstrating the prevalence of UI in nulliparous Indian sportswomen imparts knowledge and awareness among primary care physicians pertaining them to plan preventative and rehabilitative protocols.

Limitations

The limitations of the present study involved a small sample size, a shorter range of age distribution of Indian sportswomen, recall bias while filling out the questions for some participants, and self-reported data by the study participants as it was not filled out under the supervision of a therapist.

Conclusion

The present study concluded that the highest prevalence among nulliparous Indian sportswomen was for SUI, followed by MUI

and UUI. Additionally, weightlifting sport showed the highest prevalence for SUI, followed by malkhamb for UUI and kushti for MUI. Most women usually feel uneasy talking about UI or think it is untreatable, which is why it is one of the most ignored areas of concern for women's health, not only in India but globally as well. The prevalence of UI in Indian sportswomen is addressed in the present study to raise awareness by imparting knowledge among women and designing appropriate preventive and rehabilitative protocols for curtailing such problems in women in the near future for professionals.

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Conflicts of interest

There are no conflicts of interest.

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