



Screening of Urinary Incontinence in Female Athletes - An Observational Study

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Abstract

Background: Urinary Incontinence (UI) is socially embarrassing condition which decreases the quality of life. Stress urinary incontinence has shown to lead to withdrawal from participation in high-impact activities. It may be considered a barrier for life-long and may cause the individual to withdrawn from social situation and decrease quality of life.

Objective: The main purpose of this study is to find out- 1) The incidence of Urinary Incontinence in female athletes. 2) To access a possible correlation between the type, duration, and intensity of sport to that of UI and in which sport the UI is more Prevalent.

Methods: A total sample size – 300 female athletes/sportswomen, participating in various sports at recreational, competitive and elite level selected from various universities and sports centre with Age Screening Criteria- 18-30 years.

Outcome Measures: The data was analyzed by Questionnaire for Urinary Incontinence Diagnosis (QUID), Revised Urinary Incontinence Scale (RUIS) for screening UI in female athletes, and King's Health Questionnaire (KHQ) for quality of life.

Results: Overall, 16 female athletes reported (5.33%) of urine loss while participating in their sport/training. Track and field events had highest incidence of 9. 38%. Highest incidence was seen in elite 11.76% and competitive athletes 8.70%. QUID, RUIS and KHQ scores were correlated and showed statistically significant with p value of $p = 0.0001^*$ respectively.

Conclusion: UI in young nulliparous female athletes is 5.33% when screened in common Indian based sports.

Keywords: Urinary Incontinence; Athletes; Sports; Screening; Prevalence

Introduction

Athletes – are persons who are involved in athletics (sport), which involves track and field events, long distance, cross-country and road running, and race walking. Sportspersons are persons who takes part in a sports regularly. The term athlete may be used as a synonym for sportspeople in general. Athletes may be professionals or amateurs [1].

In India, common professional sports in both male and females includes Olympic sports like Field hockey, Cricket, Football,

Basketball, Tennis, Badminton, Boxing, Wrestling, Weightlifting and power lifting, Archery, Volleyball Handball, Taekwondo, Cycling, Athletics and triathlon, Gymnastics. Non- Olympic sports like Snooker, Kabaddi, Karate, Netball, Throw ball [2].

Specific conditions in female athletes were considered, including iron deficiency, anaemia, Heat illness, stress urinary incontinence, breast issues (i.e. pain, asymmetry, galactorrhoea), the female athlete triad (i.e. menstrual dysfunction, abnormal eating patterns, and osteopenia or osteoporosis), and injuries [3].

World Health Organization (WHO) stated, urinary incontinence is a "wide spread global disease and one of the last medical taboos to many people" [4]. International Continence Society (ICS) has defined Urinary Incontinence as the involuntary loss of urine which is a social or hygiene problem. It is not a life threatening disease but affects all the strata of the society, having many medical and social outcomes [5].

Urinary incontinence is more common in women than in men of all ages. SUI is the most common and prevalent type with prevalence rates between 10% and 55% in women between ages 15 and 64 years. Stress urinary incontinence leads to withdrawal from participation due to high impact activities such as gymnastics, aerobics, and running. SUI has been reported to occur in two-thirds of female gymnasts and 28% of female college students athletes [6].

A high prevalence has been demonstrated in young nulliparous physically fit females. Female athletes involved with track and field (long jump, triple jump, high jump, hurdles), gymnastics (floor exercises, asymmetric bars, trampolining), basketball, volleyball, handball, combat sports, bodybuilding are at highest risk of urinary incontinence, although SUI frequency is well noted in tennis players, skiers, skaters, and joggers [7].

Activities most commonly associated with a sudden increase in intra-abdominal pressure are jumping, landings which provoke leakage. Athletes who are training experience more leakage than competitive ones (95.2% vs 51.2%), possibly because of higher catecholamine levels during competition is more that act on the urethral α -receptors to maintain its closure.

A study found that 26% of young physical education students had urinary leakage during different forms of physical activities (response rate 84%) [9]. In a survey of 156 women participating in varsity athletics at a large state university found that 28% reported urine loss while participating in their sports [10].

Urinary Incontinence affects the physical activities, self perception, self confidence and social activities, leading to low Quality of Life. Thus, King's Health Questionnaire, recommended by the ICS is used as an outcome measure which shows the impact of urinary incontinence on quality of life of women [1].

A study shows that the forces generated during sports involving weight bearing activities such as gymnastics, track and field, ball games and trampolinists and those involving agility like running, squash, netball are transmitted to the pelvic floor via the ground reaction. Insufficient pelvic floor strength during these activities predisposes to incontinence [11].

A study found that 20% of women who exercised or practiced sports neglect these activities because of incontinence. A study verified, that there is a negative influence on the quality of life in women with urinary incontinence, especially concerning aspects related to their daily life, social interactions, and personal perceptions about their health condition [4].

Studies have shown the prevalence of Urinary Incontinence among the foreign female athletes but there is dearth in evidence for the same in the Indian Female Athletes. Therefore, need to study arises to identify female athletes in Indian Population experiencing UI or at risk for developing UI. Hence, this study aims to know the incidence of urinary incontinence in female athletes in Belgaum city. Also, correlation between the type of sport, time, intensity of sport to UI. Also to evaluate in which sport UI is more. Hence there is need to screen UI in female athletes.

Methodology

- **Sample:** A total of 300 subjects were screened.
- **Participants:** Female athletes/sportswomen, participating in various sports at recreational, competitive and elite/novice level selected from various universities and sports centre with age ranging from 18-30 years.
- **Inclusion Criteria:** 1. Female Athletes, 2. Sportswomen, 3. Age group 18-30 yrs, 4. Athletes who are willing to participate in the study.
- **Exclusion Criteria:** 1. Symptomatic Urinary Tract Infection, 2. Neurogenic Bladder, 3. Giggle Incontinence, 4. Chronic cough, 5. Constipation, 6. Adverse medication effects.

- Procedure:** Study was approved by the ethical Study and was approved by the Institutional Ethical Review Committee. Athletes/sportswomen fulfilling eligibility criteria were recruited for the study and written informed consent was taken from study participants, Athletes/sportswomen prior to the commencement of the study. Demographic data of subjects were noted in the form of type of athlete, type of sport activity, menstrual history, and training history, incontinence experienced during physical and sports activity were taken.

Outcome measures

Questionnaire for Urinary Incontinence Diagnosis (QUID)

A 6-item UI symptom questionnaire was developed and validated in distinguishing stress and urge UI. 3-items focus on stress incontinence symptoms and 3-items on urge incontinence symptoms. Each item includes 6 frequency-based response options, ranging from "none of the time" to "all of the time", which are scored from 0 to 5 points [12].

Revised Urinary Incontinence Scale (RUIS)

The RUIS is a short, reliable and valid 5- item scale that can be used to assess urinary incontinence and to monitor patient outcomes following treatment. Originally developed by selecting the best performing urinary incontinence items (selected from standardized measures such as the Urogenital Distress Inventory- 6 and the Incontinence Severity Index) [13].

King's Health Questionnaire (KHQ)

The KHQ for women with urinary incontinence was developed and validated by Kelleher, *et al.* at King's College Hospital, London. The questionnaire has been shown to be a valid and reliable instrument for the evaluation of quality of life (QOL) in women with urinary incontinence with strong psychometric properties. It consists of 32 questions with 8 different domains [14].

Statistical analysis

Data was computed and analysed using SPSS (statistical package for social sciences) software version 21. Age, Body Mass Index

(BMI), incidence of UI and comparison of types of sport and UI were taken into percentage. Chi -square test was used for Incidence of UI by age, BMI groups and comparison of types of athletes and UI.

Results

The average mean age of the participants was 22.47 ± 2.13 years. All the women are nulliparous. There was no statistically significant difference between the mean ages of the participants which shows that the participant's age were well matched thus showing that they were homogenous in relation to age. The average BMI of the participants was 22.18 ± 2.22 . Most of them had Normal BMI. There was no significant difference BMI of the participants in both the groups which shows that that the participant's BMI in both the groups was well matched.

Urinary incontinence	No of samples	% of samples
Incontinence	16	5.33
Continence	284	94.67
Total	300	100.00

Table 1: Incidence of Urinary incontinence as a whole.

Incidence of Urinary incontinence as a whole was 5.33%. Total number of athletes with incontinence N =16; with continence N = 284. Overall, 16 female athletes (5.33%) reported of urine loss while participating in their sport (Table 1).

Age groups	Incontinence	%	Continence	%	Total
<=20yrs	8	12.90	54	87.10	62
21-25yrs	8	3.54	218	96.46	226
>=26yrs	0	0.00	12	100.00	12
Total	16	5.33	284	94.67	300
Chi-square=9.1532 P = 0.0100*; *p < 0.05					

Table 2: Incidence of Urinary incontinence by age groups.

Incidence of UI in <=20yrs and 21-25yrs (N = 8) age groups was 12.90% and 3.54% respectively. Suggesting chances of urinary incontinence is high in younger athletes. There was statistically significant difference seen with p= value of P = 0.0100* (Table 2).

BMI groups	Incontinence	%	ContinenCe	%	Total
Under weight	1	11.11	8	88.89	9
Normal	14	5.93	222	94.07	236
Over weight	1	1.82	54	98.18	55
Total	16	5.33	284	94.67	300
Chi-square=2.1096 P = 0.3486					

Table 3: Incidence of Urinary incontinence by BMI groups.

Participants present with incontinence in different BMI groups had incidence of 5.33%. Normal BMI (N = 14) had 5.93%, underweight (N = 1) had 11.11%, and overweight (N = 1) had 1.82% of incidence. Most of the athletes had normal BMI. Incidence of UI was high in underweight athletes. There was no statistically significant difference seen with p= value of P = 0.3486 (Table 3).

Types of sport	Incontinence	%	ContinenCe	%	Total
Athletics	0	0.00	5	100.00	5
Badminton	0	0.00	24	100.00	24
Basket ball	1	11.11	8	88.89	9
Discuss throw	0	0.00	15	100.00	15
Hockey	2	22.22	7	77.78	9
Javelin throw	1	5.56	17	94.44	18
Judo	1	7.69	12	92.31	13
Karate	2	9.09	20	90.91	22
Net ball	0	0.00	2	100.00	2
Short put	1	11.11	8	88.89	9
Swimming	0	0.00	26	100.00	26
Taekwondo	1	5.26	18	94.74	19
Throw ball	0	0.00	40	100.00	40
Track and field	6	9.38	58	90.63	64
Volley ball	1	4.00	24	96.00	25
Total	16	5.33	284	94.67	300

Table 4: Comparison of types of sport and Urinary incontinence.

Different types of sports like Athletics, Badminton, Basket Ball, Discuss Throw, Hockey, Javelin Throw, Judo, Karate, Net Ball, Short Put, Swimming, Taekwondo, Throw Ball, Track And Field, and Volley Ball altogether had 5.33% of incidence of urinary incontinence. The proportions in different sports were: In each sport, Basket Ball (N = 1) 11.11%, Volley Ball (N = 1) 4.00%, Hockey (N = 2) 22.22%, Field events like Javelin Throw (N = 1) 5.56%, Short Put (N = 1) 11.11%. Mixed Martial Arts like Judo (N = 1) 7.69%, Karate (N = 2) 9.09% and Taekwondo (N = 1) 5.26% Track events (N = 6) including Running (200m, 400m), relay (200m, 400m), hurdle jumps, triple jump, long jump had highest incidence of 9. 38% (Table 4).

Types of athlete	Incontinence	%	ContinenCe	%	Total
Competitive	12	8.70	126	91.30	138
Elite	2	11.76	15	88.24	17
Novice	0	0.00	18	100.00	18
Recreational	2	1.57	125	98.43	127
Total	16	5.33	284	94.67	300
Chi-square=9.0502 P = 0.0293*, *p < 0.05					

Table 5: Comparison of types of athletes and Urinary incontinence.

Competitive athletes with incontinence (N = 12) had 8.70% of incidence. Elite (N = 2) had 11.76% and recreational athletes (N = 2) had 1.57%. Highest incidence was seen in elite athletes. There was statistically significant difference seen with p= value of P = 0.0293* (Table 5).

Discussion

The present observational study was conducted to find the incidence of urinary incontinence in young nulliparous female athletes/sportswomen in Indian based sports centres.

The present study includes the outcome measures which are reliable and valid such as Questionnaire for Urinary Incontinence Diagnosis (QUID), Revised Urinary Incontinence Scale (RUIS), King's Health questionnaire (KHQ) were these questionnaires are used to measure the symptoms of UI in women but never used on athletes [12-14] as per previous studies.

A report shows that, SUI occurs in about 25–30% of young female athletes. Mostly noticeable in certain sports such as gymnastics, basketball, jumping and running (i.e. track and field events); and less commonly in sports lsuch as skiing, tennis and skating [15,16]. However in this present study, incidence was 5.33% in young nulliparous female athletes. Particularly seen in certain sports like track and field events 9% (Running (200m, 400m), relay (200m, 400m), hurdle jumps, triple jump, long jump, short put throw, discuss throw, javelin throw), hockey 22.22%, basket ball 11.11%; less implicated sports includes mixed martial arts like Judo 7.69%, Karate 9.09% and Taekwondo 5.26%, Volley Ball 4.00%.

In a study of, 291 female athletes, with mean age of 22.8 years, 51.9% had experienced urine loss during their respective sports and in different situations of daily life. 43% i.e. 125 athletes reported urine loss only during practice. 95.2% had lost urine during training, while 51.2% had lost it during competitions. This difference may be concerned with emptying the bladder before competitions and with decrease of fluid intake [8]. However, in present study mean age was 22.47 ± 2.13 years and 5.33% had experienced urine loss in their respective sports. Although no much difference was observed in the mean age of the above study, we found lesser percentage of UI in our population which could be attributed to good pelvic floor integrity in our nulliparous athletes. Approximately 10% to 40% of nulliparous women. All aspects of urinary incontinence have been reported in nulliparous women, with increasing prevalence and severity associated with age and BMI, suggesting that these women may have a pelvic floor prone to dysfunction.

An epidemiological study was done to evaluate the prevalence of SUI in menstruating women practicing recreational sports activity, to detect specific sports with a stronger association with SUI, and to evaluate risk factors possibly related. From 679 women SUI was reported by 101 women (14.9%). Of these, 32 (31.7%) complained of SUI only during sports activity, 48 (47.5%) only during daily life and 21 (20.8%) in both situations. Parity and body mass index were significantly associated with the risk of SUI. In different sports activities, a higher rate of incontinence was found in women participating in basketball (16.6%), athletics (15%), and tennis/ squash (11%). About 10.4% of women abandoned their favourite sport, because of SUI, and a further more 20% limited the way they

practiced to reduce leakage episodes [17]. Present study BMI was $< 18 \text{ kg/m}^2$ which fall under weight which could have limited our association of BMI and UI. however, our study had 5.33% of UI even with $\text{BMI} < 18 \text{ kg/m}^2$ which suggests that even female athletes with lower BMI are at risk of developing UI.

A study was done on the prevalence of lower urinary tract symptoms (LUTS) and incontinence in female athletes and tried to determine the etiological factors. An anonymous self-questionnaire was collected from 623 casual female athletes aged 18 to 56 years, who were involved in 12 different sports. The prevalence of LUTS was 54.7%, and 30% for urinary incontinence. 91 (14.6%) women had urine frequency changes. Urgency was very common in volleyball players, as was dysuria among hockey and basketball players, whereas straining mainly affected aerobic participants and cyclists. The main number of incontinent people was football sport. Urge Incontinence affected mainly in cyclists and football players. Stress Incontinence was more frequent in hockey and volleyball players. In many cases, the incontinence were present only during sports activities [18]. However in present study, high-impact sports were more associated with incontinence. Stress Incontinence affected a lot of athletes, mainly track and field, hockey, and basketball players. Urge Incontinence was more frequent in mixed martial arts and volleyball players. Mixed Incontinence was less frequent seen in basketball and volleyball players.

The strength of the present study, the first of its kind, in Indian scenario provides a contribution to the sparse scientific literature about the incidence of Urinary Incontinence and experiencing UI or at risk for developing UI.

One of the limitation of the present study, was that it was done in a single city, which cannot be applied for different geographical areas with area specific sports.

More research is need to determine optimal Pelvic Floor Muscle Training (PFMT) protocols for athletes. Trainers, coaches and other athlete's caregivers should be educated and made aware of this frequent but under-reported complaint [18].

Conclusion

UI in young nulliparous female athletes/sportswomen is 5.33% when screened in common Indian based sports.

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Conflicts of Interest

None Declared.

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