CLINICAL ARTICLE

Prevalence and impact of urinary incontinence among female athletes

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Synopsis: Urinary incontinence is a prevalent condition in athletes and affects their physical performance and daily living.

ABSTRACT

Objective: To assess the prevalence of urinary incontinence (UI) in a group of female athletes and to explore its impact on their lives.

Methods: In total, 106 female athletics, basketball, and indoor football athletes were recruited. Data were collected through a questionnaire and a focus group and analyzed via Pearson's χ^2 test, 2-way analysis of variance, and thematic analysis.

Results: Urinary incontinence was experienced by 41.5% of the athletes. Its prevalence across the 3 types of sport was similar and was not affected by age. However, athletes who experienced UI had a lower body weight (P=0.011) and a lower body mass index (P=0.035). Most (95.5%) athletes had never discussed their condition with a health professional. In the focus group, all athletes described preventive urination to avoid urine leakage. It was mentioned that UI affected their performance and made them feel uncomfortable and frustrated.

Conclusion: Urinary incontinence is a prevalent condition among athletes that is not openly discussed. However, it causes regular changes in their physical performance and daily life. More research is needed to increase awareness of UI and to design interventions.

1. Introduction

According to the International Continence Society, urinary incontinence (UI) is defined as an involuntary loss of urine [1]. It is a clinical condition that is more prevalent in women than in men, affecting 20–50% of women during the course of their lives, with a higher prevalence in adulthood [2]. Urinary incontinence can be divided into 3 types: stress UI, urge UI, and mixed UI [1]. A higher prevalence of stress UI can be found in young women who practice high-impact sports, specifically in athletes whose activities involve jumping [3–5]. However, its exact prevalence is unknown [5].

Urinary incontinence causes many women to abandon sports to avoid urine loss during exercise [6]. Physiotherapy is effective for the prevention and management of this condition and is widely recommended as a first-line management option, namely through pelvic floor muscle training, which involves strengthening of the pelvic floor muscles [7]. However, the embarrassment that women feel about discussing their condition with health professionals means that UI continues to be underdiagnosed and undertreated [8,9]. Furthermore, measures to prevent UI are not included as a routine part of sports practice [10]. Therefore, athletes with UI symptoms use strategies such as wearing absorbent pads, preventive urination, control of liquid intake, adaptation of their athletic technique, or even a change sports to minimize the consequences of this condition [4], but they do not commonly seek treatment or professional advice [10,11].

Previous research has shown that UI can have a negative impact on the quality of life of a woman [12–14]. However, little attention has been given to the impact of UI on the daily life of athletes [10]. Therefore, the main aims of the present study were to investigate the prevalence of UI in a group of female athletes, and to explore its impact on their lives by identifying their emotions regarding urine loss and the techniques they use to reduce UI episodes.

2. Materials and methods

The present cross-sectional study, carried out between 15th September 2008 and 19th June 2009, applied methodologic triangulation to produce authentic and rich exploratory/descriptive data [15]. Ethics approval was obtained from the ethics representatives or ethics committees of all sports institutions involved in the study.

Female athletes involved in athletics (track and field sports—specifically, sprinting, middle-distance running, long-distance running, and jumping), basketball, or indoor football were recruited from sport teams in the central region of Portugal. Athletes were eligible if they were older than 18 years and had been practicing sports for more than 1 year. Athletes older than 45 years and those practicing 2 types of sport were excluded. The total sample comprised 106 athletes.

Data were collected via a questionnaire and a focus group interview. The questionnaire contained 3 sections (demographic and sports-related data, urine leakage characterization, and risk factors for UI) and was used to

characterize the sample and screen for UI among the athletes. It had previously been submitted to a pre-test with 16 athletes, which had resulted in changes to the layout and the language used. The focus group was performed to gain a deep understanding of the implications of UI for the daily lives and physical performances of the athletes.

The athletes received information about the study during a training session. During the subsequent 2 weeks, interested athletes contacted the research team and signed the informed consent forms. The questionnaires were distributed and completed at the end of a training session.

Three weeks prior to the focus group, a letter was given to each female athlete who had responded to the questionnaire. All female athletes who had experienced UI (as indicated by their answers to the questionnaire) were selected for the focus group and were given a letter with an invitation to participate in the focus group, whereas the other athletes received a letter thanking them for their participation. All data remained confidential. Seven athletes contacted the research team and agreed to participate in the focus group. The focus group was conducted in a nondirective manner according to a semistructured discussion guide, as recommended by Morgan [16]. It took place in the staff room of a sports club and lasted 1.5 hours.

Descriptive statistics were used to analyze the data from the questionnaires. A binomial test was used to evaluate differences between the proportions of female athletes who had experienced UI at least once and those who had

never experienced UI. Pearson's χ^2 test was applied to investigate the relationship between UI and the type of sport, the duration of practicing sport, the number of weekly training hours, and risk factors for UI including smoking, parity, pelvic surgery, and constipation. The assumptions of the χ^2 test were verified (no more than 20% of the categories have expected frequencies of less than 5). In situations where the expected values were small, no differences were found between the results of the χ^2 test and those of the exact tests (Fisher's exact test). A 2-way analysis of variance (ANOVA) was used to explore the relationship between UI and age, weight, and body mass index (BMI). An analysis of outliers and extremes values was carried out through visual inspection of the boxplots. The assumptions of variance homogeneity (Levene's test) and normality of the residuals (Shapiro-Wilk test) made in the 2-way ANOVA model were verified. $P<0.05$ was considered statistically significant. All analyses were performed using Excel 2007 (Microsoft, Redmond, WA, USA) and SPSS version 15.0 for Windows (SPSS Inc, Chicago, IL, USA).

The focus group interview was transcribed and analyzed by two independent investigators using thematic analysis. This method identifies, analyzes, and reports patterns (themes), and organizes and describes data in rich detail [17].

3. Results

In total, 106 athletes were included in the study, with 32 (30.2%) practicing athletics, 36 (34.0%) basketball, and 38 (35.8%) indoor football. Overall, 44 (41.5%) athletes had experienced UI at least once and 62 (58.5%) had never

experienced it. The average age (23.0 ± 4.4 years) was similar regardless of whether participants experienced UI and regardless of the type of sport they practiced (Table 1). Participants who experienced UI had a lower body weight (P=0.011) and a lower BMI (P=0.035).

The prevalence of UI was similar across the three types of sport (P=0.308) (Table 2). Most athletes had practiced sport for at least 8 years (n=61 [58.1%]) and exercised 4–8 hours per week (n=53 [50.0%]). The vast majority did not smoke (n=96 [90.6%]), did not have children (n=96 [90.6%]), and did not present with constipation symptoms (n=97 [91.5%]). Only 5 (4.7%) athletes had undergone pelvic surgery for the removal of ovarian cysts. None of these risk factors was significantly associated with UI (P>0.05).

The majority (27 [61.4%]) of the athletes with incontinence had experienced symptoms of stress UI; 9 (20.5%) athletes had experienced urgency UI, and 8 (18.2%) had experienced mixed UI (Table 3). Leakage occurred rarely in 27 (61.4%) athletes and sometimes in 11 (25.0%). Most (26 [59.1%]) athletes reported losing a few drops at a time, whereas 16 (36.4%) lost only a drop.

The situations and activities most likely to induce urine loss were an urgent need to go to the bathroom (43.2%), coughing (38.6%), practicing sport (36.4%), sneezing (31.8%), and laughing (31.8%) (Table 3). More than half (61.4%) of the athletes had never talked to anyone about their leakage; 9 (20.4%) reported having discussed the problem with a friend, 5 (11.4%) with a

relative, 2 (4.5%) with a health professional, and only 1 (2.3%) with the team coach.

The focus group revealed that the athletes considered urine loss to be a normal condition that is unrelated to practicing sport. The athletes pointed out that their physical performance was most restricted during activities that required physical effort and jumping. When urine loss occurred, the athletes felt concerned, annoyed, frustrated, and fearful that a new activity might trigger another leakage. Despite their concerns about UI, the athletes stated that the condition had no current impact on their daily lives.

The main strategies mentioned to reduce the occurrence of UI symptoms were preventive urination, restriction of liquid intake, and performance of physical activities in a restricted way. The athletes considered that urinary leakage affected their performance.

Although the occurrence of urine leakage was evident and the athletes needed to use strategies to prevent it, no athlete in the focus group had sought help from a health professional to minimize or eliminate the symptoms of UI. The athletes were not aware of the relationship between practicing sports and experiencing UI, or of methods to prevent or treat the condition.

4. Discussion

In the present study, the mean age was similar regardless of the presence of UI, possibly because the study sample was composed of young and fertile

women. Therefore, as indicated by previous evidence [18–20], age may only be associated with a higher risk of UI among women of more advanced age.

Women who experienced urine leakage had a lower body weight and a lower BMI than those who had never experienced UI. The evidence indicates that the prevalence of UI increases proportionately with an increasing BMI [19,21]. However, the majority of athletes in the present study were very young, and the effects of an increased body weight and an increased BMI on the pelvic floor muscles are probably not evident until later in life.

Almost half (41.5%) of the female athletes experienced involuntary urine loss either during their physical activity or during activities of daily living. This prevalence lies within the range of prevalence values (28–68%) reported in other studies [4,10,18,22,23]. The fact that athletics, basketball, and indoor football are similar sports in terms of their level of physical impact could explain why the prevalence values for UI found across the three sports were similar. Comparable values for the prevalence of UI have been reported for other sports similar to those studied, for example some ball games [3–5]. Furthermore, the association between the prevalence of UI and the risk factors studied was not statistically significant. This lack of association has also been observed by other authors [18,23].

Stress UI was the type of UI most frequently experienced by athletes. This is the most frequent form of UI in women and has a direct relationship with physical effort such as that involved in high-impact physical activities [18].

Activities related to an increased intra-abdominal pressure (laughing, coughing, jumping, physical effort, and athletic activity) were the second most frequent causes of urine leakage. The findings from this study support the hypothesis that UI is related to an increase in the forces directed towards the pelvic floor during physical activity [5,18]. These data reinforce how important it is that coaches, physiotherapists, and other professionals involved in maximizing the performance of athletes include pelvic floor muscle exercises in an athlete's training plan, because such exercises are effective in preventing and managing UI [7].

Urinary leakage in the present study occurred sporadically and in small quantities [10,18,23]. The fact that urine leakage did not occur in large quantities could explain why the athletes did not consider that UI had implications for their daily lives, even though they used specific strategies to deal with the problem.

The most commonly reported strategies were preventive urination and restriction of liquid intake, possibly because athletes believed that reducing the volume of urine stored in the bladder would avoid the loss of urine. However, these strategies are not always sufficient and urine loss can nevertheless occur during physical activity, leading athletes to modify their athletic technique [6,23]. Such modifications are significant evidence that UI does affect the physical and competitive performance of athletes.

Urinary incontinence did not only have an impact on the athletes' performance. In addition, the athletes experienced feelings of concern and frustration about the noticeability of urinary leakage to others. This reflects findings from previous studies [8,14,24], in which women with UI reported feelings of embarrassment, humiliation, and vulnerability. In agreement with studies by Carls [10] and Geirsson et al. [25], the athletes also suffered from a lack of information regarding the relationship between sports and UI and regarding methods to prevent and treat UI. As a result of the experienced emotions and the lack of information, the majority of athletes never discussed the occurrence of urine leakage with anyone or sought treatment. For all these reasons, which are also found in other studies [8–11], many women abandon sports, worrying about a condition that could be prevented if the professionals involved in their training were aware of the implications of UI [6] and referred them, for example for physiotherapy support. In addition to other techniques, the physiotherapy could include pelvic floor muscle exercises because such exercises are proven to be effective in the first-line management of UI [7].

The present study included only a single focus group and the sample size was small, which could be seen as limitations. However, this was an exploratory study. Despite the limitations, the findings indicate that there is a lack of awareness of UI. More attention should therefore be given to this condition by all professionals involved in women's sports, so that this condition does not become a barrier to women's participation in sport. The present findings could be used to increase awareness about UI, to help athletes better understand

this condition, and to design adequate interventions by health professionals that are tailored to the needs of athletes.

The present study shows that UI is a prevalent and important issue for athletes practicing sports. Although the athletes reported that the loss of urine had no implications for their everyday lives, they used a number of strategies to reduce urine leakage episodes while engaged in sports and showed concern about the occurrence of urine loss. Therefore, more research is needed to gain a full understanding of the real implications of UI for the lives of athletes and to design adequate interventions.

Conflict of interest

The authors have no conflicts of interest.

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Table 1 Age, weight and BMI of the athletes [a]

Parameter	Urinary incontinence		Total sample	*P* value
	At least once (n=44)	Never (n=62)	(n=106)	
Age, y				
Athletics	22.8 ± 5.4	20.0 ± 1.8	20.6 ± 3.5	0.075
Basketball	25.3 ± 3.9	22.5 ± 3.6	23.7 ± 4.0	
Indoor football	23.5 ± 4.5	24.4 ± 5.2	24.0 ± 4.8	
All types of sport	24.0 ± 4.5	22.3 ± 4.1	23.0 ± 4.4	
Weight, kg				
Athletics	53.5 ± 5.6	58.8 ± 5.9	57.4 ± 6.2	0.011
Basketball	63.7 ± 8.3	66.2 ± 6.7	65.2 ± 7.4	
Indoor football	56.1 ± 4.3	58.2 ± 3.4	57.1 ± 4.0	
All types of sport	58.3 ± 7.3	61.2 ± 6.7	60.0 ± 7.1	
BMI [b]				
Athletics	20.3 ± 1.5	21.1 ± 1.7	20.9 ± 1.7	0.035
Basketball	22.1 ± 2.0	22.7 ± 1.7	22.4 ± 1.9	
Indoor football	21.7 ± 1.6	22.6 ± 1.2	22.1 ± 1.5	
All types of sport	21.6 ± 1.8	22.1 ± 1.7	21.8 ± 1.8	

Abbreviations: BMI, body mass index.

[a] Values are given as mean ± SD.

[b] Calculated as weight in kilograms divided by the square of height in meters.

Table 2 Prevalence of urinary incontinence risk factors among the athletes [a]

Risk factor	Urinary incontinence		Total sample	*P* value
	At least once (n=44)	Never (n=62)	(n=106)	
Type of sport practiced				
Athletics	10/32 (31.3)	22/32 (68.8)	32/106 (30.2)	
Basketball	15/36 (41.7)	21/36 (58.3)	36/106 (34.0)	0.308
Indoor football	19/38 (50.0)	19/38 (50.0)	38/106 (35.8)	
Duration of practicing sport				
≤1 year	4/8 (50.0)	4/8 (50.0)	8/105 (7.6)	
>1 and ≤5 years	6/18 (33.3)	12/18 (66.7)	18/105 (17.1)	0.823
>5 and ≤8 years	7/18 (38.9)	11/18 (61.1)	18/105 (17.1)	
>8 years	27/61 (44.3)	34/61 (55.7)	61/105 (58.1)	
Hours of exercise per week				
≤4	10/26 (38.5)	16/26 (61.5)	26/106 (24.5)	
>4 and ≤8	24/53 (45.3)	29/53 (54.7)	53/106 (50.0)	0.786
>8	10/27 (37.0)	17/27 (63.0)	27/106 (25.5)	
Smoking				
Yes	5/10 (50.0)	5/10 (50.0)	10/106 (9.4)	0.738
No	39/96 (40.6)	57/96 (59.4)	96/106 (90.6)	
Parity				
Yes	6/10 (60.0)	4/10 (40.0)	10/106 (9.4)	0.313
No	38/96 (39.6)	58/96 (60.4)	96/106 (90.6)	
Pelvic surgery				
Yes	1/5 (20.0)	4/5 (80.0)	5/106 (4.7)	0.400
No	43/101 (42.6)	58/101 (57.4)	101/106 (95.3)	
Constipation				
Yes	5/9 (55.6)	4/9 (44.4)	9/106 (8.5)	0.485
No	39/97 (40.2)	58/97 (59.8)	97/106 (91.5)	

[a] Values are given as number (percentage).

One athlete failed to answer her duration of practicing sport (n=105).

Table 3 Urinary incontinence characteristics

Parameter	Number (%) (n=44)
Type of urinary incontinence	
Stress	27 (61.4)
Urgency	9 (20.5)
Mixed	8 (18.2)
Frequency	
Once	5 (11.4)
Rarely	27 (61.4)
Sometimes	11 (25.0)
Often	1 (2.3)
Always	0 (0.0)
Quantity	
A drop	16 (36.4)
A few drops	26 (59.1)
Moistended protection/clothing	2 (4.5)
Exceeds the absorption capacity of the protection	0 (0.0)
Trigger activities [a]	
Urgent need to go to the bathroom	19 (43.1)
Coughing	17 (38.6)
Practicing sport	16 (36.4)
Sneezing	14 (31.8)
Laughing	14 (31.8)
Mention of leakage	
To no-one	27 (61.4)
To a friend	9 (20.5)
To a relative	5 (11.4)
To a health professional	2 (4.5)
To the team coach	1 (2.3)

[a] Multiple answers were possible.