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ORIGINAL ARTICLE

Rug-pee study: the prevalence of urinary incontinence among female university rugby players

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Abstract

Introduction and hypothesis The goal of this study was to determine the prevalence of urinary incontinence among female university varsity rugby players. Secondary objectives were to understand when the incontinence occurred and to assess the degree of bother experienced. It is postulated that female rugby players may have higher rates of urinary incontinence due to the high-impact activities involved in training and competitions.

Methods Data was collected via a self-administered, anonymous questionnaire.

Results A total of 95 athletes were included in the survey results. Urinary incontinence was experienced by 51 of the 95 (54%) players. Of the 51 athletes who reported leaking urine, 90% leaked urine when competing in a rugby game and 88% of players leaked when being tackled or hit. Despite the high prevalence of urinary incontinence, most players reported they were not bothered or only slightly bothered by their urinary leaking. Several of the players (18%) were interested in receiving treatment for their urinary incontinence.

Conclusion The prevalence of urinary incontinence among varsity female rugby players is 54%, which is consistent with rates among other high-impact sports. Surprisingly, the majority of these women are not bothered by their incontinence and most are not interested in treatment for this condition at this time.

Keywords Athletes · Incontinence · Rugby · Sports · Urinary incontinence · Urinary stress incontinence

Abbreviations

UI	Urinary incontinence
BMI	Body mass index
SD	Standard deviation
UDI-6	Urogenital Distress Inventory short form
CI	Confidence interval

Introduction

Urinary incontinence is defined as the complaint of involuntary loss of urine [1]. Two of the most common types of urinary incontinence include stress urinary incontinence and urgency urinary incontinence. Stress urinary incontinence is the involuntary loss of urine on effort or physical exertion, including sporting activities [1], whereas urgency urinary incontinence is the sudden, compelling desire to void which is difficult to defer [1].

Although the etiology of urinary incontinence is multifactorial, many risk factors for urinary incontinence are known including older age, obesity, increased parity, postmenopausal status, smoking and caffeine intake [2–4]. Several studies have also shown athletes to be at higher risk for urinary incontinence, especially those involved in high-impact sports [3, 4]. It has been postulated that the repetitive high-impact nature of these sports, which causes increased intraabdominal pressure, may cause pelvic floor muscle fatigue and predisposes women to urinary incontinence [3, 5].

In the literature the prevalence of urinary incontinence among female athletes is quite wide, ranging from 28 to 80% [5–11]. Recently, a metanalysis of female athletes in both high- and low-impact sports found a 36% prevalence of urinary incontinence [4]. Among women solely competing in high-impact sports, the latest data from a second recent meta-analysis revealed a prevalence of 58% [3]. As urinary

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incontinence has been shown to affect athletic performance and may even lead to quitting the sport altogether, these high rates are quite alarming [2, 9, 12].

Rugby involves running and tackling and is therefore classified as a high-impact sport. A tackle occurs when the player carrying the ball is held by an opponent and brought to the ground. Women's rugby is currently the fastest growing sport in the world [13]. It is estimated that by 2026 there will be 6 million female rugby players worldwide [13]. In Canada, all prominent universities have a varsity women's rugby team, totaling 27 altogether. Despite this popularity there have been no studies to date looking at the incontinence rates among female rugby players.

It is postulated that female rugby players may have increased rates of urinary incontinence due to the high-impact activities involved in training and competitions. The objective of this study is to determine the prevalence of urinary incontinence among female university varsity rugby players. Secondary objectives are to understand when the incontinence occurred and to assess the degree of bother experienced.

Materials and methods

The prevalence of urinary leakage among female varsity rugby players in Alberta, Canada, was assessed by the administration of a survey. All three varsity female rugby teams in Alberta—University of Lethbridge, University of Calgary and the University of Alberta—were approached at the beginning of their training season. Players were deemed eligible if they were 18 years or older, were nulliparous and were active members of one of the three varsity rugby teams. This cross-sectional study was approved by the Conjoint Health Research Ethics Board (REB19–0080).

Data was collected via a self-administered, anonymous questionnaire.

The survey was divided into four sections. Demographic information including age, height, weight and hours spent training was obtained. The UDI-6 evaluated the type of incontinence and overall bother. To further explore when incontinence occurred and the degree of bother, a specific rugby-related activity questionnaire was developed. Lastly the degree of bother, previous treatment, desire for treatment and coping strategy questions were queried.

A study investigator traveled to each team to introduce the study at the end of a training session. Paper copies of the survey were distributed to all players who consented to participate. The surveys were placed in an opaque envelope once completed, which was collected by the investigator.

Results were summarized using descriptive statistics. Proportions were used for categorical variables and means with standard deviations for parametric variables. An unpaired t-test was used to explore the relationship between urinary incontinence and age, BMI and hours spent training. A linear regression model was also used to assess the risk of urinary incontinence in relation to hours of training (SPSS V25).

Results

Every female varsity rugby player in Alberta was approached to participated in the survey; this consisted of a total of 109 women. All the players consented to participate and completed the survey. Fourteen players were excluded, all due to age < 18 years old. None of the players had previously given birth. Therefore, a total of 95 athletes were included in the survey results. Urinary incontinence was experienced by 51 of the 95 (54%) players.

The average age was 19.9 ± 1.8 years old, and the average BMI was 25.8 ± 3.2, with no difference between athletes who experienced urinary incontinence and those who did not (Table 1). The athletes who leaked urine reported more hours of training per week ($P = 0.008$) (Table 1). For every additional hour of training, the risk of urinary incontinence increased by 15.3% (2.9%–29.3%, 95% CI).

Stress urinary incontinence was the most commonly reported type of urinary incontinence. Most athletes (70%) who reported urinary incontinence disclosed that this occurred only rarely (Table 2). Overactive bladder symptoms including urinary frequency and urinary urgency were reported by 53% and 39% of athletes, respectively, who experienced urinary incontinence (Table 2). The majority of the athletes denied difficulty voiding or pelvic pain (Table 2).

Of the 51 athletes who reported leaking urine, 90% leaked urine when competing in a rugby game and 88% of players leaked when being tackled. Most reported their incontinence occurred only rarely during these activities (Table 3). Of the players who reported urinary incontinence, 41% leaked when running and only 18% experienced urinary incontinence when weight training.

Despite the high prevalence of urinary incontinence, most players reported they were not bothered or only slightly bothered by their urinary leaking (Table 4). None of the athletes disclosed use of any incontinence products or pads during exercise. Only one athlete had discussed her urinary incontinence with a health professional. None of the players had received any treatment for urinary incontinence. Several of the players (18%) were interested in receiving treatment for their urinary incontinence.

Discussion

In this study, 54% of female varsity rugby players experienced urinary incontinence. Recent epidemiological data suggest that 17% of all women > 20 years have experienced urinary

Table 1 Baseline demographics[a]

	Total sample ($n = 95$)	Urinary incontinence ($n = 51$)	No urinary Incontinence ($n = 44$)	P value[b]
Age, years	19.9 ± 1.8	20.0 ± 1.6	19.8 ± 2.0	0.625
BMI[b]	25.8 ± 3.2	25.9 ± 3.2	25.7 ± 3.3	0.827
Time training per week, hours	14.9 ± 4.4	16.0 ± 4.8	13.7 ± 3.6	0.008

[a] Values are given as mean ± SD

[b] t test

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

incontinence [10]. The rate of urinary incontinence among these young, nulliparous rugby players may seem high compared to the general population but it falls within the range of urinary incontinence seen among female athletes reported in the literature of 28–80% [5–11, 14, 15]. It is also consistent with a recently published metanalysis which reported a 58% prevalence of urinary incontinence in female athletes playing high-impact sports, similar to rugby, and a study reporting a 62.8% prevalence of urinary incontinence among soccer players [3, 12]. It is somewhat concerning that previous literature has shown a strong association between elite athletes disclosing urinary incontinence during competitions and experiencing urinary incontinence later in life [12, 16]. It is therefore possible that this study has unmasked the young women who now experience urinary incontinence only with high-impact activities, but that may go on to experience urinary incontinence more regularly as they age.

Many risk factors for urinary incontinence are known, one of the most common being obesity, which is classified as a BMI > 30 [2–4, 17]. The reasons behind these findings are likely related to the chronic increased intraabdominal pressure associated with obesity, which may at times overwhelm the urethral closure pressure and lead to incontinence [17]. In this study there was no difference in BMI between the athletes who experienced urinary incontinence and those who did not. All the players were found to have a BMI < 30; therefore, none should be at increased risk of urinary incontinence related to BMI and that is the most likely explanation for these findings.

High-impact sports athletes, such as soccer players, trampolinists and runners, seem to have the highest reported rates of urinary incontinence among athletes [5, 8, 12, 18, 19]. Rugby is also a high-impact sport which involves running, tackling and multidimensional movement. It was found that the athletes were most vulnerable to being incontinent while being tackled and less when running. There are two theories to explain these results. Tackling often occurs with less warning and may not allow sufficient time for contraction of the pelvic floor prior to impact, thereby leading to urinary incontinence. Tackling also involves higher intraabdominal pressures than running and may overwhelm the pelvic floor contraction, also leading to urinary incontinence.

Similarly, several studies have shown an association between hours of training and urinary incontinence among athletes [2, 12, 20]. In this study it was found that for every additional hour of training the risk of urinary incontinence increased by 15.3% (2.9–29.3% with a 95% CI). It has been postulated this may be secondary to increased regular pelvic floor muscle strain and fatigue over time which thereby leads to urinary incontinence [2, 12, 20].

Although urinary incontinence has been shown to affect athletic performances and may even cause players to quit their sport, this does not seem to be the case for female rugby players [2, 9, 12]. Most of the athletes found their urinary

Table 2 UDI-6 for participants with urinary incontinence

Symptom	Not at all, n (%)	Somewhat, n (%)	Moderately, n (%)	Quite a bit, n (%)
Frequent urination	24 (47)	20 (39)	7 (14)	0 (0)
Urine leakage related to feeling of urgency	31(61)	16 (31)	3 (6)	1 (2)
Urine leakage related to physical activity, coughing or sneezing	9 (18)	36 (70)	4 (8)	2 (4)
Small amount of urinary leakage	10 (20)	34 (67)	5 (10)	2 (4)
Difficulty emptying bladder	43 (84)	6 (12)	1 (2)	1 (2)
Pain or discomfort in lower abdomen, pelvic or genital area	38 (74)	9 (18)	2 (4)	2 (4)

Table 3 Activities associated with leakage and frequency of leakage in participants with urinary incontinence

Activity	Just once, *n* (%)	Rarely, *n* (%)	Sometimes, *n* (%)	Frequently, *n* (%)	Every time, *n* (%)
Rugby game competition	8 (18)	27 (59)	8 (18)	2 (5)	0 (0)
Tackled/hit	11 (24)	24 (54)	8 (18)	2 (4)	0 (0)
Running	12 (57)	5 (24)	4 (19)	0 (0)	0 (0)
Weight training	3 (33)	4 (45)	2 (22)	0 (0)	0 (0)

incontinence to be only a small bother or no bother at all. Consistent with this, most did not use incontinence products and had not discussed their urinary incontinence with a health care provider or received any form of treatment. Urinary incontinence in the present study occurred only rarely in most of the players, and this could explain why they did not consider it to be a larger issue. In previous studies involving athletes competing in athletics', basketball and indoor soccer, urinary incontinence was not only bothersome to players but it also impacted their performances [7, 9, 12]. It has also been found to affect players' quality of life [20]. Rugby is known to be a tough sport, with sweat and blood not uncommonly seen. It is therefore postulated that urinary incontinence may be viewed as inconsequential and perhaps the social stigma attached to it is less significant in this context.

This study has several limitations. Although the questionnaires were anonymous, they were filled out by two of the three teams in a group setting. It is therefore possible that the answers provided were affected by peer pressure. It could be assumed that players would report less urinary incontinence in this public setting and therefore the prevalence would be underestimated. With this bias, women still report a 54% incontinence rate. A more objective measurement of incontinence could have been achieved using a pad test. This method has been used in several studies and has found that players underestimate or may not be aware of their urinary incontinence [18, 21]. Second, our study included only university varsity teams, and as women's rugby is increasing in popularity, these results do not necessarily represent the recreational league population. This may limit this study's external validity as it may not be applied to the general rugby population. It is impossible to predict how the prevalence among recreational league players would compare as it would be influenced by age, training and weight differences as well as parity.

A strength of the study is the high completion rate of the survey. All of the female varsity rugby players in Alberta were willing to complete the survey. This limited any selection bias which could have skewed the results by either over- or underestimating the prevalence. Rugby is a team sport with a close-knit community of players. Although completing a survey on urinary incontinence at a rugby practice may seem embarrassing for some individuals, it is suspected that the willingness of these players to participate stemmed from their comfort and closeness with their fellow teammates and perhaps their desire to fill knowledge gaps from within the sports. Additional strengths of the study include efforts to reduce confounding bias by excluding players who had previously given birth and by assessing players' BMI and age, which are all known to be risk factors for urinary incontinence [2–4]. In addition, the study focused on the players' degree of bother and management of their incontinence.

It is reassuring to see that these female rugby players will not abandon their sport based on urinary incontinence alone. Additional research would be helpful to gain a full understanding of how rugby players differ from other athletes in their views of incontinence. Longitudinal research to follow these women over time would be important in understanding the progression of urinary incontinence over time. The high rates of reported urinary incontinence in young athletic women in general should be further researched.

The present study found the prevalence of urinary incontinence among varsity female rugby players to be higher than in the general population but consistent with rates among other high-impact sports. Surprisingly, the majority of these women are not bothered by their incontinence, and most are not interested in treatment for this condition at this time.

Table 4 Degree of bother associated with urinary incontinence and certain activities

Activity	Not a problem, *n* (%)	A small problem, *n* (%)	A big problem, *n* (%)
Rugby game competition	34 (74)	12 (26)	0 (0)
Tackled/hit	37 (82)	7 (16)	1 (2)
Running	10 (50)	10 (50)	0 (0)
Weight training	8 (89)	1 (11)	0 (0)

Compliance with ethical standards

Conflict of interest None.

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