

PREVALENCE AND RISK FACTORS OF URINARY INCONTINENCE AMONG ELITE FEMALE ATHLETES

Hypothesis / aims of study

The aim of the present study was to evaluate the prevalence of urinary incontinence (UI) in elite female athletes and age-matched controls, and to investigate possible risk factors including anthropometric characteristics, lifestyle and voiding behaviour, with the presence of UI.

Study design, materials and methods

All National Sports Federations were contacted. Five of 18 federations did not respond. Female athletes engaged at the national team level were the focus of the study and 416 elite athletes were identified. From those, we were able to contact 373 athletes and 372 (89.4%) accepted to participate in the study. For each elite athlete, an age-matched control was identified from high schools, universities and public areas. Data were collected with hand delivered questionnaires, between November 2014 and February 2016. All participants answered questions regarding socio-demographic and anthropometric characteristics, medical history, lifestyle and voiding behaviour. In addition, the International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF) was applied. Chi-square test was used to compare prevalence of UI among athletes and controls. P-value was set to <0.05. Risk of UI was reported with sports practice-adjusted odds ratios (adjOR), with 95% confidence intervals (95% CIs), using Logistic regression.

Results

The study included 744 participants, aged between 15 and 48 years (median age=19.0; inter-quartile range=6.0). Twenty five sports/disciplines were represented in the sample: basketball, volleyball, handball, rugby, swimming, water polo, synchronized swimming, judo, karate, football, futsal, tennis, beach tennis, table tennis, paddle, roller hockey, figure roller skating, rowing, canoeing, trampolining, acrobatic gymnastics, rhythmic gymnastics, horse jumping, athletics, weightlifting.

The overall prevalence of UI was 21.5% (athlete group (AG) 29.6% and control group (CG) 13.4%; $p<0.001$). When considering the classification of UI, the prevalence of stress urinary incontinence (SUI) was 11.6% (AG 19.6% and CG 3.5%; $p<0.001$), urgency UI (UUI): 4.6% (AG 3.8% and CG 5.4%; $p=0.292$), mixed UI (MUI): 3.4% (AG 5.9% and CG 0.8%; $p<0.001$) and other types of UI: 5.1% (AG 0.3% and CG 3.8%; $p=0.001$).

Athletes presented a higher risk of overall UI (OR=2.70, 1.86-3.92), SUI (OR=6.74, 3.67-12.40), and MUI (OR=7.73, 2.29-26.06), but not a significantly higher risk of UUI (OR=0.69, 0.34-1.38) or other types of UI (OR=0.90, 0.47-1.72).

Among the athletes reporting UI, 82 (74.6%) reported urine loss during sport activities. Of those, 12 (14.6%) reported the use of strategies to hide urinary leakage. Three (3.7%) reported that UI affected sports performance. Twelve (14.6%) had reported the presence of UI to a physician. Additionally, in the AG an association between the presence of UI and training volume of sports practice was found (hours/week) (OR=1.04; 1.00-1.08); but not between the presence of UI and years of sport practice (OR=1.02; 0.97-1.06).

Subjects with constipation (adjOR=1.81, 1.09-3.02), family history of UI (adjOR=1.60, 1.07-2.04) and history of frequent urinary infections (adjOR=2.04, 1.16-3.58), had higher risk of overall UI, even when adjusted for sports practice (athlete or control). Use of abdominal exertion during voiding (sometimes: adjOR=2.05, 1.39-3.01; often: adjOR=2.55, 1.26-5.17) and postponing voiding (adjOR=2.28, 1.32-3.92) were risk factors. No association was found between overall UI and body mass index or irregular menstrual cycles.

Table 1. Prevalence of stress, urgency, mixed and other types of UI within each sport

Sport (n)	SUI n (%)	UUI n (%)	MUI n (%)	Others n (%)
Basketball (n=58)	14 (24.1)	3 (5.2)	8 (13.8)	4 (6.9)
Volleyball (n=24)	1 (4.2)	0 (0.0)	1 (4.2)	0 (0.0)
Handball (n=30)	7 (23.3)	2 (6.7)	2 (6.7)	2 (6.7)
Rugby (n=41)	5 (12.2)	0 (0.0)	2 (4.9)	1 (2.4)
Aquatic sports* (n=51)	7 (13.7)	1 (2.0)	1 (2.0)	1 (2.0)
Judo / Karate (n=24)	6 (25.0)	3 (12.5)	2 (8.3)	0 (0.0)
Football / Futsal (n=37)	6 (16.2)	1 (2.7)	0 (0.0)	3 (8.1)
Tennis** / Paddle (n=21)	4 (19.0)	0 (0.0)	1 (4.8)	1 (4.8)
Roller hockey (n=10)	1 (10.0)	1 (10.0)	0 (0.0)	1 (10.0)
Figure roller skating (n=5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Rowing / Canoeing (n=8)	1 (12.5)	0 (0.0)	1 (12.5)	1 (12.5)
Trampolining (n=17)	14 (82.4)	0 (0.0)	1 (5.9)	2 (11.8)
Acrobatic / Rhythmic gymnastics (n=9)	2 (22.2)	0 (0.0)	1 (11.1)	2 (22.2)
Horse jumping (n=14)	1 (7.1)	0 (0.0)	1 (7.1)	0 (0.0)
Athletics (n=22)	4 (18.2)	3 (13.6)	1 (4.5)	0 (0.0)
Weightlifting (n=1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

* Swimming, Water polo, Synchronized swimming ** Tennis/Beach tennis/Table tennis

Interpretation of results

The present sample included young, healthy women and a higher prevalence of SUI and MUI was found among athletes compared to aged matched controls. As reported in other studies (1) women participating in high impact activities (jumping and running) showed the highest prevalence, except volleyball that showed small prevalence compared to other studies (2). Association was found between UI and hours of weekly training and not with number of years of sport practice, suggesting that weekly volume of exercise is important.

To date, few large population-based surveys have evaluated the prevalence of UI in elite athletes. Numerous competitive sports were included in this study that has not been investigated in previous published studies and new risk factors were reported. Strength of the study is the large sample size and use of ICIQ-UI-SF. One limitation involves the use of self-reported data. However, this is the most commonly used method in epidemiology.

Concluding message

The number of female elite athletes is increasing. This study found a high prevalence of UI in high impact sports. Preventive and treatment strategies should be developed, implemented and evaluated in young female elite athletes.

References

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2. Simeone C, Moroni A, Pettenò A, Antonelli A, Zani D, Orizio C, Cosciani Cunico S. Occurrence rates and predictors of lower urinary tract symptoms and incontinence in female athletes *Urologia.* 2010; 77(2): 139-146

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