



Preliminary Study on Prevalence of Urinary Incontinence in Iranian Female Athletes

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Abstract

Research carried out over the past few decades has shown that urinary incontinence is observed among physically active women, including those involved in professional high impact sports. The purpose of this preliminary study was to investigate the prevalence of stress urinary incontinence (SUI) and assess its risk factors among Iranian female athletes. A total of 195 volunteers comprising women athletes aged between 16.5 and 32.5 years (24.18 ± 8.70) completed the urinary incontinence questionnaire. Data from athletes with SUI were analyzed using the non-parametric Kruskal-Wallis test. Among the study participants, only 21 (10.77%) had SUI. Statistically significant differences were observed between urinary incontinence during exercise and a history of childhood enuresis, genital infections, and prolonged standing (> 1 h per day; $P < 0.05$). The current study demonstrated that among the factors that exert significant effects on urinary incontinence, childhood enuresis is an important risk factor to increase the risk of having SUI. This association may help to avoid exposing these female athletes to high impact exercise before starting a training program.

Keywords

Urinary incontinence, Female athletes, Childhood enuresis, Genital infection, High-impact activities

Introduction

Urinary incontinence is defined as “the complaint of any involuntary leakage of urine” [1,2] and is characterized by the inability to hold urine, even until the person reaches the bathroom. The most common form of incontinence in women is stress urinary incontinence (SUI), which occurs because of an increase in intra-abdominal pressure as a result of coughing, sneezing, laughing, and physical activities such as sports or exercise, lifting heavy objects, or sudden change in position [1,2].

Although no single factor causes SUI, hypermobility of the bladder neck and urethra during periods of increased abdominal pressure is the most important factor that results in incontinence in women with no history of urethral sphincter dysfunction. Under normal conditions, the endopelvic fascia and pelvic floor muscles

prevent the downward movement of the bladder and urethra and contain them within the abdominal cavity. The weakening of these supportive structures or repeated application of pressure on them can result in prolapse. The pelvic floor muscles and fascia act independently of one another, and weakness in any of them can lead to pelvic floor dysfunctions [3]. Other risk factors for the incidence of SUI include the following: inherited weakness of connective tissue and pelvic floor muscles; pregnancy; vaginal delivery with injuries to peripheral nerves, fascia, ligaments, or muscles of the pelvic floor; obesity; severe physical activity; and elderly [4].

Different researchers were reported different rate of urinary incontinence in different group of ages but, according to Markland et al. (2011) [5] the mean of prevalence of urinary incontinence in women and men is 51.1% and 13.9%, respectively which increases with age. It has shown normal delivery is the most important risk factor for the development of urinary incontinence in women; however, a high prevalence of urinary incontinence has also been observed in young, physically fit female athletes without a history of labor [2,6]. The prevalence of urinary incontinence varies depending on the type of exercise and, the most common form of UI in female athletes is stress urinary incontinence. According to Bo et al. (1989) [6], 26% of young students attending physical education programs suffered from urine leakage during different types of physical activities. Eliasson et al. (2002) [2] observed that the prevalence of urine leakage among female elite trampolinists was 80%, with a mean urine leakage of 28 g during each exercise session. Intra-abdominal pressure is elevated in physically active compared with sedentary women. Thus, the risk of SUI during physical activities is greater in female athletes [7]. Bo et al. (2011) [8] showed that the rate of SUI was high (approximately 25%) among yoga or Pilates instructors.

Although urinary incontinence in female athletes is not a new issue in Western countries and has been the subject of extensive research, our review of literatures showed that this problem has not been investigated among Iranian female athletes. Thus, the aim of the current preliminary study was to investigate the prevalence of urinary incontinence in Iranian female athletes. To better protect young female athletes from SUI side effects, for the prevention of

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health problems in the middle-aged and for countries' future health and social policy these information are critical.

Methods

For carrying out this cross-sectional study, a self-report questionnaire was distributed in sport clubs among 250 Iranian female athletes of > 16 years with focus on high impact exercises. However, only 195 athletes returned the completed questionnaires. The study was approved by the Ethics Committee of Tehran University of Medical Sciences and consents were obtained from all participants. Athletes who answered the question "Do you experience involuntary urine leakage during or after your practice?" in the affirmative were considered to suffer from urinary incontinence [2]. The volunteers were also asked to complete a questionnaire with different questions related to urinary incontinence. The majority of the participants were basketball players (n = 113), body builder (n = 37) and volleyball players (n = 26). However, data were also collected from athletes participating in various other sports. The swimmers had the lowest returned questionnaire in this study.

In addition to general information, all information pertinent to urinary incontinence such as history of menstrual cycle, urogenital infection, surgery, and medical treatment was collected. A brief explanation of the purpose of the study and the definition of urinary incontinence was also mentioned in the questionnaire and researchers were readily available to respond to any question.

Because of the low incidence of urinary incontinence among female athletes, the non-parametric Kruskal-Wallis test was used for statistical analysis and a P value of < 0.05 was considered significant.

Results

In this study, 195 Iranian female athletes of mean age 24.18 (± 8.70) years, weight 60.12 (± 8.37) kg, and height 166.17 (± 6.70) cm completed our questionnaire. Among the athletes, 21 (10.77%) suffered from urinary incontinence (Table 1). Since, this research was conducted at the time of training camp of basketball and volleyball teams, as can be seen in table 1, most of the participants were from these two teams and body builder which showed perfect cooperation.

Detailed information about the athletes with SUI is given in table 2. Briefly, they experienced first urinary incontinence during exercise not race, 50% of them didn't have any history of treatment and majority of them reported anxiety during race or exercise.

The results show that among the 21 factors examined in this study, a history of childhood enuresis, genital infections, and prolonged standing for > 1 hour per day were the only 3 factors that showed a statistically significant difference in athletes with SUI.

Discussion

To the best of our knowledge, this is the first study investigating urinary incontinence prevalence in Iranian female athletes. Twenty one (10.77%) of the 195 female athletes who participated in this study had experienced urine leakage during or after exercise but none of them never had discussed this problem with a physician.

Based on the load exerted on the pelvic floor, activities were classified into two categories [9]: 1) Low-impact activities such as walking, bicycling, swimming, and fitness with low pressure and 2)

Table 1: Frequency of urinary incontinence in subjects

Sport	With urinary incontinence	Without urinary incontinence	Total
Basketball	12 (57.20%)	101 (58%)	113
Volleyball	4 (19%)	22 (12.60%)	26
Rowing	2 (9.50%)	6 (3.30%)	8
Taekwondo	2 (9.50%)	4 (2.20%)	6
Body building	1 (4.80%)	37 (21.30%)	38
Swimming	0 (0%)	4 (4%)	4
Total	21 (100%)	174 (100%)	195

Table 2: Questions included in the questionnaire for study female athletes Stress Urinary Incontinence (SUI) (N = 21) (all numbers are in percentage)

Marital status	Married	28.60
	Single	71.40
Type of sport	Professional	52.40
	Non-professional	47.60
First experience of SUI	During race	40
	During exercise	60
SUI in non-sporting activities	Negative	52.60
	Positive	47.40
SUI depending on the type of sport	Horizontal jumping	43.80
	Vertical jumping	56.20
Type of drink	Coffee	71.40
	Tea	28.60
History of SUI treatment	Negative	50
	Positive	50
Type of SUI treatment	Exercise	16.70
	Pharmaceutical	83.30
History of urogenital infection	Negative	25
	Positive	75
Anxiety during race or practice (self-report)	Negative	31.60
	Positive	68.40
Carriage of load (over 5 Kg)	Negative	88.20
	Positive	11.80
History of standing (> 1 hour/day) during non-sporting activities	Negative	42.10
	Positive	57.90
Walking more than 1 hour	Negative	47.70
	Positive	52.60
Regularity of menses	Irregular	27.30
	regular	72.70
History of childhood enuresis	Negative	25
	Positive	75
History of childbirth	Negative	71.40
	Positive	28.60
Type of delivery	None	71.40
	Caesarean	14.30
	Vaginal delivery	14.30
*P < 0.05; †P < 0.008		

High-impact activities such as gymnastics, running, jumping, dancing, volleyball, and basketball (ball sports). In general, urinary incontinence is more common among women than men, with a higher prevalence among older women. The prevalence of urinary incontinence in Iranian women (non-athlete) is not clear but it is estimated to be between 2 to 65% [10]. According to our results the prevalence of stress urinary incontinence in Iranian female athletes is 10.77%.

In addition to elderly women, young women involved in sports activities and exercise may suffer from urinary incontinence [6]. The prevalence of SUI among female athletes is relatively high, and is observed in two-thirds of gymnasts and basketball players while its prevalence was limited to 10% among swimmers [11,12]. The highest prevalence rates of urinary incontinence were observed among soccer, volleyball, basketball, and track and field athletes [13,14]. Its mechanism is not exactly clear but it may be due to maximal reaction force when landing on the ground after a jump, genetic weakness and changes in the cellular composition of pelvic floor components [15-17]. In present study 10.77% of athletes were suffered from SUI and most of them were from basketball players. Not only SUI affects the ability of women to perform physical activities, it has also a considerable impact on the social, economic, and psychological aspects of life [18,19]. Urinary incontinence, if diagnosed early, is treatable; however, most patients do not consult a physician because of embarrassment. However, more than 90% of the young female athletes who experienced incontinence never discussed this problem with anyone [20]. Our previous researches showed Iranian female athletes believed that leakage of urine is a private matter due to physical and psychological stress of exercise and therefore there is no need to see a physician. They refused to drink fluids or went to toilet frequently before tournament to prevent spontaneous outflow of urine [21,22].

It has been proved that pregnancy and childbirth (especially vaginal labor) are associated with pelvic floor weakness and an increased rate of SUI [21,23-25]. The incidence of stress incontinence in the mother prior to pregnancy increases the likelihood of postpartum incontinence [26]. The results of current study showed the absence of a statistically significant difference between the type of labor and urinary incontinence, which could be because of the low sample number (only 6 of 21 athletes with SUI had a history of labor).

Prolonged standing leads to weakness of the pelvic floor muscles [27]. The current study revealed a statistically significant difference between prolonged standing (more than one hour per day) and urinary incontinence, which is attributable to changes occurring in the lumbopelvic area while standing. In addition, it has been shown that any change in the lumbopelvic area alters the activities of pelvic floor muscles [28] and our previous research showed that the lumbar lordosis is lesser in female volleyball players who suffering from SUI [21]. Research in this area is new and more research needs to be done.

One of the risk factors for urinary incontinence is urogenital infection. Previous research has shown statistically significant difference between a history of lower genital tract infection and urinary incontinence [29], which was also observed in the current study.

The prevalence of childhood enuresis is approximately 22.4% [30]. Association between childhood enuresis and adult urinary incontinence has been shown in various studies [29,30]. Accordingly, in the current study 75% of athletes with SUI had enuresis history and also revealed a strong statistically significant difference between childhood enuresis history and urinary incontinence in female athletes ($P = 0.008$); thus, a history of enuresis may be indicate that athletes are more at risk of urinary incontinence. Previously, the relationship between childhood enuresis and detrusor instability was reported [31]. It seems one could argue that childhood enuresis can be used as an indicator of SUI among female athletes and may help them to select a low impact exercise before starting a training program.

Caffeine consumption is another factor that affects bladder function; therefore, athletes are advised to limit its intake. Jura et al. (2011) [32,33] showed that high caffeine consumption (450 mg per day or 4 or more cups of coffee) is associated with urgency incontinence but not with stress or mixed incontinence. The current study showed the absence of a statistically significant difference between the types of drink and urinary incontinence; however, coffee was the favored drink of 15 out of the 21 athletes who suffered from urinary incontinence.

In contrast to our pervious study [21] the results of the current study showed the absence of a statistically significant difference between urinary incontinence and the status of the patient as a professional or non-professional athlete. Nygaard (1997) [12] showed that 19 out of 55 professional female athletes (34.54%) who competed in Olympic sports between 1960 and 1976 suffered from urinary incontinence during the Olympic Games.

Unfortunately, the number of questionnaires given to athletes in each team had not been recorded and this can be considered a limitation of this study; but, it seems the experience of urinary incontinence in volleyball and basketball players is the most important factor for return of questionnaires.

Conclusions

In conclusion, the current study marks the beginning of research on prevalence of urinary incontinence in Iranian female athletes. The results of childhood enuresis history suggest that it may be used as an indicator of urinary incontinence in athletes. Hence, focus on factors affecting enuresis is recommended for future research in athletes with SUI and enuresis history. It is recommended that research be conducted on larger population of athletes. Fear of stigma can cause athletes to avoid getting any treatment or even answering to any questionnaire. Our experience with data collection suggests that a face-to-face interview is better for completing the questionnaires. It seems that the thrust of the athlete can be obtained through the direct interview.

References

1. Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, et al. (2003) The standardization of terminology of lower urinary tract function: report from the standardization sub-committee of The International Continence Society. *Urology* 61: 37-49.
2. Eliasson K, Larsson T, Mattsson E (2002) Prevalence of stress incontinence in nulliparous elite trampolinists. *Scand J Med Sci Sports* 12: 106-110.
3. DeLancey JO (1994) Structural support of the urethra as it relates to stress urinary incontinence: the hammock hypothesis. *Am J ObstetGynecol* 170: 1713-1720.
4. Bø K, Borgen JS (2001) Prevalence of stress and urge urinary incontinence in elite athletes and controls. *Med Sci Sports Exerc* 33: 1797-1802.
5. Markland AD, Richter HE, Fwu CW, Eggers P, Kusek JW (2011) Prevalence and trends of urinary incontinence in adults in the United States, 2001 to 2008. *J Urol* 186: 589-593.
6. Bo K, Hagen R, Kvastein B, Larsen F (1989) Female stress urinary incontinence and participation in different sport and social activities. *Scandinavian Journal of Sports & Science* 11: 117-121.
7. Nygaard I, DeLancey JO, Arnsdorf L, Murphy E (1990) Exercise and incontinence. *ObstetGynecol* 75: 848-851.
8. Bø K, Bratland-Sanda S, Sundgot-Borgen J (2011) Urinary incontinence among group fitness instructors including yoga and pilates teachers. *NeuroUrology* 30: 370-373.
9. Eliasson K, Nordlander I, Larson B, Hammarström M, Mattsson E (2005) Influence of physical activity on urinary leakage in primiparous women. *Scand J Med Sci Sports* 15: 87-94.
10. Morowatisharifabad MA, Rezaeipandari H, Mazyaki A, Bandak Z (2015) Prevalence of Urinary Incontinence among Elderly Women in Yazd, Iran: A Population-Based Study. *Elderly Health Journal* 1: 27-31.
11. Nygaard IE, Thompson FL, Svengalis SL, Albright JP (1994) Urinary incontinence in elite nulliparous athletes. *ObstetGynecol* 84: 183-187.
12. Nygaard IE (1997) Does prolonged high-impact activity contribute to later urinary incontinence? A retrospective cohort study of female Olympians. *ObstetGynecol* 90: 718-722.
13. Dockter M, Kolstad KA, Martin KA, Schiwal LJ (2007) Prevalence of urinary incontinence: A comparative study of collegiate female athletes and non-athletes controls. *Journal of Women's Health Physical Therapy* 31: 12-17.
14. Thyssen HH, Clevin L, Olesen S, Lose G (2002) Urinary incontinence in elite female athletes and dancers. *IntUrogynecol J Pelvic Floor Dysfunct* 13: 15-17.
15. Hay JG (1993) Citius, altius, longius (faster, higher, longer): the biomechanics of jumping for distance. *J Biomech* 26 Suppl 1: 7-21.
16. Harris RL, Cundiff GW, Coates KW, Bump RC (1998) Urinary incontinence and pelvic organ prolapse in nulliparous women. *ObstetGynecol* 92: 951-954.
17. Bø K (2004) Urinary incontinence, pelvic floor dysfunction, exercise and sport. *Sports Med* 34: 451-464.
18. Coyne KS, Zhou Z, Thompson C, Versi E (2003) The impact on health-related quality of life of stress, urge and mixed urinary incontinence. *BJU Int* 92: 731-735.
19. Mallah F, Montazeri A, Ghanbari Z, Tavoli A, Haghollahi F, et al. (2014) Effect of Urinary Incontinence on Quality of Life among Iranian Women. *J Family Reprod Health* 8: 13-19.
20. Carls C (2007) The prevalence of stress urinary incontinence in high school and college-age female athletes in the midwest: implications for education and prevention. *UrolNurs* 27: 21-24.
21. Vatandust S, vasaghi- Gharamaleki B, AttarbashiMoghadam B (2015) The effect of lumbar lordosis, pelvic tilt, type and number of labor in volleyball players suffering stress urinary incontinence. *Modern Rehabilitation Journal* 9: 25-34 (Perssian)
22. Tabatabayi S, Kamali M, Vasaghi-Gharamaleki B, Shafaroudi N Exploring the experiences of Iranian female athletes with stress urinary incontinence from help seeking. *Modern Rehabilitation Journal* In press (Perssian)
23. Peyrat L, Haillot O, Bruyere F, BoutinJM, Bertrand P, et al. (2002) Prevalence and risk factors of urinary incontinence in young and middle-aged women. *BJU Int* 89: 61-66.
24. Phillips C, Monga A (2005) Childbirth and the pelvic floor: "The gynaecological consequences". *Reviews in Gynaecological Practice* 5: 15-22.
25. Handa VL, Zyczynski HM, Burgio KL, Fitzgerald MP, Borello-France D, et al. (2007) The impact of fecal and urinary incontinence on quality of life 6 months after childbirth. *Am J ObstetGynecol* 197: 636.
26. Wilson PD, Herbison RM, Herbison GP (1996) Obstetric practice and the prevalence of urinary incontinence three months after delivery. *Br J ObstetGynaecol* 103: 154-161.
27. Smith DB1 (2004) Female pelvic floor health: a developmental review. *J Wound Ostomy Continence Nurs* 31: 130-137.

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28. Capson AC, Nashed J, Mclean L (2011) The role of lumbopelvic posture in pelvic floor muscle activation in continent women. *J ElectromyogrKinesiol* 21: 166-177.
 29. Kuh D, Cardozo L, Hardy R (1999) Urinary incontinence in middle aged women: childhood enuresis and other lifetime risk factors in a British prospective cohort. *J Epidemiol Community Health* 53: 453-458.
 30. Gurbuz A, Karateke A, Kabaca C (2005) Enuresis in childhood, and urinary and fecal incontinence in adult life: do they share a common cause? *BJU Int* 95: 1058-1062.
 31. Moore KH, Richmond DH, Parys BT (1991) Sex distribution of adult idiopathic detrusor instability in relation to childhood bedwetting. *Br J Urol* 68: 479-482.
 32. Jura YH, Townsend MK, Curhan GC, Resnick NM, Grodstein F (2011) Caffeine intake, and the risk of stress, urgency and mixed urinary incontinence. *J Urol* 185: 1775-1780.
 33. DehghanManshadi F, Ghanbari Z, Jabbari Z, Sadat Miri E (2013) Urinary Incontinence and its Related Disorders and Risk Factors in Women. *Journal of School of Public Health and Institute of Public Health Research* 11: 53-64. [Persian]