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Pelvic Floor Health in Female Athletes: Awareness, Barriers to Care, and Future Directions from a Saudi Arabian Perspective

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Abstract

Pelvic floor dysfunction (PFD) is a relevant health concern among female athletes, particularly those participating in high-impact and strength-based sports. Urinary incontinence (UI) is the most frequently investigated symptom and has been reported by young, nulliparous women. However, PFD also encompasses symptoms of pelvic organ prolapse (POP), anal incontinence, pelvic pain, and sexual dysfunction, all of which may affect athletic participation and quality of life. These symptoms are frequently underreported, and athletes often demonstrate limited knowledge of pelvic floor anatomy, function, and dysfunction. In Saudi Arabia, a single cross-sectional study of 76 female athletes has identified knowledge gaps, particularly regarding the pelvic floor muscles (PFM) and POP. This mini-review synthesizes current evidence on PFD in female athletes, distinguishes PFD from PFM weakness, considers the role of individualized pelvic floor muscle training (PFMT), and examines the gap between symptom prevalence, recognition, and help-seeking. Building on existing athlete-specific screening work, including the PFD-SENTINEL tool, a proposed education, screening, and referral pathway is presented, and its implications for the developing female sporting environment in Saudi Arabia are discussed. Findings supported by current evidence are distinguished from proposals that require evaluation in the Saudi context.

Introduction

Women's participation in recreational and competitive sport has expanded substantially, including in Saudi Arabia, where national initiatives have broadened opportunities for female athletes at all levels[1]. This growth requires attention to health concerns that disproportionately affect female athletes, including pelvic floor dysfunction (PFD). PFD encompasses a range of conditions, including urinary incontinence (UI), pelvic organ prolapse (POP), anal incontinence, pelvic pain, and sexual dysfunction[2]. Importantly, PFD is not restricted to older or parous women. Young, physically active, and nulliparous athletes have reported UI, particularly during sports involving repetitive jumping, running, or heavy lifting. A systematic review and meta-analysis reported a pooled UI prevalence of approximately 26% in high-impact sports, with stress UI affecting approximately 21%[3]. Similar patterns have been observed in adolescent athletes[4]. Although UI has received most research attention, symptoms of POP, anal incontinence, pelvic pain, and sexual dysfunction have also been reported by female athletes[2] and are considered throughout this review.

In Saudi Arabia, a recent cross-sectional survey of 76 adult female athletes identified limited knowledge of the pelvic floor muscles (PFM) and PFD; awareness of UI was comparatively better, whereas

knowledge of POP and PFM anatomy was considerably lower[5]. This raises an important question: are female athletes adequately equipped to recognize symptoms, understand preventive and therapeutic options, and access appropriate care?

Several recent reviews have addressed UI prevalence, pelvic floor knowledge, and pelvic floor muscle training (PFMT) in female athletes[2,6,7]. The present mini-review aims to extend this literature in three ways. First, PFD is considered as a spectrum of symptoms rather than as UI alone, and symptoms are distinguished from PFM weakness. Second, the gap between symptom prevalence, symptom recognition, and help-seeking is examined using a multilevel framework of athlete, organizational, and technical factors. Third, a proposed screening and referral pathway, positioned in relation to existing athlete-specific screening work[8], is discussed in the context of Saudi Arabia, where women's sport is developing rapidly, cultural factors may influence disclosure, and athlete-specific evidence remains limited.

Literature Search

Relevant literature was identified through structured searches of PubMed and Google Scholar using combinations of the terms "pelvic floor," "urinary incontinence," "pelvic floor dysfunction," "pelvic organ prolapse," "anal incontinence," "pelvic pain," "female athlete," "pelvic floor muscle training," "screening," "awareness," and "Saudi Arabia". The initial search covered the period up to March 2026, and an updated search was conducted in August 2026 to capture more recent publications. Reference lists of relevant systematic and scoping reviews were hand-searched to identify additional primary studies. English-language peer-reviewed articles were prioritized, with recent systematic reviews, meta-analyses, and large cross-sectional studies favored where available, together with studies relevant to athlete screening and to the Saudi Arabian context. As this is a narrative mini-review rather than a systematic review, no formal PRISMA flow diagram or independent quality appraisal was conducted.

The Problem: PFD in Female Athletes

The pelvic floor is a complex neuromuscular system contributing to continence, organ support, sexual function, and pressure regulation. During physical activity, these structures respond dynamically to changes in loading. UI, defined as the complaint of involuntary loss of urine[9], is the most commonly reported PFD in female athletes and has consequently dominated the athletic literature. Other PFD symptoms are, however, also relevant. Among Norwegian female powerlifters and Olympic weightlifters, prevalences of 50% for UI, 80% for anal incontinence, and 23% for POP symptoms have been reported[10]. Anal incontinence, symptoms of vaginal bulging or heaviness, pelvic pain, dyspareunia, and other symptoms of sexual dysfunction have also been described among elite female athletes, although they are investigated far less frequently than UI and are likely to be underreported[2]. A broader view of pelvic floor health is therefore needed to capture the full burden of symptoms in this population.

UI prevalence varies by sport type, and high-impact disciplines such as volleyball, CrossFit, and rugby are associated with elevated rates[3,11,12]. Studies summarized in a recent review of rugby reported UI in 54–63% of female players[12]. In the Norwegian strength athletes described above, few reported knowledge of the PFM[10], a finding that parallels the knowledge gaps discussed below.

A clear distinction should be made between PFD, which describes symptoms and signs, and PFM weakness, which is only one possible underlying impairment. Exercise-associated symptoms may arise from reduced PFM strength or endurance, altered neuromuscular coordination or timing, impaired relaxation, fatigue, or a reduced capacity to manage repetitive or high loads[12]. Symptoms should therefore not be assumed to indicate an undertrained or weak pelvic floor; pelvic pain or dyspareunia, for example, may reflect impaired relaxation rather than weakness, in which case a strengthening-focused approach may be inappropriate. The demands of heavy lifting are illustrated by a small experimental study of 11 participants, in which a voluntary PFM pre-contraction did not significantly exceed the rise in intra-abdominal pressure during the squat, deadlift, leg press, or curl-up[13]. These findings suggest that a voluntary pre-contraction alone may be insufficient to counteract pressure increases during strenuous strength exercises.

Risk factors for PFD in female athletes are multifactorial, and sports participation should not be assumed to be the primary cause of symptoms. Sport-related factors, including impact exposure, training frequency, and level of competition, have been associated with UI; among female strength athletes, competition at international level and weightlifting on at least four days per week were associated with stress UI, as was higher body mass index[10]. Low energy availability has been identified as a further potential risk factor alongside impact sport participation[14]. Demographic, reproductive, and individual factors, including age, parity, body mass index, hormonal status, straining during defecation, and joint hypermobility, should also be considered[10,14]. Urinary leakage or other PFD symptoms during sport therefore warrant individualized assessment to identify modifiable factors and to determine whether pelvic floor physiotherapy is indicated.

Awareness Gaps and Barriers to Care

Effective interventions have limited impact if athletes do not recognize symptoms or know when to seek help.

In the Saudi cross-sectional survey of 76 adult female athletes, awareness of UI was relatively adequate, whereas knowledge of POP and PFM anatomy was substantially poorer[5]. These findings indicate an educational gap that is independent of symptom status. This issue is not unique to Saudi Arabia; limited knowledge of PFD has also been reported among Spanish female athletes, with gender-related stereotypes contributing to symptom normalization and discouraging disclosure[15].

These gaps can be understood across three interacting levels: the athlete, the organizational environment, and the technical characteristics of training (Figure 1). At the athlete level, embarrassment and shame are consistently reported reasons for concealing symptoms[2,15]. A systematic review found that most athletes managed symptoms through pads or other containment strategies, and very few discussed their symptoms with a health professional[2]. At the organizational level, coaches and support staff may share these knowledge gaps, and pelvic health is rarely incorporated into athlete education or support structures[6]. At the technical level, characteristics of training such as repeated high-impact landings, heavy external loads, high training frequency, and fatigue may challenge pelvic floor function[10,12], whereas pelvic floor symptoms are seldom considered in load management or return-to-sport planning[12].

A distinction should also be made between symptom prevalence, symptom recognition, and actual access to treatment. Athletes may experience symptoms without recognizing them as treatable, may recognize them but regard them as a normal consequence of training, or may wish to seek care but be uncertain where to go or reluctant to disclose[2,15]. Each of these steps represents a potential point of attrition between prevalence and treatment. Increasing awareness is therefore necessary but may not be sufficient, because knowledge alone does not necessarily translate into help-seeking. This distinction reinforces the need for structured, confidential screening and clear referral pathways that do not depend solely on athlete-initiated disclosure.

Structured education may help to address part of this gap. A quasi-experimental study of a three-session online educational program for female athletes reported improvements in knowledge and pelvic health habits[16]. These findings are encouraging; however, they reflect changes in knowledge and self-reported behavior rather

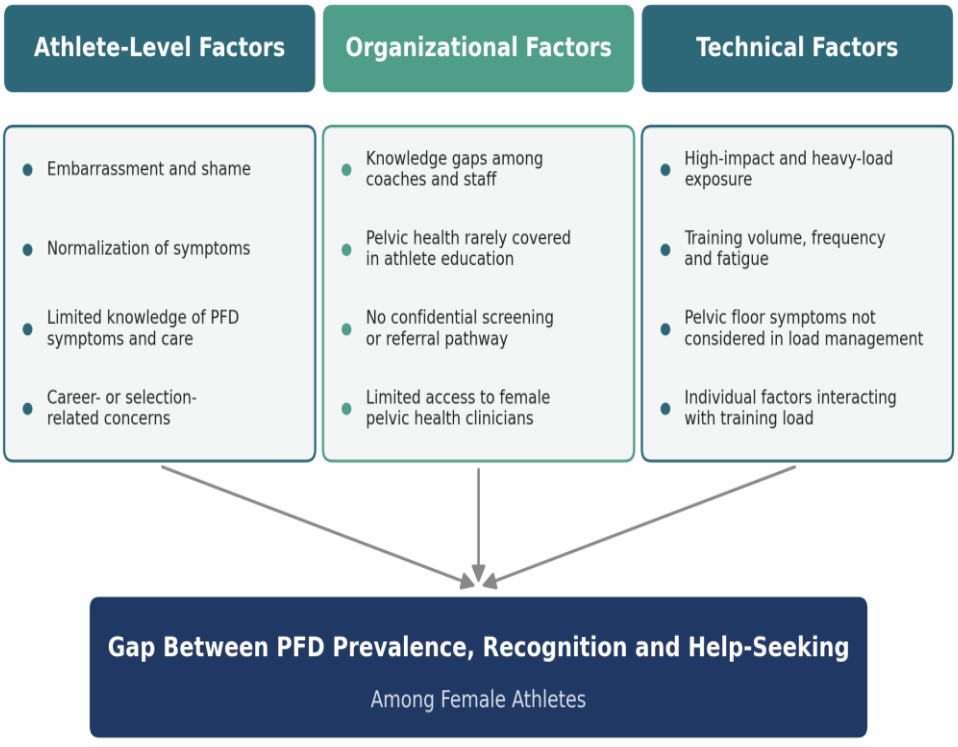

Figure 1. Proposed multilevel framework of factors contributing to the gap between pelvic floor dysfunction (PFD) prevalence, recognition, and help-seeking among female athletes. Barriers at the athlete level (embarrassment and shame, symptom normalization, limited knowledge, career- or selection-related concerns), the organizational level (knowledge gaps among coaches and staff, limited coverage in athlete education, absence of confidential screening and referral pathways, limited access to female pelvic health clinicians), and the technical level (high-impact and heavy-load exposure, training volume and fatigue, and limited consideration of pelvic floor symptoms in load management) are proposed to interact and sustain under-recognition of PFD. *This framework is a conceptual synthesis of the literature reviewed and has not been formally tested or validated.*

than prevention of PFD or a reduction in symptoms. Whether education reduces the incidence or severity of PFD, or increases help-seeking, remains to be established in prospective studies.

PFMT and a Proactive Pathway Forward

PFMT is well established as a conservative intervention for UI in the general female population. Cochrane evidence supports PFMT for women with stress, urgency, and mixed UI, with women receiving PFMT more likely to report cure or improvement than those receiving no treatment[17]. Evidence specific to athletes, while limited, suggests that supervised PFMT can improve PFM strength and reduce urine loss[7].

However, PFMT should not be reduced to instructing every athlete to perform repeated "Kegel exercises." Verbal instruction alone does not reliably produce a correct PFM contraction, even among exercising women who are repeatedly instructed to contract these muscles[18]. Moreover, because PFD symptoms do not necessarily reflect weakness, a generic strengthening program may not be appropriate for all symptomatic athletes. Assessment by an appropriately trained healthcare professional, such as a pelvic health physiotherapist, is therefore recommended to evaluate PFM strength, endurance, coordination, and relaxation, and to determine whether and how PFMT should be prescribed. In this context, PFMT refers to an individualized program that may target strength, endurance, timing, coordination, or relaxation, rather than a universal set of strengthening exercises. The integration of routine PFMT into team warm-ups has not been evaluated and is not recommended here; within the sports environment, the emphasis should instead be on education, symptom recognition, and referral.

Athlete-specific screening has recently received attention. The Pelvic Floor Dysfunction-ScrEeNing Tool IN fEmale athLetes (PFD-SENTINEL) was developed through an international Delphi consensus for use by sports medicine clinicians and comprises a cluster of five PFD symptoms and 28 items, covering risk factors and clinical and sports-related characteristics, that should prompt referral to specialist care[8]. Generic validated instruments are also available, including the International Consultation on Incontinence Questionnaire–Urinary Incontinence Short Form (ICIQ-UI SF)[19] and the Pelvic Floor Distress Inventory-20 (PFDI-20), which covers urinary, colorectal–anal, and prolapse symptoms[20]; however, these instruments were developed for general female populations rather than for athletes. The pathway proposed in this review is not intended to replace such tools. Rather, it positions athlete-specific screening within a broader sequence that begins with education and symptom recognition and continues through individualized assessment, intervention, and follow-up, and it considers how this sequence could be adapted to the Saudi context. On this basis, a six-step pathway is proposed (Figure 2):

1. **Education:** Culturally appropriate education for athletes, coaches, and support staff about PFM anatomy and function, the full range of PFD symptoms (UI, POP symptoms, anal incontinence, pelvic pain, and sexual pain or dysfunction), and available care.
2. **Recognition:** Normalizing discussion of pelvic floor symptoms, while avoiding the normalization of the symptoms themselves (for example, regarding leakage as an expected consequence of training), to reduce stigma and encourage disclosure.
3. **Screening:** Confidential screening incorporated, where feasible, into routine pre-participation or periodic athlete health assessments and administered by a clinician or appropriately trained team healthcare provider. Screening should cover urinary symptoms (stress, urgency, or mixed UI; frequency; voiding difficulty), anorectal symptoms (flatal or fecal incontinence, urgency, obstructed defecation), POP symptoms (vaginal bulge, heaviness, or pressure), pelvic and sexual pain (including dyspareunia), and the impact of symptoms on training, performance, and quality of life. An athlete-specific tool such as the PFD-SENTINEL[8] may be used, supplemented where necessary by validated questionnaires such as the ICIQ-UI SF[19] or the PFDI-20[20], preferably in validated Arabic versions where available.
4. **Assessment:** Individualized clinical assessment by an appropriately trained healthcare professional, such as a pelvic health physiotherapist, including evaluation of PFM strength, endurance, coordination, and relaxation, with medical referral where indicated.
5. **Intervention:** Individualized, evidence-based conservative management, which may include PFMT targeted to the identified impairment, behavioral strategies, and load modification, as directed by the treating clinician.
6. **Follow-up:** Reassessment of symptoms, bother, and adherence across the training and competitive cycle.

Within this pathway, findings that should prompt referral to a pelvic health professional include any involuntary leakage of urine, flatus, or stool during sport or daily life; symptoms of vaginal bulging, heaviness, or pressure; pelvic pain or pain with intercourse; symptoms that cause bother or alter training behavior, such as the use of pads or other containment strategies[2]; and the risk factors and clinical characteristics identified by athlete-specific screening tools[8]. Red-flag symptoms, such as hematuria, rectal bleeding, or new neurological symptoms, warrant prompt medical review.

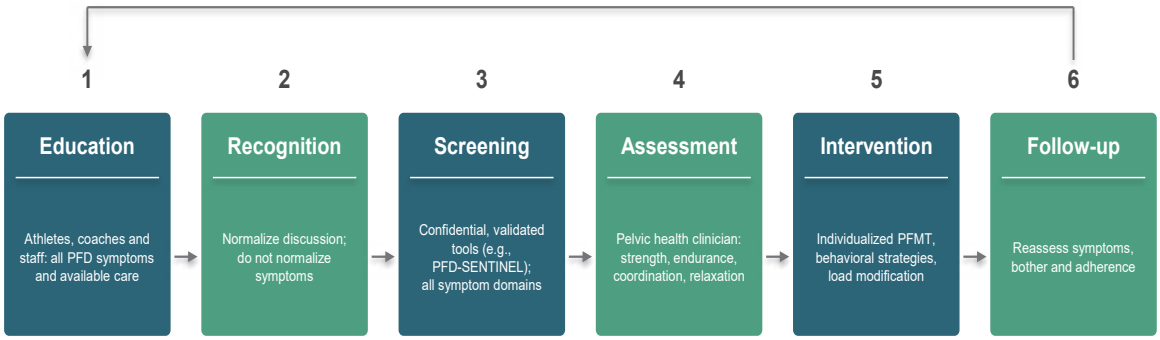

Figure 2. Proposed pelvic health pathway for female athletes

This six-step framework outlines a cyclical approach to pelvic floor health, comprising education, symptom recognition, confidential screening, individualized assessment, intervention, and follow-up within the athlete's training and competitive cycle. PFD-SENTINEL, Pelvic Floor Dysfunction-ScrEeNing Tool IN fEmale athLetes; PFMT, pelvic floor muscle training. *The pathway is proposed for future evaluation and has not been formally tested or validated in a clinical or sporting setting*.

Implications for Saudi Arabia and Future Directions

The rapid development of women's sport in Saudi Arabia, supported by national initiatives to increase female participation[1], provides an opportunity to incorporate pelvic health into athlete healthcare at an early stage rather than retrofitting it into established systems. Several features of the Saudi context are relevant. First, PFD is common among Saudi women in the general population[21], indicating that the issue is not confined to athletes. Second, cultural factors, including modesty norms and reluctance to discuss intimate health concerns, may compound the barriers documented internationally[22]. Third, embarrassment and a preference for same-sex providers have been identified as leading barriers to seeking UI care among Saudi women[23], which has direct implications for how screening and referral are staffed and delivered.

The evidence specific to Saudi female athletes is, however, currently limited to one cross-sectional study of 76 participants[5]. Accordingly, findings supported by Saudi data should be distinguished from proposals that still require evaluation. Current Saudi data support the presence of knowledge gaps regarding the PFM and POP among female athletes[5] and the importance of embarrassment and provider sex as barriers to UI care among Saudi women more generally[23]. By contrast, the use of digital education, the integration of confidential screening into athlete health assessments, the involvement of female pelvic health clinicians, university-based implementation, and the stakeholder actions summarized in Table 1 are proposals derived from the international literature that have not yet been tested in the Saudi sporting context.

Educational interventions should be culturally appropriate and confidential, and should provide practical referral information. Digital education may be particularly suited to the Saudi setting because it permits private access to information and can help to standardize content; an online program has improved knowledge and habits among Spanish female athletes[16], although its transferability to Saudi athletes has not been examined. Given the reported preference for same-sex providers[23], screening and assessment pathways should, where possible, ensure access to female clinicians, and screening questionnaires should be made available in validated Arabic versions. Universities are suitable environments for initial implementation, as they combine health professional education, research infrastructure, and organized women's sport.

Future research should progress beyond single cross-sectional studies to include multicenter prevalence studies covering the full range of PFD symptoms, longitudinal cohorts, and randomized controlled trials. Specific priorities include the cross-cultural adaptation and validation of an Arabic version of the PFD-SENTINEL; evaluation of whether improvements in knowledge translate into earlier help-seeking, appropriate referral, and reduced symptoms; and assessment of the feasibility and acceptability of the proposed screening and referral pathway within Saudi sporting organizations.

Proposed priority actions for key stakeholders are summarized in Table 1. The role of coaches and trainers is intentionally limited to recognizing symptoms, avoiding the normalization of leakage, and facilitating confidential referral. Coaches are not expected to prescribe or instruct PFMT, which requires clinical assessment and supervision by appropriately trained healthcare professionals; their contribution lies in fostering an environment in which athletes feel safe to disclose symptoms.

Conclusion

Pelvic floor dysfunction is an important but underrecognized, underreported, and undertreated aspect of female athlete health. UI is prevalent across a range

Table 1. Proposed Priority Actions for Pelvic Health in Saudi Women's Sport

Stakeholder	Priority Action
Female athletes	Recognize the full range of pelvic floor symptoms and know how to access confidential care
Pelvic health clinicians	Incorporate pelvic health screening into athlete assessments, provide individualized assessment and management, and establish referral pathways
Coaches/ trainers	Avoid normalizing leakage, support symptom disclosure, and facilitate confidential referral; PFMT is prescribed only by trained clinicians
Universities	Integrate pelvic health into athlete education and relevant curricula
Sports organizations	Include pelvic health within female-athlete health strategies and pre-participation assessments
Researchers	Adapt and validate screening tools in Arabic; conduct prospective, intervention, and sport-specific studies

Note: These actions are proposed on the basis of the evidence reviewed and have not been evaluated in the Saudi setting.

of sports and can affect young and nulliparous athletes, but PFD also includes POP symptoms, anal incontinence, pelvic pain, and sexual dysfunction, which warrant greater attention in athletic populations. These symptoms are multifactorial in origin and do not necessarily indicate PFM weakness. PFMT is well supported for UI in the general female population, and emerging evidence suggests benefit for athletes when PFMT is supervised and individualized. In Saudi Arabia, one cross-sectional study has identified insufficient pelvic floor knowledge among female athletes, although the broader evidence base in this population remains limited.

Addressing these issues requires more than teaching isolated exercises. A proposed approach combining culturally appropriate education, confidential screening across all PFD symptom domains, individualized clinical assessment, evidence-based conservative management, and clear referral pathways, building on existing tools such as the PFD-SENTINEL, warrants formal evaluation. As women's sport continues to develop in Saudi Arabia, pelvic health can be incorporated proactively into athlete healthcare, and the implementation of such pathways can be evaluated to establish a stronger evidence base for the next generation of female athletes.

Abbreviations

ICIQ-UI SF, International Consultation on Incontinence Questionnaire–Urinary Incontinence Short Form; PFD, pelvic floor dysfunction; PFD-SENTINEL, Pelvic Floor Dysfunction-ScrEeNing Tool IN fEmale athLetes; PFDI-20, Pelvic Floor Distress Inventory-20; PFM, pelvic floor muscle; PFMT, pelvic floor muscle training; POP, pelvic organ prolapse; UI, urinary incontinence.

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Conflict of Interest

The author declares no conflict of interest.

Author Contributions

The author conceptualized the review, conducted the literature review, analyzed and interpreted the included studies, drafted the manuscript, and critically revised and approved the final version.

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