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Original research

Screening for pelvic floor symptoms in exercising women: a survey of 636 health and exercise professionals

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ABSTRACT

Objectives: This study aimed to establish health and exercise professionals' (i) current practice of screening for pelvic floor (PF) symptoms in women within sports/exercise settings (ii) between-professional group differences in screening practice (iii) confidence and attitudes towards screening for PF symptoms and (iv) barrier/enablers towards engagement in future screening practice.
Design: Observational, cross-sectional survey.
Methods: Australian health and exercise professionals (n = 636) working with exercising women participated in a purpose-designed and piloted, online survey about PF symptom screening in professional practice. Data were analysed descriptively and groups compared using Chi-square/Kruskal-Wallis tests.
Results: Survey respondents included physiotherapists (39%), personal trainers/fitness instructors (38%) and exercise physiologists (12%), with a mean of 12 years of practice (SD: 9.7, range: 0–46). One in two participants never screened women for PF symptoms; 23% screened when indicated. Pregnant/recently post-natal women (44%) were more commonly screened for PF symptoms than younger women (18–25 years:28%) and those competing in high-impact sports (32%). Reasons for not screening included waiting for patients to disclose symptoms (41%) and an absence of PF questions on screening tools (37%). Most participants were willing to screen PF symptoms but cited a lack of knowledge, training and confidence as barriers.
Conclusions: Screening for PF symptoms in exercising women is not common practice, especially in at-risk groups such as young, high-impact athletes. Including PF questions in existing pre-exercise questionnaires and providing professional development to improve knowledge of indications for screening and evidence-based management options may facilitate early symptom identification and prevent secondary exercise cessation.

Practical implications

- Health and exercise professionals working in sports/exercise settings do not commonly screen women for PF symptoms, despite women being at risk of exercise cessation secondary to their symptoms.
- A majority of health and exercise professionals did not believe screening was indicated in young, high-impact athletes. Education is needed to raise awareness of the high prevalence and impact of PF symptoms on exercise in these at-risk groups.
- Strategies identified to facilitate future PF screening practice include providing health and exercise professionals with: (i) professional development to improve knowledge of indications for screening and enhance confidence, (ii) screening questions and (iii) resources and referral options for management.

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1. Introduction

Pelvic floor (PF) disorders (including urinary (UI), anal incontinence [AI] and pelvic organ prolapse [POP]) are prevalent; one in four women

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experience PF symptoms.[1] During exercise, rises in intrabdominal pressure and repetitive ground reaction forces load the PF and may provoke symptoms.[2] Women participating in sport/exercise have a higher prevalence of PF disorders than sedentary women.[3] One in three women leak urine whilst exercising[3]; prevalence rises to up to 80% in young, elite, nulliparous gymnasts.[3] Other PF symptoms during exercise also exist: 65% of recreational athletes experience AI[4] and 7% of triathletes experience POP.[5]

Experiencing PF symptoms during exercise impacts participation; one in two women with PF symptoms stop a form of exercise secondary to symptoms.[6] Forty-two percent of women experiencing PF symptoms during high-impact sports cease participation.[6] One-third of young, nulliparous, symptomatic women, reported UI a barrier to exercise.[6] Reduced physical activity is associated with increased risk of chronic disease and mental illness.[7]

Women are reluctant to disclose their symptoms; 0–30% of exercising women have told a health professional about their UI symptoms.[8–10] Elite athletes disclose symptoms at lower rates than recreational athletes (2–6%).[11,12] Low levels of health-care seeking behaviour have been attributed to shame, inconvenience, fear of surgery and inadequate knowledge of available treatment options.[13]

Health and exercise professionals screen as part of either a clinical assessment or pre-exercise participation questionnaire. Pre-exercise questionnaires such as the Adult Pre-Exercise Screening System (APSS)[14] do not include PF symptom questions. In women attending recreational exercise facilities, less than 15% had been asked about their PF symptoms as part of their fitness appraisal.[15] If health and exercise professionals do not currently screen for PF symptoms, strategies to support them to engage in PF screening are required.

This study aimed to establish health and exercise professionals' (i) current practice of screening for pelvic floor (PF) symptoms in women within sports/exercise settings (ii) between-group differences in screening practice (iii) confidence and attitudes towards screening for PF symptoms and (iv) barrier/enablers towards engagement in future screening practice.

2. Methods

A cross-sectional survey of health and exercise professionals providing advice or management to women participating in sports/exercise activities, of any type or level, was undertaken from July–December 2019. Registered, practising, Australian health professionals (including but not limited to doctors and physiotherapists) and exercise professionals (including but not limited to exercise physiologists, coaches, fitness instructors and personal trainers) were invited to participate. The study was approved by a Human Ethics Research Committee: (project number 19918, 26/06/2019.) The checklist for reporting results of internet e-surveys (CHERRIES) was used to guide reporting.[16]

A purposively sampled group of sports/exercise organisations representing the most popular sports amongst Australian women, and health/exercise professional bodies or associations, were contacted (Supplemental File 1). Each organisation/association invited their members to complete the survey via email or advertisements on their website/social media pages/newsletters (Supplemental File 2). Participants were encouraged to forward the advertisement to other relevant organisations/individuals (snowball sampling). Participation was voluntary, informed consent was implied by participation in the survey after reading the explanatory statement and investigator contact details were available for questions. Because of lower numbers of participating men, a 1-month period of social media advertising targeted male health/exercise professional staff. The first 40 participants to complete the survey received a $20 movie voucher and participants could also win one of three $100 gift vouchers. This approach has been used in previous studies with success.[17]

Published workforce data[18–20] estimated that 50,000 health and exercise professionals were currently working with exercising women. It was estimated that a sample size of n = 196 respondents were needed, assuming a proportion of participants with prior experience of PF symptoms screening/management of 15%,[15] 5% precision estimate and a 95% confidence interval (CI). Viewing, participation and completion rates of the survey were reported in lieu of a true response rate.[16]

The survey was designed by investigators, with careful consideration of logical order of items and piloted with a representative cohort of health and exercise professionals including: women's health and sports physiotherapists, a personal trainer, exercise physiologist, sports physician and statistician. Pilot participants were asked for feedback on the survey length, questions, language, content acceptability and response options.

The questionnaire was administered via a survey platform, (Qualtrics, Provo, UT, version: September 2020, https://www.qualtrics.com). The survey took approximately 15 min to complete, was formatted for mobile devices, and designed to minimise bias by not permitting missing responses or 'back-tracking'. Internet Protocol (IP) addresses prevented participants from completing the survey multiple times.

Specific questions screened out ineligible participants. Eligible participants recorded demographic and professional characteristics followed by their current practice for PF screening. Screening was defined for participants as 'screening for PF disorders includes any questions (verbal or written) you may ask women to identify presence of symptoms or risk factors for PF disorders. It does not need to include a full assessment and may be a part of questions you ask for other conditions.' Participants' self-rated confidence in PF screening was investigated using a 10-point Likert scale ('0 = not at all confident' to '10 = extremely confident'). Acceptability of PF screening practices within sports/exercise settings was explored by asking participants to rate agreement to a series of statements on a 5-point scale ('1 = strongly disagree' to '5 = strongly agree'). Barriers and enablers to including screening for PF symptoms in future practice were explored. Free-text responses were provided for those who had additional barriers/enablers not listed. Adaptive questioning was used to minimise response burden.

Data were analysed (SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) using descriptive statistics (frequency [percentage], means [SD], or median [IQR]). Frequencies are expressed as a percentage of those who completed each variable of interest. Chi-square analyses for categorical data compared differences between participants who reported screening for PF symptoms (yes/no). Participants were categorised a priori according to demographic/professional characteristics that may influence screening practice including: gender, occupation, years working in the profession and level of sports participation of patients/clients. Participant occupation was categorised into 'health professionals' or 'exercise professionals', to account for differences in settings/facilities and training for these professionals that may impact screening practice. 'Health professionals' were those with Australian Health Practitioner Regulation Agency registration[21]; all other occupations were categorised as 'exercise professionals'. Years working in the profession was categorised as '0–3 years', '4–10 years'; '11–20 years'; '21–30 years' and '>30 years'. Participants worked with patients/clients categorised as elite (national/international sportswomen) vs non-elite (all other levels of sport/exercise participation). Confidence in PF screening was evaluated by participant gender and occupation using Kruskal-Wallis tests. The level of significance was $p < 0.05$. Free-text responses to 'other-please specify' were categorised according to content, coded and frequency counted. Difficult to interpret or 'one-off responses' not fitting other categories, were frequency counted under the category 'other'. Responses to barriers to future screening were presented in figures as subcategories. Missing data due to survey drop out are reported. In order to identify participants providing low quality, or inattentive answers we first analysed response time.[22] The median time to complete the survey was 15 min (minimum 4 min). As there is normal variation for completion time in surveys with adaptive questioning we employed additional methods for detecting careless responses. Speeding has

been previously correlated with straight-lining as a measure of invalid responses,[23] therefore we then manually checked the questionnaires for any participants who completed the survey with a response time in the lowest 25th percentile (<11 min). These responses (n = 139) were checked for: (i) evidence of straight lining/patterned responses (i.e. always selecting the midpoint on a Likert scales of agreement, "All or Nothing" responses e.g. all '0'ratings and patterns 1,2 3,4 etc) (ii) inconsistent answers (e.g. occupation and level of education attained), (iii) nonsensical/absent open text responses or (iv) always selecting options that may lead to less adaptive questions.[22,24,25] No responses were identified or removed from analysis via these quality check processes.

3. Results

Analytics (Facebook) recorded an advertisement reach of n = 7594. A view rate was unable to be determined as the survey was also distributed via organisations newsletters/emails. The informed consent page was displayed to 947 respondents and 94% commenced the survey. Of the respondents, 23% (n = 206) did not meet the inclusion criteria; the most common reason for exclusion was not being a health or exercise professional (n = 72) (Supplemental File 3). Data from 51 participants (7%) who did not complete the demographic or professional characteristics questions of the survey were excluded; 77% of participants who began the survey completed it.

The majority of the 636 participants were women (86%), with a mean age of 41.1 years (SD:12.0) (Supplemental File 4). The representation included physiotherapists (39%), personal trainers/fitness/Pilates instructors (38%) and exercise physiologists/scientists (12%). Participants had worked in their current profession for an average of 12 years (SD 9.7) across a variety of settings: including clinical practice (47%) and exercise/recreational facilities (44%). Participants worked with women participating in a range of sports (Supplemental File 5); 15% worked with elite female athletes. Many (77%) had accessed training specific to PF disorders, most commonly a lecture (53%); 9% had a PF specific post-graduate qualification (Supplemental File 4).

3.1. Current practice of screening exercising women for pelvic floor symptoms

The majority (89%) of participants reported screening for general health conditions that may impact on exercise participation. However, 49% of participants never screened for PF symptoms (Table 1**).** One in four participants (26%) screened all exercising women they interacted with and 23% screened only when they believed it to be indicated. Pregnant/recently post-natal women and those with a history of childbirth were most commonly screened. Few participants considered screening for PF symptoms in younger women (28%) and those competing in high-impact sports (32%) **(**Table 1**).**

Chi-square analysis determined that female professionals (54% vs 33% males, p = 0.002) and health professionals (68% vs 37% exercise professionals, p < 0.001) more commonly screened for PF symptoms. Participants who were new to their profession, less commonly screened for PF symptoms than more experienced participants (0–3 years, 39%; 4–10 years: 55%; 11–20 years: 59%; 21–30 years:46% and >30 years 49%, p = 0.008). Screening rates were not significantly different between those working with elite and non-elite athletes.

Most participants who screened for PF symptoms used verbal questions (79%, n = 249) rather than written questionnaires (16.1%, n = 51). Half did not use a specific screening tool or standardised question; 15% used the Pelvic Floor First tool[26] and 6% used another validated questionnaire such as the Australian Pelvic Floor Questionnaire.[27] For both health and exercise professionals, the most common reasons for not screening for PF symptoms were waiting for their patients/clients to disclose their symptoms first and the absence of PF questions on their organisation's screening tool. Amongst all professionals, inadequate training and lack of knowledge of which questions to ask, were common reasons for not screening (Table 1).

3.2. Confidence and attitudes towards provision of pelvic floor disorder screening in sports/exercise settings

Participants reported a moderate level of confidence in their ability to screen for PF symptoms (median score 6 [IQR: 4–8]). Health professionals were more confident in their ability to screen for PF symptoms than exercise professionals (median 7.0 [IQR: 4–8] vs. median 6 [IQR: 4–7]; p = 0.03) and women were more confident than men (median 6.0 [IQR: 4–8] vs. median 5 [IQR: 3–7]; p = 0.009). Only 6% of participants felt their profession should not be involved in PF screening. Most participants agreed that questions on PF symptoms should be included in pre-exercise screening questionnaires and annual screenings conducted in sports teams (Supplemental File 6).

3.3. Barriers and enablers/support to including future screening of pelvic floor disorders for exercising women

Barriers for future PF screening practice included a lack of knowledge, confidence or training; half of all exercise professionals reported a lack of training on PF screening. Aspects of sports and exercise facilities/settings were also a barrier; health professionals felt there was not enough time in the consultation to include screening of PF symptoms and exercise professionals stated there was no private consultation space or the setting was inappropriate (Fig. 1).

Most participants (86%, n = 515) stated they would be willing to include or were already screening for PF symptoms and intended to continue (Table 2). Access to resources/handouts for educating patients/clients and professional training to improve PF knowledge were the two most cited enablers to include screening of PF symptoms in future practice (Table 2). Most participants (87%, n = 503, missing = 59) were interested in attending training or accessing further information on screening for PF symptoms; the preferred methods were online webinar/course (32.4%, n = 163) or a face-to-face practical course (23.5%, n = 118). Open responses indicated that specific training on PF disorders was limited in rural areas and for professions other than physiotherapy**.** For those participants who were not already screening for PF symptoms, a written or verbal PF symptom screening tool was also considered an important enabler.

4. Discussion

One in two health and exercise professionals working with exercising women never screened for PF symptoms. Health and exercise professionals were willing to screen for PF symptoms in sports/exercise settings, if professional development to improve knowledge and confidence in screening for PF disorders was available.

The occurrence of UI at a younger age, predisposes women to greater odds of UI later in life.[28] PF symptoms lead to exercise cessation in one in three younger, nulliparous women[6] with resultant impact on decreased physical activity across the lifespan. Our results show that at-risk groups such as young, nulliparous women and high-impact exercise participants were not being screened because health and exercise professionals responded that screening was not indicated in these groups despite published evidence identifying prevalence and impact of this problem.[3,6,29] This evidence-knowledge gap suggests education is needed to raise awareness amongst health and exercise professionals of the high prevalence and impact of PF symptoms on exercise in young, nulliparous athletes, to ensure these groups are included in screening practices and that appropriate intervention is offered at an early age.

Self-disclosure rates for PF symptoms in sports/exercise settings, particularly to health professionals are low (<10%).[8,30] Misinformation about UI, lack of knowledge of potential treatment options and shame/

Table 1
Current practice of screening exercising women for pelvic floor symptoms by health and exercise professionals.

Current practice	Total n (%)	Health professionals n (%)	Exercise professionals n (%)
Screening for PF symptoms	n = 634	n = 286	n = 348
Yes	324 (51.1)	194 (67.8)	130 (37.4)
Not specifically - invite patients/clients to disclose any/injuries/illnesses	273 (43.1)	86 (30.1)	187 (53.7)
No	37 (5.8)	6 (2.1)	31 (8.9)
Missing (n = 2)			
Categories of women screened for PF symptoms	n = 625	n = 280	n = 345
All exercising women	163 (26.1)	83 (29.6)	80 (23.2)
Currently pregnant/recently given birth	276 (44.2)	164 (58.6)	112 (32.5)
All who have ever experienced pregnancy/childbirth	269 (43.0)	158 (56.4)	111 (32.2)
All exercising women over the age of 50	229 (36.6)	127 (45.4)	102 (29.6)
All women participating in high-impact sports	197 (31.5)	104 (37.1)	93 (27.0)
Younger nulliparous athletes (18–25 years)	173 (27.7)	91 (32.5)	82 (23.8)
Do not screen any exercising women	310 (49.6)	92 (32.8)	218 (63.2)
Other	6 (0.9)		
Missing (n = 11)			
Method of screening for PF symptoms[a]	n = 316	n = 188	n = 128
Verbal questions about PF symptoms	249 (78.8)	161 (85.6)	88 (68.8)
Written questionnaire	51 (16.1)	20 (10.6)	31 (24.2)
Written and verbal	9 (1.4)	<5 (2.1)	5 (3.9)
Other	7 (1.1)	<5(1.5)	<5 (3.1)
Missing (n = 8)			
Specific screening tool or standardised question[a]	n = 313	n = 187	n = 126
No screening tool or standardised question asked	157 (50.2)	100 (53.5)	57 (45.2)
A standard question	72 (23.0)	45 (24.1)	27 (21.4)
Pelvic floor first screening tool	48 (15.3)	18 (9.6)	30 (23.8)
A validated PF questionnaire	18 (5.8)	16 (8.6)	2 (1.6)
Other (please specify)	10 (3.2)	5 (2.7)	5 (4.0)
Self-designed questionnaire	8 (2.6)	<5 (1.6)	5 (4.0)
Missing (n = 11)			
Reasons for not currently screening for PF symptoms[b, c]	n = 310	n = 92	n = 218
Wait for patients/clients to disclose symptoms first	126 (40.6)	39 (42.4)	87 (39.9)
Pelvic floor questions not included in screening tool	116 (37.4)	28 (30.4)	88 (40.4)
Not received adequate training in this area	101 (32.6)	28 (30.4)	73 (33.5)
Not aware of which questions to ask	78 (25.2)	22 (23.9)	56 (25.7)
Have not thought of asking about PF symptoms	61 (19.7)	25 (27.2)	36 (16.5)
Not confident in managing PF symptoms if disclosed	57 (18.4)	22 (23.9)	35 (16.1)
Worried to embarrass patient/client	42 (13.5)	9 (9.8)	33 (15.1)
Not aware of which women to ask	37 (11.9)	17 (18.5)	20 (9.2)
The work setting is not appropriate	34 (11.0)	9 (9.8)	25 (11.5)
Don't think PF symptoms are an issue for clients/patients	14 (4.5)	8 (8.7)	6 (2.8)
Not part of my job	10 (3.2)	<5 (2.2)	8 (3.7)
Not aware of the symptoms of PF disorders	24	6 (6.5)	18 (8.3)
Clients are underage and therefore screening not appropriate	11	6 (6.5)	5 (2.3)
Too embarrassed to ask	7	<5 (1.1)	6 (2.8)
They are screened by another professional in my organisation	4	<5 (1.1)	<5 (1.4)
Lack of time in the consult	2	<5 (1.1)	<5 (0.5)
Already provide management/education on PF symptoms and hope this cues woman to disclose symptoms	9	0	8 (3.7)

PF = Pelvic floor.
[a] % expressed as denominator of those who report screening (n = 324).
[b] Participants could select multiple responses.
[c] % expressed as denominator of those who do not screen for pelvic floor symptoms (n = 310).

embarrassment to discuss symptoms have all been cited as reasons for low help-seeking behaviour in women with incontinence.[13] Despite low self-disclosure rates, health and exercise professionals are waiting to be told about PF symptoms by female athletes. In our study, waiting for disclosure of PF symptoms was the most frequently reported reason for not screening. Health and exercise professionals have a role in improving women's knowledge of PF disorders and providing an environment within sports/exercise settings for women to disclose symptoms. Given the personal nature and social stigma surrounding PF symptoms, careful consideration should be given to strategies for facilitating disclosure within sports/exercise organisations. Future research should focus on understanding acceptable screening practices within sports/exercise settings. Women's preferences for screening, including the method (e.g. written vs verbal), language used, context, professionals involved and privacy of facilities are factors to be explored, in order to create a safe and supportive environment for symptom disclosure.

Most health and exercise professionals were willing to screen for PF disorders within sports/exercise settings but require support. Contrary to women's embarrassment discussing their PF problems,[30] only a minority of professionals reported embarrassment as a barrier to discussing PF symptoms. This is consistent with a previous study in fitness instructors; 60% felt comfortable discussing UI symptoms with their clients.[31] Health and exercise professionals identified the need for PF-specific training on: how/which patients to screen, management options if symptoms are identified and clear referral pathways. Broader access to professional development on this topic through online webinars to allow participation of rural professionals and short-courses targeted at the scope of practice for each profession may help translate research knowledge to health care practice.

Health and exercise professionals agreed that questions on PF symptoms should be included in existing pre-participation exercise questionnaires and annual physical health evaluations in sports/exercise organisations. However, one in four participants were unaware

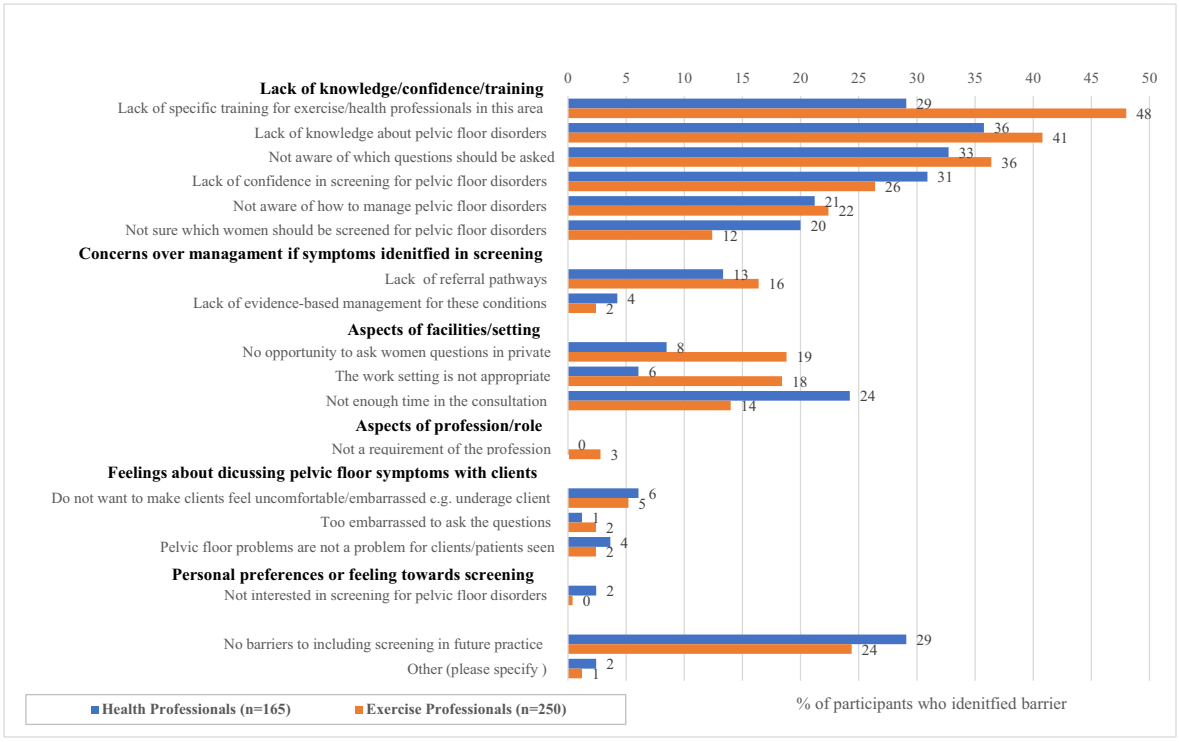

Fig. 1. Barriers to including screening for pelvic floor symptoms in future practice (n = 415) (excluding those participants [n = 185] who already screen and will continue to; missing [n = 36]).

which questions they should ask and standardised verbal questions or a written questionnaire to use with patients/clients was suggested by participants to enable engagement in PF screening. A systematic review of population-based screening for UI in community dwelling women, reported that brief, clinician or self-administered, validated questionnaires displayed high accuracy in detecting symptoms, although this evidence was limited.[32]At present, there are no PF symptom screening tools validated specifically for use with female athletes[33]; development of a tool specific to exercising women is warranted. As health professionals identified lack of time as a barrier to engaging in PF screening, a small number of key validated PF questions added to screening tools, to minimise screener burden is critical. Ideally, screening questionnaires would also allow identification of modifiable risk factors placing athletes at increased chance of developing PF symptoms in order for preventative intervention. However, the evidence for factors increasing the risk of PF symptoms in exercising women is limited and inconclusive[2]; further research is needed before screening can include identification of those at risk of PF disorder. Given the high symptom prevalence in exercising women,[34] including PF questions from patient reported outcome measures, validated in community dwelling populations, will give a large number of women the opportunity to seek healthcare.

The strengths of this study include a large sample of health and exercise professionals - across a diverse range of sports, exercise and clinical facilities and with different levels of sports competition (recreational to elite). The survey was modelled on previous clinical practice surveys[17,35] and improved through co-design and piloting amongst key stakeholders. To minimise response burden for busy professionals, we used adaptive questioning.

Table 2
Enablers/support required to include screening for pelvic floor symptoms in future practice.

	Health professionals n (%)	Exercise professionals N (%)
Willingness to include screening for PF symptoms in future practice	(n = 275)	(n = 325)
Yes	142 (51.6)	188 (57.8)
I already screen and will continue to	110 (40.0)	75 (23.1)
Unsure/maybe	20 (7.3)	50 (15.4)
No	3 (1.1)	12 (3.7)
Missing (n = 36)		
What would support/enable you to include screening for pelvic floor disorders in your future practice?[a, b]	(n = 165)	(n = 250)
Access to resources for patients/clients on pelvic floor disorders	127 (77.0)	189 (75.6)
Training/resources to improve knowledge of pelvic floor disorders including how to screen.	112 (67.9)	187 (74.8)
A verbal pelvic floor symptom screening tool to use	110 (66.7)	144 (57.6)
A written pelvic floor symptom screening tool to use	108 (65.5)	165 (66.0)
Training/education on which patients to screen and management options	108 (65.5)	148 (59.2)
Longer consultation times	62 (37.6)	55 (22.0)
Facilities that include a private area for discussion	55 (33.3)	87 (34.8)
I am not interested in screening even with support/resources	1 (0.6)	4 (1.5)
Other (please specify)	2 (1.2)	3 (1.2)

[a] Participants could select multiple responses.
[b] % reported excluding those who responded 'Already screen exercising women and will continue to (n = 185)'.

Limitations include our uncertainty about the response rate because of the multifaceted recruitment strategy (including social media advertising and snowballing). Non-responder bias inherent to self-enrolment in internet surveys, may have led to an overestimation of the number of health and exercise professionals engaged in regular PF screening in our study. Participants who are motivated and willing to engage in screening for PF symptoms may have been more willing to respond. Our screening rate (25%) was higher than previous report that 15% of women attending recreational exercise facilities had been questioned about PF symptoms.[15] In addition, higher than previously reported screening rates could be attributed to survey participants deliberately misrepresenting or overstating their practicing behaviours, but as the survey was anonymous and 'low stakes' this was thought to be unlikely.

Males and doctors were under-represented limiting generalisation of our findings to these groups. This may indicate a lack of interest, confidence or comfort regarding PF symptom screening. Women are more likely to participate in internet based health studies[36] especially to a women's health survey. The higher number of responses received from personal trainers/fitness instructors, exercise physiologists/scientists and physiotherapists may also reflect the level of involvement these professions have with pre-exercise screening, therefore they perceived the survey as more applicable to their role.

As is typical of online surveys (not conducted by an interviewer) there is the potential for survey bias from respondent inattention, error or fraud. We found little evidence of inattention in our data. Speeding (an indicator of inattention) was uncommon; median response times were consistent with piloting and only 38 participants completed the survey in under eight minutes. Other methods used to detect inattention found no evidence of individual respondent inattention throughout an entire survey, however, as has been reported in previous studies, attention may wane throughout questionnaires[37] and it is possible that some participants may not have provided considered responses to all questions. As inattention/response error is more frequent in young, uneducated respondents[23,24] and fraud more likely when high incentives are offered,[25] we believe the impact of invalid responses or fraud on our findings to be low.

The US Women's Preventative Services Initiative recommends that all women are screened annually for symptoms of UI, based on a favourable benefit-harm balance, due to the high-effectiveness and low-risk associated with conservative first-line management (including PF muscle training and weight loss).[38] Urinary incontinence affects women who participate in regular exercise at greater rates than inactive women[39]; athletes are three times more likely than sedentary women to experience symptoms.[40] Including PF screening within sporting/exercise organisations is likely to facilitate help seeking behaviour. Early symptom identification and education/referral for conservative management may reduce exercise cessation secondary to PF symptoms.

5. Conclusion

Exercising women were not commonly screened for PF symptoms including at-risk groups such as young, high-impact athletes. Health and exercise professionals were willing to screen for PF symptoms but access to training, appropriate screening questions and information on referral pathways and evidence-based management options are required to enable this practice.

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Confirmation of Ethical Compliance

The study was approved by Monash University Human Ethics Research Committee: (project number 19918, 26/06/2019.)

Credit Author Statement

Jodie Dakic: Conceptualization, Formal analysis, Investigation, Writing - Original Draft, Writing - Review & Editing, Visualisation, Project administration, Funding acquisition. **Jill Cook:** Conceptualization, Writing - Review & Editing, Supervision. **Jean Hay-Smith:** Conceptualization, Writing - Review & Editing, Supervision. **Kuan-Yin Lin:** Conceptualization, Writing - Review & Editing, Supervision. **Helena Frawley:** Conceptualization, Writing - Review & Editing, Supervision, Funding acquisition.

Declaration of Interest Statement

The authors declare no conflicts of interest.

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Appendix A. Supplementary material

Supplementary material to this article can be found online at https://doi.org/10.1016/j.jsams.2023.01.008.

References

1. Mac Lennan A, Taylor A, Wilson D et al. The prevalence of pelvic floor disorders and their relationship to gender, age, parity and mode of delivery. *Br J of Obstet and Gynecol* 2000;107:1460-1470.
2. Bo K, Nygaard IE. Is physical activity good or bad for the female pelvic floor? A narrative review. *Sports Med* 2019;50(3):471-484. doi:10.1007/s40279-019-01243-1.
3. Teixeira RV, Colla C, Sbruzzi G et al. Prevalence of urinary incontinence in female athletes: a systematic review with meta-analysis. *Int Urogynecol J* 2018;29(12):1717-1725. doi:10.1007/s00192-018-3651-1.
4. Almeida MB, Barra AA, Saltiel F et al. Urinary incontinence and other pelvic floor dysfunctions in female athletes in Brazil: a cross-sectional study. *Scand J Med Sci Sports* 2016;26(9):1109-1116. doi:10.1111/sms.12546.
5. Yi J, Tenfelde S, Tell D et al. Triathlete risk of pelvic floor disorders, pelvic girdle pain, and female athlete triad. *Female Pelvic Med Reconstr Surg* 2016;22(5):373-376. doi:10.1097/SPV.0000000000000296.
6. Dakic JG, Cook J, Hay-Smith J et al. Pelvic floor disorders stop women exercising: a survey of 4556 symptomatic women. *J Sci Med Sport* 2021;24(12):1211-1217. doi:10.1016/j.jsams.2021.06.003.
7. Kohl HW, Craig CL, Lambert EV et al. The pandemic of physical inactivity: global action for public health. *Lancet* 2012;380:294-304. doi:10.1016/S0140-6736(12)60898-8.
8. Cardoso AMB, Lima C, Ferreira CWS. Prevalence of urinary incontinence in high-impact sports athletes and their association with knowledge, attitude and practice about this dysfunction. *Eur J Sport Sci* 2018:1-8. doi:10.1080/17461391.2018.1496146.
9. Dobrowolski SL, Pudwell J, Harvey MA. Urinary incontinence among competitive rope-skipping athletes: a cross-sectional study. *Int Urogynecol J* 2019. doi:10.1007/s00192-019-04048-y.

10. Nygaard IE, DeLancey JO, Arnsdorf L et al. Exercise and incontinence. *Obstet Gynecol* 1990;75(5):848-851.
11. Skaug KL, Engh ME, Frawley H et al. Urinary and anal incontinence among female gymnasts and cheerleaders-bother and associated factors. A cross-sectional study. *Int Urogynecol J* 2021. doi:10.1007/s00192-021-04696-z.
12. Thyssen HH, Celvin L, Olesen CS et al. Urinary incontinence in elite female athletes and dancers. *Int Urogynecol J* 2002;13:15-17.
13. Vasconcelos CTM, Firmiano MLV, Oriá MOB et al. Women's knowledge, attitude and practice related to urinary incontinence: systematic review. *Int Urogynecol J* 2019;30(2):171-180. doi:10.1007/s00192-018-3759-3.
14. Adult Pre-Exercise Screening System (APPS). Available at: https://www.essa.org.au/Public/ABOUT_ESSA/Adult_Pre-Screening_Tool.aspx. Accessed 2020 30th January.
15. McKenzie S, Watson T, Thompson J et al. Stress urinary incontinence is highly prevalent in recreationally active women attending gyms or exercise classes. *Int Urogynecol J* 2016;27(8):1175-1184. doi:10.1007/s00192-016-2954-3.
16. Eysenbach G. Improving the quality of web surveys: the checklist for reporting results of internet E-surveys (CHERRIES). *J Med Internet Res* 2004;6(3):e34. doi:10.2196/jmir.6.3.e34.
17. Kunstler BE, Cook JL, Kemp JL et al. The behaviour change techniques used by Australian physiotherapists to promote non-treatment physical activity to patients with musculoskeletal conditions. *J Sci Med Sport* 2018;22(1):2-10. doi:10.1016/j.jsams.2018.06.002.
18. Profile of the Fitness Industry in Australia Worforce Fitness Australia. Available at: https://www.aqia.org.au/wp-content/uploads/2019/07/Profile-of-the-Fitness-Industry-in-Australia-Worforce-Fitness-Australia-2016.pdf. Accessed 2019 18th February.
19. Physiotherapist workforce report. Available at: https://hwd.health.gov.au/assets/Physiotherapist%202019.pdf. Accessed 2019 18th February.
20. Future workforce report. Available at: https://www.essa.org.au/Public/Advocacy/industry_Reports/Public/Advocacy/Industry_Reports.aspx?hkey=e74923d2-9802-4d0f-b9a4-fbc578c418ac. Accessed 2019 18th February.
21. Australian Health Practitioner Regulation Agency. Available at: https://www.ahpra.gov.au/. Accessed 2021 18th February.
22. Curran PG. Methods for the detection of carelessly invalid responses in survey data. *J Exp Soc Psychol* 2016;66:4-19. doi:10.1016/j.jesp.2015.07.006.
23. Zhang C, Conrad F. Speeding in web surveys: the tendency to answer very fast and its association with straightlining. *Surv Res Methods* 2014;8(2):127-135. doi:10.18148/srm/2014.v8i2.5453.
24. Alvarez RM, Atkeson LR, Levin I et al. Paying attention to inattentive survey respondents. *Polit Anal* 2019;27(2):145-162.
25. Teitcher JEF, Bockting WO, Bauermeister JA et al. Detecting, preventing, and responding to "fraudsters" in internet research: ethics and tradeoffs. *J Law Med Ethics* 2015;43(1):116-133. doi:10.1111/jlme.12200.
26. Pelvic floor first screening tool. Available at: http://www.pelvicfloorfirst.org.au/data/files/Pelvic_Floor_First/Pelvic_Floor_Screening_Tool_for_Women_2014.pdf. Accessed 2021 April 24.
27. Baessler K, O'Neill SM, Maher CF et al. Australian pelvic floor questionnaire: a validated interviewer-administered pelvic floor questionnaire for routine clinic and research. *Int Urogynecol J Pelvic Floor Dysfunct* 2009;20(2):149-158. doi:10.1007/s00192-008-0742-4.
28. Bo K, Sundgot-Borgen J. Are former female elite athletes more likely to experience urinary incontinence later in life than non-athletes? *Scand J Med Sci Sports* 2010;20(1):100-104. doi:10.1111/j.1600-0838.2008.00871.x.
29. Rebullido TR, Gomez-Tomas C, Faigenbaum AD et al. The prevalence of urinary incontinence among adolescent female athletes: a systematic review. *J Funct Morphol Kinesiol* 2021;6(1). doi:10.3390/jfmk6010012.
30. Culleton-Quinn E, Bø K, Fleming N et al. Elite female athletes' experiences of symptoms of pelvic floor dysfunction: a systematic review. *Int Urogynecol J* 2022;33(10):2681-2711. doi:10.1007/s00192-022-05302-6.
31. Stephen K, van Woerden H, MacRury S. Assessing prevalence of urinary incontinence in Scottish fitness instructors and experience of teaching pelvic floor muscle exercises: an online survey. *J Public Health (Oxf)* 2019;41(1):e44-e50. doi:10.1093/pubmed/fdy102.
32. Nelson HD, Cantor A, Pappas M et al. Screening for urinary incontinence in women: a systematic review for the Women's preventive services initiative. *Ann Intern Med* 2018;169(5):311-319. doi:10.7326/M18-0225.
33. Castro Diaz D, R D, Bosch R et al. Patient-reported outcome assessment, chapter 5B, In: Abrams P, Cardozo L, Wagg A, Wein A, eds. *In Incontinence*, 6th ed., Tokyo, International Incontience Society, 2017.
34. de Mattos Lourenco TR, Matsuoka PK, Baracat EC et al. Urinary incontinence in female athletes: a systematic review. *Int Urogynecol J* 2018;29(12):1757-1763. doi:10.1007/s00192-018-3629-z.
35. Mazloomdoost D, Crisp CC, Kleeman SD et al. Primary care providers' experience, management, and referral patterns regarding pelvic floor disorders: a national survey. *Int Urogynecol J* 2018;29(1):109-118. doi:10.1007/s00192-017-3374-8.
36. Topolovec-Vranic J, Natarajan K. The use of social Media in Recruitment for medical research studies: a scoping review. *J Med Internet Res* 2016;18(11):e286. doi:10.2196/jmir.5698.
37. Gummer T, Roßmann J, Silber H. Using instructed response items as attention checks in web surveys: properties and implementation. *Sociol Methods Res* 2021;50(1):238-264. doi:10.1177/0049124118769083.
38. O'Reilly N, Nelson HD, Conry JM et al. Screening for urinary incontinence in women: a recommendation from the Women's preventive services initiative. *Ann Intern Med* 2018;169(5):320-328. doi:10.7326/M18-0595.
39. Chisholm L, Delpe S, Priest T et al. Physical activity and stress incontinence in women. *Curr bladder dysfunct rep* 2019;14(3):174-179. doi:10.1007/s11884-019-00519-6.
40. Carvalhais A, Natal Jorge R, Bo K. Performing high-level sport is strongly associated with urinary incontinence in elite athletes: a comparative study of 372 elite female athletes and 372 controls. *Br J Sports Med* 2018;52(24):1586-1590. doi:10.1136/bjsports-2017-097587.