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Perceptions and experiences of the menstrual cycle amongst elite adult and adolescent football players

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ABSTRACT

The purpose of this study was to investigate players' experiences and perceptions of the menstrual cycle (MC) and the perceived impact on performance. Female elite adult ($n = 31$, age 24.6 ± 5.1 years) and adolescent ($n = 65$, age 15.0 ± 1.1 years) players completed an online questionnaire consisting of quantitative and qualitative questions. MC symptoms were experienced by 90.1% naturally menstruating participants (86.9% adolescents and 93.6% adults ($x^2 = 1.53$, df = 2, $p = 0.47$, $n = 92$)), and 78.3% adolescents perceived their MC impacts performance, compared to 96.4% adults ($x^2 = 4.54$, df = 1, $p = 0.033$, $n = 74$). Physical symptoms, psychological symptoms and energy levels were cited as key reasons for the MC negatively impacting performance. Challenges in communicating MC experiences were reported by 44.92% ($n = 23$) adolescents compared to 20.0% ($n = 6$) adults ($x^2 = 7.29$, df = 2, $p = 0.026$, $n = 82$), with a perceived lack of knowledge, ability to relate and awkwardness cited as key reasons. Football players report wellbeing and performance impacts due to their MC, highlighting the need for individual understanding and support. Furthermore, understanding the experiences of adolescents enables the development of targeted support structures that equip them with tools to manage and communicate about their MC, and hopefully preventing issues as they become senior players.

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KEYWORDS
Football; menstruation; female; girls; period

Introduction

With the rise in visibility, popularity and professionalism of women's football in recent years (Welford 2015; Williams 2015; FIFA, 2022), player development pathways (youth teams with direct links/association to elite first teams to facilitate progression) are crucial to identify, develop and produce senior athletes that can successfully compete domestically and internationally (North et al. 2014). However, only 6% of sport and exercise medicine research is conducted solely on female participants (Cowley et al. 2021). Thus, much work is required to understand factors affecting female athletes, and more specifically, female football players. Although previous research does not show that exercise performance is objectively impacted by menstrual phase (McNulty et al. 2020; Meignié et al. 2021), sportswomen often self-report that MC related symptoms perceptually negatively affect their performance (Martin et al. 2018; Armour et al. 2020; Findlay et al. 2020; Solli et al. 2020; Bruinvels et al. 2021; Carmichael et al. 2021; Ekenros et al. 2022; Heyward et al. 2022; Kiemle-Gabbay et al. 2024; Oester et al. 2024). Thus far, there has been little focus on the landscape of MC health within the adolescent population, especially within football.

In the early post-menarcheal years, MCs can be extended in length, with irregular MCs common due to the immature hypothalamic-pituitary-ovarian axis (Mansfield and Emans 1984). Up to 97% of adolescents report painful periods (dysmenorrhea), which, along with other symptoms such as fatigue and headaches, can negatively affect school engagement, performance and attendance (Houston et al. 2006; Steiner et al. 2011). There has been little work, however, to understand the experiences and impact of the MC on adolescent sporting performance (Taim et al. 2023; Brown et al. 2024; Keil et al. 2024). Although no football players were included, Taim et al. (2023) highlighted that 43% of naturally menstruating (NM) Singaporean adolescent athletes perceived their performance to be 'worse' during their period and led to modified training (20%) or competition (15%). Recent work within Australian youth and senior football players reported that 40% perceived training or performance to be disrupted by their MC; 89% found it to be 'whilst menstruating' (Brown et al. 2024). Therefore, the MC is known to sometimes cause complications within daily life and sport for adolescents, but this requires further understanding within a football context.

The perpetual notion that the MC is a 'taboo topic' means that athletes and coaches may not be comfortable communicating about menstrual-related topics (Larsen et al. 2020; Höök et al. 2021; von Rosen et al. 2022; Anderson et al. 2023; Bergström et al. 2023; Donnelly et al. 2024). Whilst most studies in this area have been conducted in adults or senior athletes, Taim and colleagues reported 17% of youth athletes had spoken to their coach regarding their MC, citing gender and awkwardness, amongst other factors as barriers to communication (Taim et al. 2023). However, positive changes to the culture and discussion were noted by seven adolescent athletes from

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a variety of sports, with changes to clothing requirements and menstrual product policies noted as allowing the topic of menstruation to be more normalised, yet support from coaches still felt limited (Keil et al. 2024). Thus, there remains a lack of understanding of communication practices and available support to adolescent football players. Through understanding adolescent players' experiences within the unique environment of football, we will be able to provide football-specific support systems for adolescents. Therefore, the aims of this study are:

(1) To investigate the adolescent and adult elite football players' experiences and perceptions of the MC and the perceived impact on performance.
(2) To understand communication practices and perceived support to adolescent and adult elite players.

Methods

Participant information

Adult elite and adolescent female football players were recruited through purposive and convenience sampling from clubs in the Scottish Women's Premier League (SWPL) and English Championship. This included the associated youth academies, ranging from Under 14s teams to First Team level. A minimum reading age of 13 years was established to take part in this study due to the mandated scientific understanding required for questioning and response depth as defined by the National Centre for Education Statistics (NAEP 2017), whilst also the starting age for National Performance pathways from the National Governing Body.

Following ethical approval by the School of Health and Life Science Ethics Committee (2021 -17,219 -14,436) at the University of the West of Scotland, written informed consent was attained from participants. For those under the age of 16, consent from parents/legal guardians was given.

Data collection

Participants completed an online questionnaire through QuestionPro (Appendix 1), which was adapted from Kiemle-Gabbay et al. (2024). Questions were provided within four sections: 1) MC characteristics, including historical and current MC status, 2) MC symptom frequency and severity, 3) symptom management strategies, and impact on training and/or football games and 4) communication and support available to them, including how they may access information (if relevant). Participants who had not yet reached menarche completed section 1 and were then directed to section 5) premenarcheal perceptions of the MC, and its positive/negative impact on lifestyle, health, and performance. Question formatting included both quantitative (e.g., Likert-scale style questions and singular/multiple choice) and open-text qualitative questions. Due to the perceived sensitive nature of the topic, some questions signposted to relevant services, e.g., General Practitioner if the participant is over 16 years old and experiencing amenorrhoea.

Pilot data was collected from 12 participants and the feedback prompted minor amendments in question wording to improve clarity. For the main study, a total of 212 responses were recorded, with 116 responses removed due to insufficient completed sections. Data from 96 participants were therefore analysed, including 31 elite adult professional (age 24.6 ± 5.1 years) and 65 adolescent (age 15.0 ± 1.1 years) football players (of which 8 were premenarcheal). Participants were from three clubs in the SWPL (n = 87) and one within the English Championship (n = 9). The questionnaire took on average 37 ± 12 min (range = 28–61 min) to complete.

Analysis

Data was exported from QuestionPro, and statistical analysis was performed within Microsoft Excel (Microsoft Corporation) and Jamovi (version 2.3.21.0). Where appropriate, data checks for normality and homogeneity of variance were performed to check assumptions for analysis were met. Independent T-tests were utilised for continuous data, with Cohen's d reported to determine effect size. A chi-square test of association analysis was utilised to test for associations between age categories (adults (aged 18+ years) and adolescents (aged 13–17 years). Significance was set at $p < 0.05$. When expected counts were less than 5 and, where appropriate to the question, two routes were taken: 1) the category with the lowest counts were merged with the nearest category, and the test for association was re-tested until expected counts were met, or 2) descriptive statistics and/or proportion frequencies were used to report data.

Open-text responses were analysed using frequency analysis to accommodate for the short nature of responses, displayed in descending order of frequency/appearance within text (Mayring 2015). The question 'How do you think your menstrual cycle impacts your performance?' was analysed via conceptual content analysis (Kleinheksel et al. 2020), interpreted implicitly to infer key concepts summarising like-minded codes and to allow for quantification (Hsieh and Shannon 2005; Kleinheksel et al. 2020). For the purpose of reporting qualitative data, quotes within text have been coded with NM = naturally menstruating, PM = premenarcheal, AD = adolescent, A = adult (e.g., NMA10 = Naturally menstruating adult, participant 10).

Results

Personal MC characteristics

Personal information denoting individual MC characteristics are outlined in Table 1. Average cycle lengths were not found to be significantly different, yet bleeding lengths were, on average one day longer in the adolescent cohort compared to the adult cohort.

A total of 32.8% (n = 20) adolescents and 53.5% (n = 15) adults described their bleeding as "Heavy' or 'Very Heavy'. Self-reported secondary amenorrhoea was historically or currently experienced by 16.9% (n = 11) and 16.1% (n = 5) of NM adolescents and adults, respectively (Table 2). Of those currently experiencing amenorrhoea, 66.7% (n = 4) of adults perceived that they 'knew' the reasons for this, with all participants citing elements included within the RED-S

Table 1. Self-reported menstrual cycle characteristics.

	Adolescents	Adults	Analysis
Mean (and range) age at menarche (years)	12.7 ± 1.1 (10–15)	13.5 ± 1.3 (11–16)	t = −3.04, df = 94 p = 0.003, Cohen's D = −0.664
Mean (and range) cycle length (days)	30.8 ± 10.8 (12–90)	29.3 ± 5.4 (10–38)	t = 0.658, df = 80, $p = 0.512$, Cohen's D = 0.156
Mean (and range) bleeding length (days)	5.6 ± 1.3 (3–14)	4.8 ± 1.3 (3–9)	t = 2.502, df = 92, $p = 0.014$ Cohen's D = 0.554

Table 2. Self-reported menstrual bleeding characteristics.

	Adolescents (%)	Adults (%)	Analysis
Does the time between one period and your next period change each time?			
Yes	30.8	22.6	$x^2 = 1.64$, df = 2,
Somewhat	58.5	58.1	$p = 0.44$, $n = 96$
No	10.8	19.4	
Have you ever experienced missing a period for a duration of 90 days in a row or more?			$x^2 = 0.009$, df = 1, $p = 0.922$, $n = 96$
Yes	16.9	16.1	
No	83.1	83.9	
Of those who selected 'Yes'; Are you currently experiencing amenorrhoea?			
Yes	18.2	40.0	$x^2 = 0.873$, df = 1,
No	81.8	60.0	$p = 0.350$, $n = 16$
My bleeding is:			
Light	4.9	7.1	
Moderate	62.3	39.3	$x^2 = 4.55$, df = 3,
Heavy	23.0	32.1	$p = 0.27$, $n = 89$
Very Heavy	9.8	21.4	

criteria (Mountjoy et al. 2023) such as '*Stress, weight-loss, change of training*' (NMA18).

Symptom frequency and severity

Figure 1 shows the frequency of MC symptoms in both adolescents and adults. Of all NM participants, 90.1% (86.9%; $n = 53$ adolescents and 93.3%; $n = 28$ adults) reported experiencing symptoms related to their MC. A significant association was not found between NM age categories and overall symptom prevalence ($x^2 = 1.32$, df = 2, $p = 0.518$, $n = 91$).

The most frequent symptoms experienced on a monthly basis by adolescents were abdominal pain/cramps, tiredness or fatigue and feeling irritable or angry (Figure 1, Supplemental Material Table S1). When considering symptom severity, abdominal pain/cramps (37.0%; $n = 17$), tiredness/fatigue (37.0%; $n = 17$) and feeling irritable/angry (28.3%; $n = 13$) were seen as 'Severe' or 'Very Severe' (Figure 2, Supplemental Material Table S2). One participant added '*muscle aches*' to additional symptoms experienced. The most frequently experienced symptoms by adults (i.e., experienced every month) were abdominal pain/cramps, tiredness or fatigue and bloating. Moreover, abdominal pain/cramps (57.1%; $n = 16$), feeling sad or teary (35.7%; $n = 10$), and breast tenderness (25.0%; $n = 7$) were ranked most commonly as 'Severe" or 'Very Severe' (Figure 2, Supplemental Material Table S2). One participant selected 'Other' to add additional symptoms experienced, citing '*uterine pain*'.

Symptom management and perceived impact of the MC

Both adolescents (51.8%, $n = 26$) and adults (58.6%, $n = 17$) tracked their MC symptoms either 'always' or 'sometimes'. ($x^2 = 0.446$, df = 2, $p = 0.800$, $n = 83$). Both NM adolescents and adults reported managing their MC symptoms with medication (60.9% and 77.7%; $x^2 = 2.56$, df = 2, $p = 0.278$, $n = 73$) and non-medication (87.0% and 92.9%; $x^2 = 0.639$, df = 2, $p = 0.726$, $n = 73$), and these were not significantly associated by age category. Content analysis highlighted that ibuprofen (34.8%, $n = 16$ adolescents; 40.7%, $n = 11$ adults) and paracetamol (41.3%, $n = 19$ adolescents; 40.7%, $n = 11$ adults) were the most popular medicative means. Hot water bottle use was the preferred non-medication symptom management method amongst both cohorts (69.6%, $n = 32$ adolescents; 77.8%, $n = 21$ adults) (Supplemental Material Table S3).

Eighty five percent ($n = 62$) of NM participants (78.3%, $n = 36$ adolescents and 96.3%, $n = 26$ adults) believed their MC impacted their performance, therefore a significant association between age category and response was identified ($x^2 = 4.32$, df = 1, $p = 0.038$, $n = 73$). Content analysis identified three key concepts from open-text responses to highlight reasons for this impact; '*Physical symptoms*', '*Psychological symptoms*' and '*Reduced Energy*' were all found to be influential to football performance by adolescents and adults (Supplemental Material Table S4). Firstly, players referenced the physical repercussions of their MC as directly influencing their ability to reach the required training or match demands. For example, adults noted they felt they experienced '*Slower reaction times and heavy legs*' (NMA28), or they '*sometimes feel as though I can't focus on what I'm trying to (do) in the game, as my cramps/pain is instead on my mind, so (I) can't perform as well*' (NMA44). Additionally, 'Energy' was seen to be a concept identified by players as being impacted by the MC: '*I feel tired more often and a reluctance to move . . .* ' (NMAD60). Both adolescents (20.4%, $n = 11$) and adults (24.1%, $n = 7$) report to avoid, reduce, or change their sporting habits during their cycle ($x^2 = 1.9$, df = 2, $p = 0.387$, $n = 83$).

Support available and support preferences

Communication related to their MC differed between the age categories of NM participants. There was a significant association between age and communicating with fellow players and health professionals (Table 3). Adolescents would typically approach friends and family (67.2%, $n = 41$) or fellow players (23.0%, $n = 14$) to discuss any MC-related issues, and 16.4% ($n = 10$) answered 'No-one', whilst adults highlighted fellow players (56.7%, $n = 17$), sports doctors (53.3%, $n = 16$) and friends and family (50.0%, $n = 15$) (Supplemental Material Table S5).

Furthermore, there was a significant relationship between age and experiencing difficulties in communicating regarding the MC.

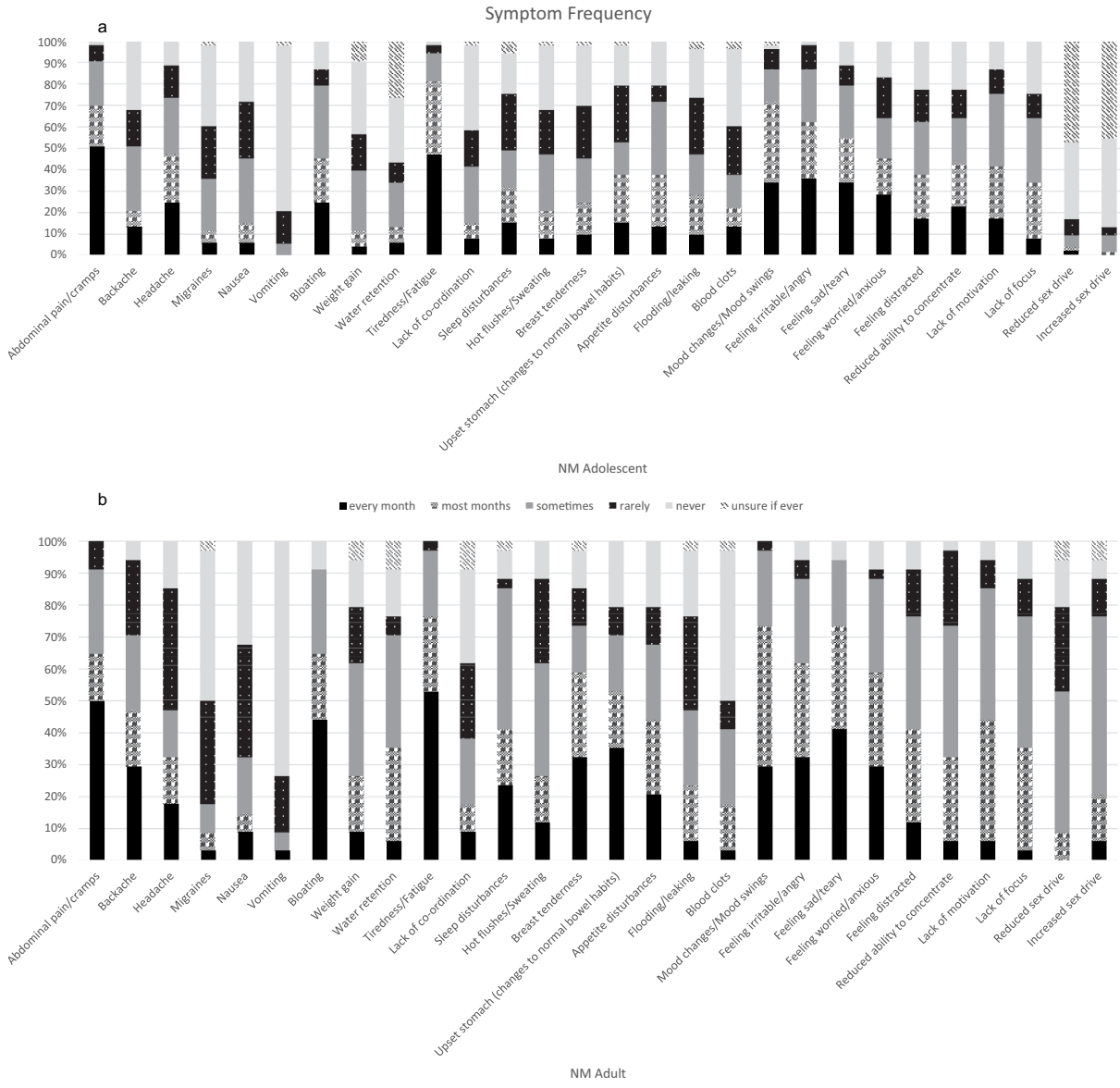

Figure 1. Symptom frequency for NM A) adolescents and B) adults.

The influence of gender of the coach was also found to be significantly associated with age category (Table 3). Frequency analysis identified a perceived lack of knowledge or ability to relate from their coaches were key responses from adolescents and adults (Supplemental Material Table S6). Adults commonly recognised key traits of a coach to be of greater importance than gender: '*I think it [gender] could be a factor, but I think it mainly would depend on how approachable I feel they are as a person and how comfortable I would be speaking to them about any issue.*' (NMA10). No positive aspects of having a male coach were identified upon responses from adolescents, with players citing male coaches being less likely to understand or do not have enough knowledge to engage in discussions '*As a male may feel awkward because they are less knowledgeable*' (NMAD20). Participants also cited awkwardness as a key determinant related to the gender of coach impacting discussion:

> If the coach is a man who can take the issue without embarrassment, then I would feel as comfortable as speaking to them as to a woman who I would assume is more comfortable talking about the issue. (NMA10)

Pre-menarcheal perceptions

Eight pre-menarcheal participants were also captured within the dataset. Almost 90% (87.50%, $n = 7$) of respondents perceived there would be negative aspects to having a period. Answers often referenced the symptoms involved, or the inconvenience of bleeding. One participant stated, '*I never hear anything positive about having [periods]*' (PM06). When asked if they perceived the MC would help sporting performance, 87.50% ($n = 7$) disagreed. One referenced the positives of maturing on their physical performance; '*Body develops a bit more*' (PM01). Reasons for disagreeing included the potential to be distracted due to menstrual products, or pain ($n = 5$): '*I think I will feel uncomfortable and if I'm sore it might have a negative effect on my performance*' (PM07).

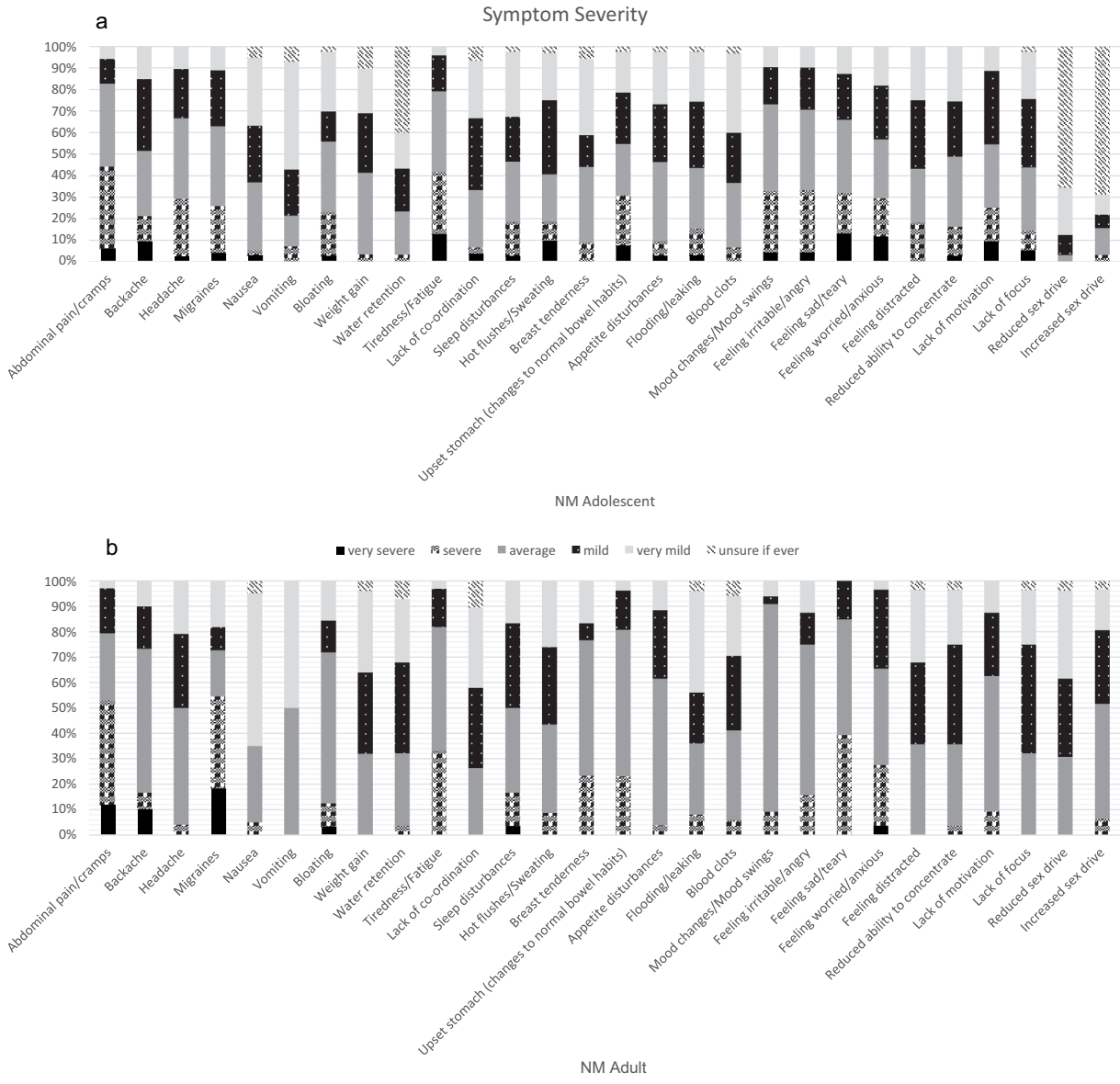

Figure 2. Symptom severity for NM A) adolescents and B) adults.

Discussion

This study investigated adolescent and adult female football players' experiences and perceptions of their own MC and communication practices. This research adds to the limited findings currently available to identify experiences and perceptions of the MC from adolescents in general sport (Taim et al. 2023) and, more specifically, football (Brown et al. 2024), but the first to outline findings against an adult population. Critically, this research also provides a novelty in its exploration of communication practices and support within the academy and senior football. Whilst symptom frequency and severity were comparable between adults and adolescents, the adults perceived that their MC had a greater impact on sporting performance than the adolescents. Moreover, communication was largely varied, with adolescents less likely to communicate about their MC both within and outwith the sporting environments. This research, therefore, demonstrates that there is a clear need to understand MC-related communication barriers within female youth performance environments and develop support mechanisms for athletes, coaches and their support team.

When evaluating MC characteristics between age groups in this study, the adolescent players had significantly longer bleeding duration than the adults, yet no differences were found between cycle lengths. Whilst it has been previously reported that cycle lengths are longer during the early post-menarcheal years, the mean age of adolescents (15.0 ± 1.1 years) meant they were, on average, 2–3 years post-menarche (with menarche occurring at a mean age of 12.7 ± 1.1 years). By this time, 60–80% of MCs are 21–34 days long as per adult typical values (World Health Organisation 1986; Hickey and Balen 2003). Nevertheless, 89.3% ($n = 58$) adolescents stated that the timings between their periods change. Irregular cycle

Table 3. Adolescent and adult menstrual cycle-related communication and support.

	Adolescents		Adults		Analysis
	N	%	N	%	
Where would you go to find information related to the MC? Please select all that apply:					Exp value < 5
Internet	22	42.3	24	80.0	
Books	0	0.0	0	0.0	
Journal Articles	0	0.0	2	6.6	
Social Media	15	28.8	6	20.0	
Health Professional	5	9.6	8	26.7	
Friends and Family	42	80.8	14	46.7	
Period-tracking Apps	18	34.6	13	43.3	
Other	0	0.0	0	0.0	
Have you spoken to a fellow player regarding your MC?					$x^2 = 16.0$, df = 1,
Yes	19	36.5	24	82.8	$p < 0.001$, $n = 81$
No	33	63.5	5	17.2	
Have you spoken to a doctor or health professional regarding your MC?					$x^2 = 14.3$, df = 2,
Yes	4	7.7	12	41.4	$p = <0.001$, $n =$
No	45	86.5	17	58.6	81
I do not experience symptoms	3	5.8	0	0.0	
Have you ever experienced situations in which you found it challenging to communicate or were not able to communicate to others that you were menstruating?					$x^2 = 7.84$, df = 2, $p = 0.020$, $n = 81$
Yes	9	17.3	0	0.0	
Sometimes	14	26.9	5	17.2	
No	29	54.7	24	82.8	
Do you believe the gender of your coach influences comfort in communication?					$x^2 = 6.39$, df = 2,
Yes	33	63.5	10	34.5	$p = 0.041$, $n = 81$
Somewhat	10	19.2	11	37.9	
No	9	17.3	8	27.6	
How happy are you with the current resources, help or support available to you in regard to your MC?					Exp values < 5
Extremely happy and satisfied	2	3.8	3	10.3	
Very happy and satisfied	7	13.5	7	24.1	
Somewhat happy and satisfied	21	40.4	9	31.0	
Neither happy nor unhappy	20	38.5	8	27.6	
Somewhat unhappy and unsatisfied	1	1.9	2	6.9	
Very unhappy and unsatisfied	1	1.9	0	0.0	
Extremely unhappy and unsatisfied	0	0.0	0	0.0	

lengths can be expected for three years post-menarche (American Academy of Pediatrics et al. 2006; Adams Hillard 2008), with reported lengths ranging up to 90 days and historical or current secondary amenorrhoea self-reported by 16.9% adolescents. The potential for menstrual disorders (known or unknown) within this population is therefore a worthwhile consideration. Historical or current secondary amenorrhoea was documented by 16.9% and 16.1% within adolescents and adults, respectively, which is within the range (0–61.5%) found by Taim et al. (2023) in their systematic review of 24 studies (1705 female athlete participants with secondary amenorrhoea). Amenorrhoea has previously not been well identified, and then recognised as a potential issue by players, parents and coaches of adolescent and adult football players (McHaffie et al. 2022; Donnelly et al. 2024). Amenorrhea within athletes is a key indicator of Relative Energy Deficiency in Sport (RED-S), and outcomes such as reproductive issues, poorer immune health, and greater injury risk can all impact athletes' short and long-term health and performance (Mountjoy et al. 2023).

The age category of NM players was not found to influence the overall MC symptom prevalence. Abdominal pain/cramps prevalence was found to be comparable to, or greater than, research within adult and adolescent athlete populations (Bruinvels et al. 2021; Ekenros et al. 2022; McNulty et al. 2023; Taim et al. 2023, 2023; Brown et al. 2024; Kiemle-Gabbay et al. 2024). There was a significant association between age category and the perception of performance being impacted by the MC (($x^2 = 4.32$, df = 1, $p = 0.038$, $n = 73$), 78.3% adolescents and 96.3% adults). This may be due to adults having had MCs for a longer time, leading to a greater likelihood of being impacted, and a stronger connection between these experiences and sporting outcomes. Additionally, adults may be more likely to discuss and share these perceptions with others. This study also found a higher proportion of athletes reporting menstrual cycle-related performance impacts than previously highlighted by previous survey data responses in adults (Bruinvels et al. 2016; Armour et al. 2020; Ekenros et al. 2022), and adolescents (Taim et al. 2023; Brown et al. 2024). This may be due to increased awareness from mainstream media, particularly in football, where issues faced by female players have been highlighted (The Athletic 2020; The Independent 2023), including the movement to remove white shorts from the game (The Guardian 2023). Whilst some athletes have perceived positive impacts of their MC on performance outcomes (Armour et al. 2020; Ekenros et al. 2022), content analysis in this study supports the findings that the majority of athletes have a negative perception of the performance implications of ovarian hormonal fluctuations (Findlay et al. 2020; Brown et al. 2021; Ekenros et al. 2022; Taim et al. 2023).

Content analysis in this study sheds further light on the reasons why MC-related issues are perceived to impact performance. Physical and psychological symptoms were found to be key factors, and are commonly reported in the literature and by professional athletes (Findlay et al. 2020; Brown et al. 2021; Ekenros et al. 2022; Taim et al. 2023). Players also identified

'*reduced energy*' as a key outcome of their MC which consequently impaired their exercise performance. This too was highlighted in the recent work by Brown et al. (2024) with 87% of senior and youth athletes citing this as disrupting performance. The high-intensity intermittent nature of football relies on repeated sprinting bouts (Scott et al. 2020; Mäkiniemi et al. 2023), and with players perceiving difficulties due to '*tiredness*', '*fatigue*' and '*taking longer to recover*', these football-specific demands may pose an added complexity to maintaining optimal match performance. To date, there is limited research which explores the impact of menstrual phase on football-specific performance. Whilst Julian et al. (2017) highlighted that very high-intensity running distances were greater during the luteal phase compared to the follicular phase in elite football players, a greater volume of high-quality evidence is required to support these findings and for a general consensus to be made (McNulty et al. 2020). On the other hand, subjective responses from English Women's Super League players found that just over half ($n = 8/15$) perceived increased recovery times and fatigue following performances during menses (Read et al. 2021). The ability to match performance outcomes with athlete perceptions is currently difficult due to the divide in research outcomes, with the inclusion of adolescent athletes yet to be considered within this dynamic.

Adult players were found to be more likely to turn to teammates and medical professionals for support than adolescents. The ability to share experiences and be more comfortable in discussions may provide comfort to those seeking support. In general, adolescents experienced greater difficulties communicating about these topics, noted previously by Hyde and Zipp (2023). Adolescents were also reliant on friends and family to support them with their MC experiences (Supplemental Material Table S5). Whilst this has been reflected in the general population (Santer et al. 2008), Findlay et al. (2020) found elite rugby players were more likely to communicate with health professionals than non-experts in the field, perhaps due to the in-built support system within some sport organisations which facilitates greater contact time to build relationships, improving comfort in communication. However, PLAN UK noted 27% of girls aged 14–21 years had not sought medical help for their MC as they felt too embarrassed (Youth Sports Trust 2018). This further highlights the often-stigmatised nature of the topic which propagates embarrassment and shame over menstrual bleeding and hinders communication within sporting environments and society (Olson et al. 2022; Youth Sport Trust 2022). In the present study, adolescent and adult athletes were found to seek support from the internet, social media, and period tracking apps; potentially due to the ease of access and privacy of accessing information. However, gaining advice on health-related matters through these mediums can result in conflicting and, at times, erroneous information (Donnelly et al. 2024). Having designated sport-specific resources that are clearly signposted to athletes would ensure they receive the correct information in a digestible format tailored to age and stage of development. With 28.8% adolescent athletes utilising social media to receive information, ensuring these resources fit the medium they may be accessed is also crucial. McGawley et al. (2023) suggest these resources should be 'functional, interactive and critical', ensuring the information is not only reliable and practical, but engaging and relevant to the individual and their experiences.

Athletes perceived a lack of support was available to them to support their MC experiences, with the gender of the coach seen as a limitation to communication, which mirrors previous research in rugby (Findlay et al. 2020), swimming (Hyde and Zipp 2023), football (Bergström et al. 2023), and cross-country skiing (Höök et al. 2021). The current study found that adolescents and adults considered that their coach's knowledge of the MC was lacking and considered them to offer limited support for related issues. Qualitative responses from adolescents did not cite any positive aspects of having a male coach in regard to communication on the topic, and a significant relationship was found between age and the perception of the gender of coach impacting comfort in communication. There may be a number of reasons behind this; the full-time nature of the adult elite athletes means they spent considerably more time with their coach than younger players and therefore may be more willing to share personal details due to the increased time spent developing their coach–athlete relationship. In addition, adolescents in recent work in this field identified gender to be a constraint but also the relationship itself with the coach, with key aspects such as trust and closeness being critical to discussing sensitive topics (Taim et al. 2023). Overall, the lack of comfort in discussion from adolescents was found to be evident, with 16.4% stating they would usually speak to 'No-one' regarding their MC, highlighting communication barriers are still very much in place which may prevent them from receiving support within daily life or sport. Whilst coaches from various sports (Clarke et al. 2021; Bergström et al. 2023), including football (Forsyth et al. 2023; Donnelly et al. 2024) have previously acknowledged that they have inadequate understanding of the MC, they are generally willing to learn in order to improve the openness of discussion. Improving education throughout the sporting environment is crucial to ensure players, coaches and support staff receive sport-specific support they require, but also do so in a comfortable and safe space (Taim et al. 2023). In doing so, it should help develop a culture of open discussion where defined support processes are established.

Limitations and future work

There are a number of limitations to this research. The population utilised limits the ability to transfer findings to other sports, countries or environments. This study used a self-reported questionnaire which means recall bias may influence results (Althubaiti 2016). For example, the adult population may have greater difficulty recalling the age of menarche. Furthermore, frequency and severity of symptoms are subjective and menstrual dysfunctions such as amenorrhoea were not confirmed with medical diagnoses.

Future studies should consider the efficacy and design of menstrual health education across the football sporting pathway. McGawley et al. (2023) highlight the need to assess these education interventions for effectiveness to ensure 'knowledge' is improving and resources are suitable. Whilst schools also

have a vital role in aiding discussion and targeting improved knowledge for adolescents, pupils have reported education is currently limited in the UK (Brown et al. 2024) and teachers do not always have the knowledge or confidence to deliver the content (Brown et al. 2022). Thus, ensuring there are sport-specific fit-for-purpose educational resources is key to equip female football players with the appropriate knowledge and ability to communicate and advocate for themselves and others.

Conclusions

This study has shown that both adolescent and adult football players often perceive sporting performance to be impacted by their MC, with athletes experiencing difficulties in communicating these experiences from an early age and thus limiting the access to support they may require. This highlights the need to consider targeted sports and age-specific education and support to ensure athletes not only have the tools to manage any MC-related issues but are also in a comfortable environment where open conversations about these topics are normalised, or access routes to support services are well-recognised.

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Code availability

Available upon Request.

Data availability statement

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