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Normalising the conversation: a qualitative analysis of player and stakeholder perceptions of menstrual health support within elite female soccer

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ABSTRACT

Purpose: This qualitative study explores player and stakeholder perceptions of menstrual health support in elite female soccer.

Methods: Semi-structured interviews were conducted with 47 participants including players (n = 12), parents (n = 9), coaches (n = 9), sport scientists (n = 7), nutritionists (n = 5) and medical staff (n = 5).

Results: Via thematic analysis, data demonstrate that elite female soccer players experience a range of physical and psychological symptoms primarily at the onset of and during menses (as also perceived by stakeholders), with most participants perceiving these symptoms to impact performance. Nonetheless, menstrual health support is perceived as minimal and although players have their menstrual status tracked, they report little understanding as to why or how this information is used. This confusion was also present among stakeholders, often as a result of uncertainty about the evidence supporting the need for menstrual health support. The perceived lack of support may also be reflective of a culture where conversations about the menstrual cycle are not normalised. Overall, this may result in failure to identify and treat menstrual irregularities despite non-coaching staff members perceiving them to be common amongst players.

Conclusion: These data support the need for individualised support based on the lived experiences of individual players and support staff. Furthermore, our research identifies the need for organisational, stakeholder, and player centred education programmes (led by experts in female athlete health) that create an environment where players receive personalised menstrual health support.

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KEYWORDS
Menstrual cycle; female soccer; menses

Introduction

The effects of the distinct phases of the menstrual cycle (MC) on exercise performance are currently a hot topic amongst athletes, support staff, and researchers within elite sport. Although the fluctuations in ovarian steroid hormones (i.e., oestrogen and progesterone) that occur throughout the MC are well characterised (Owen 1975; Landgren et al. 1980; Davis and Hackney 2017), the impact of such changes on the function of various physiological systems is complex and not yet fully understood (Chrousos et al. 1998; Ansdell et al. 2019). Furthermore, the potential impact of such changes on exercise performance is also complicated by the magnitude of physical and psychological symptoms that are experienced at the individual level (Martin et al. 2018). Indeed, although a recent meta-analysis concluded that exercise performance may be trivially reduced in the early follicular phase of the MC (McNulty et al. 2020), the researchers specifically highlighted that a personalised approach should be adopted when managing the impact of the MC on exercise performance. Importantly, the quality of the evidence presented by McNulty et al. (2020) was rated as 'low' (due to methodological limitations of the studies included) and measures of exercise performance were limited to markers of endurance or strength capacity, some of which have limited relevance to team-based sports such as soccer.

In relation to soccer (albeit in amateur players) Dos Santos Andrade et al. (2016), reported that hamstring-to-quadriceps peak torque strength ratio was lower during the follicular phase compared with the luteal phase, the outcome of which could lead to increased risk of lower limb injury (Hewett et al. 2008). In addition Julian et al. (2017), also reported that amateur players' performance in the Yo-Yo intermittent endurance test was reduced during the mid-luteal phase when compared with early follicular phase. In relation to elite level match play, the same researchers recently reported that high-intensity running distance was greater in the luteal phase compared to the follicular phase (Julian et al. 2021). However, it was concluded that interventions at a group or team-based level do not seem necessary to optimise performance, as MC phase does not contribute largely to changes in physical performance in comparison to the potential effects of individual and match variation. With regards to symptomology, our research group (Parker et al. 2021) recently conducted an audit of players in the English Women's Super League (WSL) and reported that of the 72% of players surveyed who were not currently using hormonal contraceptives, 74% reported negative symptoms with 4% choosing to abstain from training as a result. Furthermore Read et al. (2021), also reported that in a cohort of elite players from the WSL, 100% of the group perceived that the MC negatively affected their performance, with the most

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prevalent occurrence during menses. When taken together, such data suggest that soccer-specific performance may also be negatively affected by the MC and hence, strategies to manage menstrual health support (at an individual level) are therefore warranted.

In addition to understanding the players' lived experiences, an important step towards personalised menstrual health support is to ascertain the current understanding and perceptions of key stakeholders that may be involved in the management and delivery of such processes. Such stakeholders are likely to include coaches, medical doctors, sport science staff, and parents, all of whom can impact the environment and culture around menstrual health support. For example, in a study conducted on elite rugby players, Findlay et al. (2020) emphasised the need for support staff to initiate conversations with female athletes and to 'normalise' conversations surrounding the MC. However Armour et al. (2020), previously reported that female athletes do not readily discuss the MC with their coaches (especially in those instances where the coaches are male), thus highlighting the challenge for practitioners to support the development of sporting performance whilst also respecting athletes' rights to privacy and control of their own bodies. The athletes in that study also described that their training load was never manipulated as a result of symptoms associated with the MC, despite reporting perceived negative impacts on speed, agility, and strength. Such data clearly highlight the requirement for more aligned thinking between athlete and support staff in order to optimise the management of menstrual health support in an ethical way.

With this in the mind, the aim of the current study was to explore both player and stakeholder perceptions of the menstrual health support currently provided in elite women's soccer. It is our intent that the present data may serve as a stimulus to better inform the creation and delivery of personalised menstrual health support for players.

Methods

To explore player and key stakeholder perceptions of menstrual health support, we undertook a qualitative investigation. Qualitative research provides a route to understand the experiences and perceptions of individuals within complex social environments (Sparkes and Smith 2014). As such, a qualitative approach was deemed an effective way to understand menstrual health experiences across key individuals in elite female soccer (e.g., athletes, parents etc.). A relativist ontology was adopted which recognises that individuals experience their world subjectively (Smith and McGannon 2018). This position influenced the sampling, data collection, and data analysis procedures that are described below, and which sought to provide a credible, insightful, and transparent account of menstrual health support in elite women's soccer.

Sample

To gain multiple detailed insights into the perceptions of menstrual health support, players, parents, and staff in varying roles were purposefully invited to take part in the study. This approach is comparable to previous qualitative explorations in professional sport (Martin et al. 2018; Logue et al. 2021; McHaffie et al. 2022), which value those who experience a phenomenon as best placed to elucidate it, while also enabling the development of a broad understanding of the soccer context in question. The inclusion criteria for the purposeful sample included those above 16 years old and who had experiences of elite female soccer in England within one of the roles (e.g., player, parent, coach etc.). To recruit this sample, some participants were contacted through gatekeepers of their respective governing bodies via an email including details of the study and participant information details. Convenience sampling was also used to contact other participants who met the inclusion criteria. Consistent with the qualitative approach that eschews a-priori sampling size calculations, the sample size was determined by the analysis, with recruitment stopping for each participant group once saturation was experienced within the data i.e., when no new insights were derived from interviews, sampling was ceased. All players (n = 12) competed in elite women's soccer, representing teams in the WSL (n = 9) or The Football Association Women's Championship (n = 3). Some players also competed at senior (n = 4) and youth (n = 7) international level at the time of the study. All the players regularly experienced menstruation and were excluded if they were currently pregnant or using hormonal contraceptives. Parents (n = 9; 6 female, 3 male) were parents or guardians who currently live with an elite female soccer player, aged 16–18 years. Staff members invited to the study all currently work in varying roles in professional female soccer full time, at club level or international level. These roles included technical coaches (n = 9; 4 female, 5 male), sport scientists (n = 7; 1 female, 6 male), nutritionists (n = 5; 1 female, 4 male), and medical staff (n = 5; 2 female, 3 male). Staff members had an average of 5.6 ± 5.2 years of experience working in elite female soccer. Together, this sample enabled the generation of in depth and varied understanding of perceptions in elite women's soccer. Ethical approval was granted by the research ethics committee of Liverpool John Moores University (21/SPS/029) and as a condition of this, further details of the participants are not provided to avoid direct identification.

Informed consent

All participants are fully anonymised and provided verbal and written informed consent before taking part in the study, which included acknowledgement that they cannot be identified via the paper.

Data collection

As part of a larger project (McHaffie et al. 2022), data was taken from semi-structured interviews (36 ± 18 mins in length) that were conducted with all participants using Zoom (Zoom Video Communications, California, USA) and were audio-recorded. These provided accessible and safe spaces for participants to be interviewed and share their experiences and perceptions centred on menstrual health support in elite female soccer. The questions were created with the study aims in mind and were based on previous research (Armour et al. 2020; Findlay et al. 2020; McNulty et al. 2020; Logue et al. 2021; Okholm Kryger

Table 1. Player interview guide and aims – Wording adjusted for stakeholders (note, the full data set derived from domain 2 is not presented in the present paper).

Questions	Prompts	Aim
Domain 1: Participant background and demographic		
Can you tell me about your journey as a footballer so far?	Clubs, age started, setbacks, injuries.	Understand their background and experience.
How are training and matches going at the moment?	Club schedule, international schedule, any challenges.	Understand their history in terms of standard and training schedule.
Can you tell me about what kind of support you currently get from staff?	Size of staff team, sport science, nutrition, part/full time, internal/external.	Understand the level of support they have had and responsibility for nutrition.
Domain 2: Perceived impact of nutrition on performance – priorities and challenges		
Have you received much nutrition advice throughout your career so far?	Who from? Was it useful? Method of support.	Understand their experience of nutrition support.
Has your attitude towards nutrition or nutrition knowledge changed over time?	What has impacted this?	Understand their perceptions of the importance of nutrition.
What are your thoughts on nutrition and whether it impacts performance?	What areas? To what extent? Matches, training?	Understand what areas they perceive nutrition to impact and why.
Can you tell me about you approach to these areas of performance?	Strategy in place? Optimal? Barriers?	Understand their level of knowledge and practice.
Have you experienced any nutrition challenges?	When? Why? Areas of performance?	Understand what nutritional challenges they face and why.
Is there any support you have received to overcome these challenges that has been helpful?	Why? What else would be helpful?	Understand what they perceive to be helpful.
Domain 3: Female specific performance priorities and challenges		
Do you think any of the priorities previously mentioned are more of a challenge because you are female?	If so, why? Physiological or cultural?	Understand if their previous perceptions are female specific.
Do you think contraceptive status or the menstrual cycle impacts performance?	Their status? Why? Tracking, area of performance.	Understand if they perceive/experience a performance impact of the menstrual cycle.
Do you think this impacts your nutrition at all?	Positively or negatively? Appetite? Intentional?	Understand if and how nutrition habits/needs are impacted.
In your opinion, is support in this area is necessary?	Any experience? What is helpful? Who should be responsible?	Understand what they think support should look like in reality.

et al. 2021). The interview was split into three domains: Domain 1) 'Participant background and demographic'; Domain 2) 'Perceived impact of nutrition on performance with an emphasis on priorities and challenges'; Domain 3) 'Female specific performance priorities and challenges', as detailed in Table 1. The full data set derived from Domain 2 is not presented in the present paper but was included in our companion paper (McHaffie et al. 2022). An 'open ended' (Gall et al. 2003) format was adopted, presenting all questions in a conversational and informal manner, to allow maximum voluntary contribution and detail. For example, questions began with phrases such as, 'What are your thoughts on…?' and 'In your opinion…?'. Following this, naturally occurring probing questions (Gratton and Jones 2004) were asked about the answers provided in order to gain more detail. This format of enquiry allowed participants the liberty to express their experiences and opinions with minimal constraints and to self-navigate towards areas they felt significant (Braun and Clarke 2013).

Analysis

All interviews were transcribed verbatim and Nvivo10 (QSR International, London, England) was used as a data management and storage tool. Primarily an inductive approach was taken to explore data from Domain 1 and 3 of the interviews, which were directly relevant to the aim of the present study. In these domains and as part of the analysis process, the lead author identified meaningful segments of text, which were subject to initial (open) coding (Saldaña 2021). Once this initial coding was complete, these were revisited as part of a focused process to identify potential themes across the data, and to consider the research aim. Themes were subsequently developed over several iterations by the lead researcher. Through discussion with the research team, these themes were refined in order to provide a credible and trustworthy 'common thread' (Sparkes and Smith 2014), which is presented in the findings to come.

Rigour

In order to ensure credible and transparent perceptions of support practices in elite women's soccer, several procedures were undertaken. These procedures aspired to add rigour, whilst maintaining a coherent qualitative focus on understanding the subjective and multiple perspectives of the participants (Sparkes and Smith 2009; Smith and McGannon 2018). For example, interviews were conducted by a researcher trained in qualitative methods and experienced as a nutritionist in women's soccer. Mindful of their own subjectivities, interview questions were examined by a critical friend to ensure they were not leading. Pilot interviews were conducted with two players and three staff members to ensure questioning and probing were accessible to participants. The wording of some questions was adjusted following these trial interviews. Through the sample, a range of views from players, parents, and staff were gathered. A critical friend (Smith and McGannon 2018) who is detached from elite sport was also used to check and challenge data analysis, theme generation, and the presentation of selected quote. The role of the critical friends is 'not to "agree" or achieve consensus, rather to encourage reflexivity by challenging each other's' construction of knowledge (Smith & Sparkes, 2006). Consistent with this, the critical friend challenged the coding process and themes were refined over time to provide a credible account of these participants' experiences.

Results and findings

Following data synthesis and analysis, four themes were established that present a narrative of participants' perceptions and experiences of menstrual health support within women's soccer. These themes are presented below, with player and stakeholder quotes presented verbatim to support the narrative.

Theme one – Symptomology is not "one-size-fits-all"

When initially questioned about the impact of the MC on performance, all players began by discussing symptoms in the few days before and during menses and reported a perceived negative impact on performance. Stomach cramps were reported more frequently than other symptoms (n = 9/12);

> Player 9: I feel like when I first come on (*my menses*) it I get cramps. I can't really run with cramps at all.

A range of other symptoms were also identified and reported by players, including sickness (n = 6/12), low energy levels (n = 5/12), tiredness (n = 5/12), muscle aches (n = 4/12), headaches (n = 4/12), lessened co-ordination (n = 3/12) and menstrual flooding (n = 3/12). Variability was also apparent in the severity of players' symptoms, with some players reporting that symptoms were perceived to be minor and manageable and others reporting severe symptoms, such as fainting and vomiting.

> Player 5: am in a lot of pain some days and it is really tough but then some players might not even struggle, it might just kind of come up to their time of the month (*menses*) and they'll be fine.

Psychological symptoms were also identified by players (n = 7/12) that manifested as stress, lethargy, irritability, fragility, worry and low mood.

> Player 10: I think it is energy levels and I think it's also, like, you're probably more, like, stressed. I know I'm more stressed and more emotional, when I'm on my period, so I think it definitely impacts the mental side of the game.

Symptoms of the MC were also reported to have a perceived impact on nutrition habits due to changes in appetite, with all participant groups sharing first or second hand experiences of nutritional habits being impacted by mood. A wide range of changes to habits occurred, with some players consuming greater amounts of varying food groups while others had less of an appetite, both of which could have a subsequent impact on training or match day performance.

> Player 2: I could eat anything if I'm honest, like crisps, chocolate. I could probably sit on the sofa and eat a whole bag of Doritos and not even think about it. I think it's not just the what you want it's literally how much of it you could eat.

> Player 3: Obviously it's in your head that you might have pains so you want to comfort eat or whatever it is and I think it's in your head as well that when you, you've ate bad and you've gone on to the pitch you kind of, like, I know for me personally if I've eaten bad leading up to a game I go on the pitch thinking 'I'm gonna perform bad because I haven't had this in me, this, this, this', like, that's in your head as well.

Stakeholders also perceived that players experience a wide range in both the type and severity of physical symptoms. Although psychological symptoms were commonly reported by the players surveyed, this was less common amongst stakeholders (n = 6/35) with the majority of psychological symptoms being reported by parents (n = 4/9), who also identified stress, lethargy, irritability, fragility, worry and low mood.

> Parent 3: I think she is definitely more tired beforehand (*immediately pre menses*), erm, and a little bit more irritable and maybe a little bit more fragile emotionally, erm, and I guess that often on the first day she can be a bit uncomfortable. So, I would think she probably wouldn't perform as well just before and on the first day.

As a consequence of the physical symptoms described previously, players and stakeholders (n = 36/47) reported that training and match day performance could be negatively affected in their opinion. This was primarily as a result of discomfort, due to the varying symptoms previously mentioned.

> Player 3: I often just feel sick, like I could throw up at any time, so it makes training difficult when it is really bad.

> Parent 9: I mean obviously if she wasn't feeling up to anything then she wouldn't attend training if things were that bad. She does suffer quite a lot with her period pains and things like that. It physically makes her be sick because that's what she's like. So on them sort of days if it was that bad then she would miss training.

Amongst all participants, the psychological symptom most commonly related to reduced training or match day performance was worry of fear of flooding or a lack of control of menses. Wearing white shorts as part of match or training kit heightened this worry and often led to distraction from performance.

> Player 3: Like having white shorts on for example. The men would never have to think 'oh I've got white shorts on, what if something happens?'. Whereas women, it's constantly in your mind then I think that has an effect on your performance as well because you don't want to overstretch and then if you don't overstretch you might get injured. There's just so many things in your head that you have to think about when it's the time of the month.

Some stakeholders (n = 8/26) suggested a potential link between menstruation and injury risk, particularly regarding anterior cruciate ligament (ACL) injuries. A lack of co-ordination and the potential subsequent impact on injury prevalence was identified by both medical staff, sport scientists and parents.

> Parent 5: She always used to say when she first started her periods that it didn't feel like her leg was connecting quite right to her brain, it was like there was an imbalance there. I was worried that injuries could occur more. I always seem to think that sometimes that goes hand in hand.

However, this notion was challenged by two medical staff members, one of whom believes that a lack of sport science support, alongside the increasing physical demands of the game is a more likely cause of higher rates of ACL injuries in female soccer players, rather than a particular phase of the MC.

> Medical 1: The culture that these players are living within has as much of an influence and arguably a lot more. Rather than the biological difference that might be due to their menstrual cycle changes and ligament laxity … So I find that quite fascinating, it's something that I feel quite passionate about, I think we're seeing early evidence that the more professional the sport and the longer

> the players have been in that profession, the ACL risk goes down pretty rapidly.

Three coaches did not perceive a link between MC symptoms and performance. Although they identified symptoms, they acknowledged that they have not witnessed a negative impact of these symptoms on performance.

> Coach 4: I probably haven't directly, to be honest. I don't know if we've just got a very well-educated group of girls who have got it under control. I've never really noticed a huge difference I must admit, definitely not.

In summary, the type and severity of physical symptoms experienced by players were inconsistent, with each player reporting individualised symptoms. As such, the perceived impact of MC symptoms on performance varied greatly. The perceived impact of MC symptoms on performance was acknowledged by most stakeholders, with the exception of three coaches. Furthermore, some staff members acknowledged that the MC may impact susceptibility to injury, whilst participants across all groups identified an impact on appetite, which may subsequently impact performance.

Theme two – Confusion about the purpose of tracking menstrual status

The players also discussed the support they routinely receive to manage any perceived negative consequences associated with the MC. However, it was MC tracking per se (as opposed to support that is provided as a result of tracking) that was most commonly described. Regarding tracking, this data was typically collected as part of a daily wellness questionnaire collected by a club. For example, players 'ticked a box' to say if they are currently menstruating, with the option of listing symptoms. However, amongst those players who are at clubs where this is tracked, most were confused about the purpose.

> Player 5: We just do a wellness form in the morning and we literally just tick if we are on (*menses*) or if we aren't and if we are on, what sort of symptoms we were having and that. That was it but nothing has ever been altered. So, if you ticked 'yes' there nothing is altered.

Although most players (n = 8/12) described having their MC tracked as part of a daily wellness questionnaire, some players (n = 4/12) had never experienced this at their club. One player identified this as frustrating, because she perceived that her MC impacts her performance.

> Player 8: No-one kind of really knows which obviously can never really help. Sometimes you can be having a bad session because of it and they can just think it's an off day, or a couple of off sessions.

One of the reasons that this group of players didn't perceive that MC tracking data is used to inform decisions, is that it is often not followed up with them individually, with *Player 3* describing data as being '*collected for the sake of it*'. This frustration was something that *Player 3* had experienced at three different WSL clubs.

> Player 3: No, I think they're very poor with women. Every single club that I've been to, they track it. I know at *Current Club* now we do, it's similar to at *Previous Club* where you did your wellbeing, and you'd say 'are you on your period? Yes, no, whatever . . . ', 'how many days have you been on (*menses*)?' but what actually happens next? Yeah, people are asked the question, but it's never followed through. I've never had a further conversation of 'oh you're on your period now, what, how do you feel?' or 'what, has it impacted?. . . What can we actually do about it? Nobody train while they're on their period? Do you know what I mean? I just don't know what comes next because I've never had that conversation.

Rarely, some players (n = 3/12) did share their experience of individual training load being manipulated based on menstrual status. This typically occurred following an 'in-person' conversation, as opposed to being solely a result of data collected as part of daily wellness questionnaires. Interestingly, players who experienced this were very positive about the impact.

> Player 7: Generally, once we get to training, they ask us about it more in detail and then if they thought there was something that they thought you couldn't handle they'd probably decrease your load slightly, which is really helpful.

Only two players described tracking their menstrual status individually and they both used the same mobile phone application, designed primarily for the purpose of adapting nutrition to the MC. *Player 1* spoke about the perceived positive impact this had had on her performance, whereas *Player 2* was sceptical but used it as all players at the club are asked to do so.

> Player 1: I log my menstrual cycle on an app and I think that that has really raised my awareness and stuff with regards to nutrition as in how nutrition and certain types of foods can help me during different phases and how that can then benefit your training.

> Player 2: We've been educated to not eat certain meats in different phases. I, personally, don't ever feel a difference between eating chicken or steak. When I'm not supposed to eat steak, you know, I personally don't feel the difference.

Interestingly, all nutritionists that were interviewed shared similar views to *Player 2*, holding a belief that more research needs to be done before tailoring nutrition support to different phases of the MC. Nutritionists described the importance of educating players to listen to their bodies and not having a one-size-fits-all approach.

> Nutritionist 4: The app might say 'eat this at this time in your menstrual cycle', which is fine but the evidence, isn't there for that for me . . . At the moment I haven't seen strong evidence to say 'this helps at that point'. It could say try and eat more oily fish at this time or take some fish oils, which anecdotally might help but for me I haven't really seen anything. I've seen newspaper articles around 'we've done this and eat different around the menstrual cycle' and I'm just like, well, what does that actually mean? What do you actually do to eat differently in the menstrual cycle? How much more of those foods are you seeing any benefit of or is it a kind of placebo?

Similarly, even those who were responsible for tracking the menstrual status of players (typically sport scientists) were often unsure of the purpose. For example, one sport scientist admitted to tracking menstrual status, despite believing that there is not adequate evidence that modifications based on menstrual status has a performance benefit.

> Sport Scientist 6: It may have some influence on performance, but I look at it like what can we do about it? There's nothing, well, the way I see it, practically there's not a lot or there's next to nothing that you can do.

Although those who are responsible for tracking wellness data (typically sport science staff) were aware of the menstrual status of players, other staff members shared that they were often unaware of the this. Therefore, it is unlikely to be used for modulation of training load, nutrition practise, or further sport science support.

> Coach 8: So they do a wellbeing questionnaire every morning and it's tracked in that respect but I'm, I would need to check with the sports scientists.

Contrary to menstrual status, contraceptive status was often not tracked by teams at all, with only two staff members (both medical staff) stating that they were aware of players' contraceptive status, with little understanding of whether it impacted performance.

> Medical staff 2: It's such a difficult area to answer because I think there's still so many questions around, how contraception impacts women's performance, as it is still really only just being addressed.

Overall, data was often collected to track the menstrual status of players because it is thought to be important. However, a lack of understanding as to how this should be practically applied, (due to a lack of credible high-quality research) resulted in this data being collected but not being used to inform any performance decisions. This frustrated players and coaching staff who believed that more should be done to support players, although sport scientists, nutritionists and medical staff were generally not convinced that there is enough research for decisions to be made based on menstrual status, despite tracking it. However, some players (25% of the players sampled) shared a positive experience of having their training load adjusted, as a result of a one-to-one conversation with a staff member (i.e., individualised adjustments), which was greatly valued.

Theme three – The MC is a taboo topic of conversation

Despite some players (n = 3/12) reporting perceived benefits from conversations about their menstrual status, other players reported having never discussed their MC with a staff member. Furthermore, of those who said they would discuss it, this was often infrequent and only initiated if necessary.

> Player 10: I probably wouldn't talk to anybody at the Club. I'd probably talk to my mum first. At the Club, I mean I'd probably mention it to a coach but it would just generally be, like 'oh I'm having a bad day'.

> Player 8: I've got quite a good relationship with my coaches so if anything was needed to be brought up I'd feel more than comfortable to bring it up, erm, obviously only if it was absolutely necessary.

Although it wasn't common, *Player 2* spoke positively about improved menstrual health support at her club as a direct result of conversations being normalised 'from the top', with the head coach, who is female, making a concerted effort to drive a change in culture.

> Player 2: It's a very open conversation that we have at *Club* and I think that's quite rare in a female sports place where you could go to someone and say 'oh my God, I'm a week late, what's going on, what do I need to do?' and, you know, there's always that feedback … It took, it did take a few months to kind of know that you were comfortable having that conversation … I feel *Head Coach* changed a lot of the views to do with menstrual cycle at *Club*, you know." … I think definitely having a woman drive it is really, really good and I think then it helps everyone else get on board with what's going on.

In the above example, the coach led in normalising the conversation and in challenging the sport science team to ensure players had necessary support, as opposed to providing the players with support herself. The comment about the importance of a woman driving the conversation was reflected in other player interviews. Half of the player sample (n = 6/12) reported they would be more likely to discuss female specific health with a female staff member, as they know that they are more likely to be able to relate to how they are feeling.

> Player 8: We've got two female physios and a male physio and the S&C coach is female as well, so it's quite nice to have obviously female coaches to talk to as well. I think female coaches is a lot easier. It's quite easy to talk to them about it because obviously they can relate, whereas the male coaches are still a bit more, a little bit more difficult but are still not unmanageable.

However, other players (n = 4/12) who were typically older, were more concerned with their relationship and trust built with the staff member, irrespective of their gender.

> Player 12: t that comfortable with her, I'm more comfortable with *male coach×.

Like players, stakeholders described the MC as a 'taboo topic of conversation'. Nonetheless, despite this reluctancy to converse about the MC, stakeholders consistently addressed the need for this culture to be changed.

> Coach 3: I do think we've gotta be more open about talking about. I think female health and being comfortable as a multi-disciplinary team talking about it, players talking about it. At the end of the day it's, it's not like it's not happening. It's happening and I'm generalising but people get a little bit, like, 'oh should we talk about that?' and, like, we talk about your receiving skills and being able to run and being able to jump, so it's just part of the bigger picture that makes up you as a person and a player.

Staff members also shared mixed experiences regarding reasons for the perceived reluctancy of players to discuss their MC and associated symptoms. Some staff members reported that younger players are less likely to engage in conversations about the MC, particularly if they are struggling with symptoms. However, others felt that this was more dependent on the gender of the staff member, perceiving players to be more likely to speak to a female member of staff.

> Sport Scientist 7: Some people still a little bit, erm, not sensitive, I can't think of the right word, erm, insecure, you know, they don't wanna talk about it, it's, it's their thing, erm, especially being a guy coach as well they might not be comfortable speaking to a male about that.

Two coaches also perceived that players sometimes don't mention their symptoms to coaches, as they are concerned about giving the coach a reason to not select them, although this was not mentioned by players.

> Coach 4: I think they're always worried that 'I might not get picked, he'll leave me out', especially when I rotate the team so much, they think 'well, does he only need one little excuse to leave me out?'

Although it didn't seem to be a taboo topic of conversation between staff members, these discussions were centred around the need for support, rather than performance, with staff members giving a wide range of answers when asked who should be responsible for menstrual health support. The lack of an individual taking the lead on normalising these conversations could be one of the primary underlying reasons for this culture.

> Coach 5: I think if you've got a nutritionist it's ideally them but I don't know whether the whole, you know, like in our case it's the physio because she's female, who deals with a lot of that so I don't know, it's probably not an issue if it goes through a female first maybe and it's organised with the nutritionist.

> Nutritionist 4: I just think at the moment women are not well supported in that side of things because teams are under-resourced from a doctor point of view or a medical point of view and, and I'm not blaming anyone at club because they've got so many things to do, a sports scientist has got 12 different things to do and he can't be monitoring everyone's period and putting a gym session together for 30 players and downloading GPS and loading the waters on the coach and making sure they're all getting gels and making sure that they're all taking their protein shakes. They've got so many things to do that you, you can't do them all well.

As mentioned in theme 2, players found it helpful when decisions were made based on conversations about any symptoms they were experiencing. However, these conversations didn't tend to happen between players and staff members. This was potentially due to nervousness, particularly when sharing this personal information with a male member of staff or a principle of exercising their right not to discuss it. Further reasons for this reluctancy may have been a lack of understanding of potential performance implications or a frustration at the lack of support despite having their menstrual cycle tracked.

Theme four – Mixed experiences and concerns about menstrual irregularities

Experiences and perceptions of menstrual irregularities were varying between participant groups, including differing levels of concern about irregularities. For instance, sport science staff (n = 3/7), medical staff (n = 5/5) and nutritionists (n = 5/5) were particularly concerned about players not having regular menses, given that secondary amenorrhea and oligomenorrhea are clinical conditions that are an element of the female athlete triad (De Souza et al. 2014) and potential symptoms of relative energy deficiency in sport (RED-S). RED-S is defined as impaired physiological function including, but not limited to, metabolic rate, menstrual function, bone health, immunity, protein synthesis, cardiovascular health caused by relative energy deficiency (Mountjoy et al. 2018).

> Medical Staff 4: It's common and, er, getting the erratic cycles, erm, missing periods for several months at a time, that's what we're picking up.

Secondary amenorrhea was also identified as a challenge by one parent who shared her experience of her daughter not having regular menses. She also reported being anxious about not understanding if what their child was experiencing was normal or common. *Parent 8*'s daughter had been diagnosed with secondary amenorrhea by a doctor external to the club and would have valued learning from the experience of others.

> Parent 8: When she was, what, 13–14, something like that, erm, when, you know, like, her period suddenly stopped and I spoke to, I work in the medical profession and I spoke to a doctor saying 'should I be worried about this? It would be helpful for us to know whether there's girls in the First Team, in the Women's Super League in exactly the same situation as her. We just aren't aware of that and that's not for us to know because it would be confidential and everything else, but we don't know if there's anybody else in her squad or her team that is in the same situation and has come through the other side of it. So, I don't think it's talked about.

This parent's concern was perceived to be a result of the lack of discussion mentioned in theme 2, combined with inadequate support from the club. Concerns from sport science, nutrition and medical staff were particularly related to players not mentioning or reporting it. Several examples were given of this, with *Nutritionist 5* discussing an extreme example, where he perceived that under-fuelling resulted in extreme weight loss and secondary amenorrhea.

> Nutritionist 5: So obviously I already knew that she'd lost 10 kilos and when I looked into her diet I thought 'this isn't a very high calorie content'. Just to confirm it I got her to do a 2 day 'snap and send' food diary. The total calorie intake was, like, 1,500 each day. So, I think that was just an instant red flag to me really. So then I just posed the question about the menstrual cycle, 'when was the last time you'd had a period?' and she said she hadn't had a period for at least 6 months.

In contrast to the concerns noted above, some players demonstrated an acceptance of menstrual irregularity. For example, *Nutritionist 4*, worked with a player who was not concerned about menstrual irregularities, as she felt it improved performance.

> Nutritionist 4: For me she just wasn't ready to listen, she was saying things like 'ah, actually I think not having a period during the World Cup is quite handy'.

> Medical Staff 2: A big part of it is to educate them all about the myth that they believe in when it comes to the menstruation, and I don't know where the myth, came about that when you train it's normal to have some sort of menstrual irregularities.

The only two players who identified menstrual irregularities as a concern, had previous personal experience of this situation. *Player 11* was diagnosed with secondary amenorrhea but now has a regular cycle, which she attributed to a lack of understanding of nutrition.

> Player 11: Since I was increasing my training load and then I lost my period it was then, like, why have I and then is it because the mind and my body and then that made me realise 'oh, I need to focus on nutrition as well as football because it is just as important'.

It is important to note, however, that 'under-fuelling' may not always be the cause of an irregular cycle, with *Nutritionist 4* acknowledging that they too misunderstood the factors that influence secondary amenorrhea.

> Nutritionist 4: 18 months down the line she then did kind of begin to get her period back to what was normal and from us looking back as a reflection piece it was probably much more stress related than anything else. This player obviously had surgery, worried about the World Cup, was having knock backs in her rehab etc . . . For me the, the outcome to take home was it was probably much more stress

related than anything else but I was as guilty as anyone of going 'oh, you're not eating enough.'

This theme highlights both concerns and a simultaneous lack of awareness regarding menstrual irregularities. This could be as a result of limited menstrual health support and education (theme 2) and conversations about menstrual health not being normalised (theme 3). However, the primary reason for the concern and lack of awareness within these participants may be the limited research on menstrual health in athletes and confusion over whose responsibility it is to support menstrual health in practice. This situation may reflect the wider status of menstrual health research and support in general.

Discussion

Using a qualitative approach, the aim of the present study was to explore player and stakeholder perceptions of menstrual health support in elite women's soccer. Participants reported a wide range of physical and psychological symptoms that vary in severity and that were most commonly experienced in the few days before and at the onset of menses. Additionally, most participants perceived that these symptoms impacted training and match day performance. However, despite such perceived negative impacts, menstrual health support was deemed minimal or perceived to be solely related to data collection (i.e., MC tracking) that rarely impacts decision making within the multidisciplinary team of support staff. Such practices may be a result of confusion amongst staff as to whether anything *can* or *should* be adjusted based on the menstrual status of players (i.e., a lack of high-quality research data and/or knowledge on the topic itself). Furthermore, many described the MC as a taboo topic of conversation, despite some players experiencing the benefit of individual conversations about symptoms. This lack of support and education may also result in menstrual irregularities not being identified or treated. When taken together, our data provide insights into player and stakeholder experiences that can aid the development of organisational, stakeholder, and player centred educational programmes that strive to improve menstrual health support.

Our finding that all players within this sample reported negative symptoms is similar to data from Read et al. (2021), who reported that 93 and 100% of female soccer players experience negative symptoms pre-menses and during menses, respectively. The commonality of stomach cramps was consistent with recent findings from elite athletes in a variety of sports (Bruinvels et al. 2020; Brown and Knight 2021; Heather et al. 2021) as well as soccer (Parker et al. 2021), the latter reported by our research group. Perceptions of the impact of stomach cramps on performance are supported by studies that have demonstrated reductions in neuromuscular control and aerobic performance (Lebrun et al. 2013), leg strength and aerobic capacity (Chantler et al. 2009) and maximal anaerobic performance (Giacomoni et al. 2000) in women with period pain or premenstrual syndrome. The concerns surrounding heavy menstrual bleeding reported here has also been identified in female trampoline gymnasts (Stewart et al. 2010) and female rugby players (Findlay et al. 2020) who also reported that wearing white shorts heightened this anxiety. Although women often choose to change clothing in order to conceal menstruation (O'Flynn 2006), this is sometimes not possible for elite soccer players. Teams avoiding the use of white shorts during training and matches may be a helpful initial step that could be taken in order to prevent such anxiety.

The overall perception from participants that players receive inadequate menstrual health support may be a result of a lack of research on which to base this support (McNulty et al. 2020). In addition, the social environment may also have a part to play, given that the MC was frequently described as a taboo topic of conversation, a notion also reported previously (Santer et al. 2008; Findlay et al. 2020). Although it is well documented that there are benefits to coaches addressing the wellbeing of their athletes (Becker 2009), this doesn't seem to be reflected when it comes to menstrual health support, which may be because coaches don't see this as their responsibility. Nonetheless, previous research suggests that coaches have shown willingness to be educated on the MC, especially when considering the subsequent potential to adjust training loads (Clarke et al. 2021). The gender of the coach was also considered important to some players when engaging in conversation about the MC, which is reflective of findings in other sports (Armour et al. 2020). In addition, the fact that the three stakeholder participants who didn't identify a performance impact of the menstrual cycle were all coaches, potentially suggest that education within this population is of primary importance. When considered together, it is apparent that more clarity and alignment is needed within the multidisciplinary team to create a supportive climate as well as establishing whose role it is to provide the primary point of care, with many staff members identifying *each other* rather than *themselves* as being responsible for menstrual health support.

Such lack of clarity between staff may result in less communication with players which, in turn, could result in players being reluctant to address this in conversation with staff members. It is noteworthy, however, that whilst coaches perceived that players may be reluctant to engage in such conversations in fear of negative outcomes (e.g., not being selected), players did not share such concerns. Rather, our data suggest that players appear to welcome an environment where such issues can be openly discussed and there is a 'normalising of the conversation' where both player and 'staff member' are educated accordingly. In considering the development and delivery of such educational programmes, clarity from governing bodies on 'who' (i.e., specific stakeholders) they expect to be responsible for the delivery of menstrual health support is now needed in order to ensure that any interventions does not fall under the responsibility of someone where it is outside the scope of their expertise. Although the present data do not determine what *optimal support* should look like, it is readily apparent that support should (initially) be conversational, personalised and dictated by the experience and symptomology of the athlete. Indeed, whilst tracking on a team level or individual level (via mobile applications etc) may allow for an assessment of timing of menses, it is the follow up of individualised conversations (and the potential of subsequent interventions) that players appear to value most.

Staff education regarding menstrual irregularities and the associated consequences is also important due to the prevalence of primary and secondary amenorrhea in elite athletes (De Souza et al. 2014). Whilst the purpose of this study was not to identify the presence of menstrual dysfunction, the identification of the presence or potential consequences of an irregular MC from participants was lacking. This limited view of identification and concern from some participants for menstrual irregularities demonstrate a clear need for education, as secondary amenorrhea can cause negative health consequences (Meczekalski et al. 2008; Gordon 2010; Meczekalski and Podfigurna-Stopa 2010), as outlined in the female athlete triad (De Souza et al. 2021) and RED-S (Mountjoy et al. 2018) models. In both cases of players within this study personally experiencing menstrual irregularities, they attributed the solution to this as a better understanding of nutrition and an increase in dietary intake, as has been reported previously in exercising women (De Souza et al. 2021). In this regard, it is noteworthy that our research group recently identified a prevalence of low energy availability in elite female soccer players (Morehen et al. 2021) as well as a perception within elite female soccer that under-fuelling is commonplace, as a result of 'carbohydrate fear' and body image issues (McHaffie et al. 2022). Given our findings that some players experience a loss of appetite at the onset of and during menses, this further emphasises the importance of individual specific menstrual health support, due to the potential knock-on effects for health and performance. Importantly, various factors can result in secondary amenorrhea, including a variety of diseases, genetic abnormalities, and stress (Viswanathan and Eugster 2011). Therefore, it is critical to understand if this lack of identification from players, parents and coaches is due to insufficient knowledge regarding the adverse effects of amenorrhea, a lack of awareness as to the commonality, or apathy towards the condition due to amenorrhea removing the inconvenience of menstruation and its associated symptoms.

There were several limitations to this study. Firstly, all measures were self-reported meaning that these data are subjective rather than objective. Furthermore, the occurrence of only one cycle was required for players to participate in the study, which means that a participant may not have gained extensive experience of the challenges associated with the MC. Although the topic of the MC is personal, all interviews were a one-off occurrence and as such, further interviews may have resulted in more detailed findings given that participants may have become more comfortable in the (virtual) presence of the interviewer. Additionally, the fact that the principal investigator is male may have also limited participants' openness during the research process. In addition, the interviews were not conducted at any particular phase of the cycle and player perceptions may have been influenced by their experience that particular day. This is important, as pain intensity recall reduces when it is not being experienced at present (Robinson and Clore 2002). The fact that all player participants were elite soccer players is a strength of this study, particularly as there was a range in the age of the player participants (16–30 years old) and clubs they represented. This is important, as the experience of being an elite female soccer player is variable between clubs. Furthermore, the range of staff roles was a strength, as well as the inclusion of parents of younger players (aged 16–17 years), in order to understand perceptions amongst a broad range of stakeholders.

In summary, our data provides a novel insight into the experiences and perception of elite female soccer players and key stakeholders regarding menstrual health support. These findings identify a lack of menstrual health support (i.e., imposing an inappropriate 'one size fits all' approach, tracking data without using it to influence practice, the existence of a taboo culture where MCs and menstrual irregularities are not discussed), despite a need for individualised support due to varied symptomology. This lack of support and awareness of the negative health implications of an irregular MC is underpinned by a culture where conversations about the MC are not common place. Therefore, our data identifies the need for organisational, stakeholder, and player centred education programmes so as to create an environment where players receive credible and personalised menstrual health support.

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