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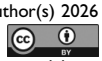
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Hormone cycle-related symptom management in international female athletes: A qualitative study of strategies, constraints, and support needs

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Abstract

Elite athletes experience menstrual and hormonal contraceptive cycle-related symptoms that can negatively affect training, performance and health, yet a significant gap remains regarding how these symptoms are managed within high-performance sport environments. The purpose of this study was to investigate strategies to manage cycle-related symptoms and report related practices adopted by international-level female athletes, and the contextual factors influencing these practices. Nine senior athletes registering at least two severe cycle-related symptoms completed semi-structured interviews. The participants were individual athletes representing eight different countries and six sports. Data were analysed using reflexive thematic analysis within a qualitative descriptive orientation and from this, three overarching themes were generated: (i) Factors influencing individual management; (ii) Sociocultural and environmental factors; (iii) Sport science, medicine and coaching support. Eight of the nine athletes reported tracking cycle characteristics, symptoms or physiological metrics. Individual, sociocultural and environmental factors constrained management strategies, whilst support from coaching and support staff was varied. Experiences differed between athletes and management strategies were often reactive and inconsistent. Moreover, adopted strategies predominantly aimed to alleviate physical rather than psychological symptoms. Athletes frequently described bloating and breast pain as difficult to manage, with few management strategies perceived to be available. In conclusion, cycle tracking was common in this sample of senior international athletes, but symptom management practices were highly individual and support varied. These findings identify a need for applied, sport-specific research on feasible cycle-related symptom management options, and improved application into practice within female athlete care systems that take sociocultural environments and support into consideration.

Keywords

Athlete monitoring, breast pain, health, hormonal contraceptives, sleep, women

Reviewer: Elisabeth Kirschbaum (Institute for Applied Training Science, Germany)

Introduction

A growing body of research has examined the menstrual cycle and hormonal contraceptive use in female athletes, including topics related to symptom prevalence,[1,2] cycle tracking,[3,4] menstrual health literacy,[5,6] and perceived associations with training and performance.[7,8] However, fewer studies have explicitly examined how female athletes manage cycle-related symptoms within high-performance training and competition environments (e.g., Read et al.[9]). This represents an important gap in the scientific literature and highlights a duty of care to female athletes in practice, as symptom burden can have negative effects on both health and performance.[10]

Female athletes report a range of cycle-related symptoms, including pain, bloating, gastrointestinal disturbances, fatigue, and mood changes.[1] In a survey of 1086 female athletes from 57 different sports, 78% reported experiencing at least one

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cycle-related symptom.[2] Among exercising women more broadly, menstrual symptoms have been associated with a reduced perceived availability to train and compete.[1] Qualitative work with elite athletes has elucidated perceived impacts on motivation, readiness, and training quality[7] and the presence of symptoms may have a particularly prominent effect amongst these individuals, whose profession requires regular intense physical and psychological performance.[7,9,10] Existing studies primarily document the prevalence of symptoms and how they are perceived by athletes; however, currently missing from research and applied practice is a deeper understanding of how cycle-related symptoms are actively and effectively managed, in addition to the feasibility of implementing management strategies in elite sport contexts.

To mitigate cycle-related symptoms, female athletes have reported using pharmaceutical and non-pharmaceutical approaches. Hormonal contraceptives, as an example, are commonly used to manipulate cycle timing, with decisions motivated by a desire to reduce performance-related disruptions or symptom severity.[1,7] Analgesic use, including non-steroidal anti-inflammatory drugs (NSAIDs), is also widely reported as an effective strategy for managing menstrual pain in female athletes,[11] consistent with clinical guidance.[12] In non-athlete populations, non-pharmaceutical strategies often include physical activity and nutritional interventions.[13] For example, exercise-based interventions (e.g., yoga and low-intensity movement) have been shown to reduce self-reported symptom severity in general populations under controlled conditions, including randomised trials in previously inactive women.[14] Furthermore, some nutritional strategies have been reported to reduce symptoms such as dysmenorrhea.[15] However, evidence on symptom management is lacking for athletic populations, where feasibility within high-load training environments or during competition are specific factors to be considered. For instance, symptom management in elite sport may be influenced by logistical and environmental considerations relating to travel, food availability, and selection pressures.[11]

In the context of sport, existing studies have typically focused on cycle-related symptom prevalence, perceived impacts, or broad coping behaviours[16] rather than systematically describing symptom-specific management strategies, mechanisms or the contextual factors shaping their use. Therefore, the purpose of the current study was to examine the cycle-related symptom management practices adopted by international female athletes. Using qualitative interviews, this study aimed to identify the symptoms athletes find difficult to manage, the strategies they currently use, and the contextual factors influencing practice and support, to inform future applied research and practice.

Materials and methods

Methodological coherence

Methodological rigour was ensured through alignment between the research question, epistemological and ontological assumptions, methodology, data collection, and analytical approach.[17–19] An initial armchair walkthrough was conducted by the research team to confirm coherence across these components.[17] The study was informed by a relativist ontology, recognising multiple context-dependent realities and a subjectivist epistemology, whereby knowledge is co-constructed through participants' lived experiences.[20,21]

Qualitative description

Qualitative description provides a pragmatic framework for studying phenomena in their natural contexts while staying close to participants' words and meanings.[22–24] Therefore, a qualitative descriptive approach was adopted to examine cycle-related symptom management as experienced by elite athletes within real-world training and competition contexts.[22–24] Following a naturalistic orientation,[25] qualitative description prioritised low-inference description and remained close to participants' language and accounts.[21,26] This design was selected to support applied translation,[22,26,27] allowing findings to inform athlete support, education and implementation within elite sport settings.

Participant recruitment

This study was approved by the Swedish Ethical Review Authority (ref. 2024-04373-01). The participant recruitment process adopted a pragmatic approach using researcher networks within national federations and coaching groups, alongside targeted social media outreach. Eligibility criteria required participants to be female, aged 18 to 40 y, English speaking and classified as tier 4 (elite/international level) or 5 (world class)[28] individual athletes in aerobically-dominant sports. Those expressing an interest to participate were invited to complete a pre-interview survey (Supplementary material 1), which included demographic, sporting, menstrual health and symptom-related information. Of the 34 prospective participants who completed the survey, only those who rated at least two cycle-related symptoms as 'severe' on the pre-interview survey were eligible to participate. Participants were also required to be experiencing a natural regular menstrual cycle or using hormonal contraception and were excluded if they reported menstrual dysfunction, diagnosed menstrual disorders, had changed or discontinued their hormonal contraception in the previous three months or were pregnant. In total, nine athletes (Table 1) from eight countries (Australia, Germany, Ireland, Mauritius, Singapore, Sweden, the United Kingdom, and the United States of America) met the eligibility criteria and provided written informed consent prior to completing a semi-structured interview.

Data collection

Data were collected via semi-structured interviews that were designed to explore the athletes' experiences of

managing their cycle-related symptoms and the strategies used to maintain training, performance and well-being. The interviews were conducted in English by the first two authors (NB and SS) between February and April 2025 and lasted 57.6 ± 9.2 (mean ± standard deviation) minutes. The interviews were audio recorded and transcribed using Microsoft Teams (Microsoft Corporation, Redmond, WA, USA) and were checked for accuracy by two members of the research team (SS and KS). The interview guide (Supplementary material 2) was developed collaboratively by the research team in consultation with an external expert (professor in sport psychology), then pilot tested with two representative athletes to refine clarity and flow. Interview questions addressed menstrual cycle and hormonal contraceptive experiences, symptom management strategies, perceived support from coaches and support staff, and contextual influences such as training and competition, team culture, travel, and geographical location.

Data analysis and representation

Interview transcripts were analysed using reflexive thematic analysis,[29] consistent with a qualitative descriptive orientation.[30] Analysis followed the six iterative phases of familiarisation, coding, theme generation, review, definition, and reporting.[29,31] Coding was conducted inductively by SS, staying close to the language used by the participants.[26] Emerging codes and themes were reviewed and refined through discussion with NB to enhance analytic rigour and shared understanding. Final themes were collaboratively defined by NB and SS to ensure they accurately reflected the data and provided applied insight into athletes' approaches to cycle-related symptom management. Representative quotations were selected to illustrate each theme while maintaining a low-inference, descriptive focus. Findings are presented thematically using participants' language to retain authenticity and minimise researcher interpretation.[22,30] Each theme is illustrated with direct quotations to reflect both individual and shared experiences.

Results

A total of 78,842 words of interview transcripts were analysed, and three overarching themes and 14 sub-themes were developed (Table 2). The athletes described a range of strategies used to manage cycle-related symptoms (Table 3), including cycle and symptom tracking, nutritional supplementation or modification, and situational adjustments. However, these strategies were limited in scope and consistency, and their use was influenced by multiple contextual factors. Moreover, participants reported limited symptom-specific management options and variable levels of support from coaches, sport science staff, and medical practitioners.

Theme 1: factors influencing individual management

All athletes ($n = 9$, 100%) discussed cycle-related symptoms, for example '*I get really bad PMS [premenstrual syndrome] and bloated before my period'* (P1), and *'I struggle a lot with premenstrual cycle symptoms. I have a lot of tension in my breasts which is very uncomfortable on the bike, like…it's painful'* (P4). Moreover, participants provided insight into the discomfort and challenges many of these symptoms presented when training and competing:

> *The sensations of feeling anxious and irritable and feeling like I was gaining water weight or like, bloating…my breasts have definitely gotten bigger and are really tender sometimes for a couple weeks and it's really uncomfortable (P5).*

Symptoms were typically reported to be worse in the lead up to and during menstruation, with one athlete explaining '*I get stressed or cry about random things. And my brain has a negative outlook on things. And then suddenly I start my period and I feel so much better and I have a really positive outlook on things'* (P9). However, all athletes reported that their experiences changed across each cycle, with symptoms varying in severity, for example '*Sometimes I don't really feel symptoms that badly, and then some periods I'm just exhausted and it hasn't necessarily been after a big block that it's worse or better. I actually I think it's just completely random, to be honest'* (P6). In one case, the variation in symptoms was in relation to menstrual irregularity:

> *I particularly would have bad symptoms if there were larger gaps between my period, and so my cramps would worsen, my fatigue levels would worsen, and my heavy legs would worsen. A few examples in particular, when I was working towards the year leading up to World Champs, I would be able to swim at around threshold pace, 65, 66 s for 100 meters, and days before my period I would go all out, max, and I would not be able to go faster than 1 min 17 s (P2).*

For one athlete, symptom severity prevented her from training altogether; '*Sometimes I just can't train: not because I'm in pain, but because I'm just tired'* (P2). Athlete responses indicated a lack of management strategies being implemented, with most reporting they were not aware of how they could reduce their symptoms, especially relating to bloating and breast pain. This was highlighted specifically by one athlete, stating '*With my breast pain, like I'd love to have a better understanding, or if I could take something that would make my breasts not swell and hurt, that would be awesome'* (P5). A further barrier to management was highlighted in relation to anti-doping regulations:

> *I was always quite unsure what to do about it [breast pain]. My gynaecologist said to take some herbs, but I never did because*

Table 1. Participant details.

Participant identifier	Age (y)	Hormonal cycle status	Sport	Years competing	Highest level of senior competition	Tier[28]
P1	36	Natural MC	Rowing	20	Olympic Games	4
P2	28	Natural MC	Open water swimming	18	World Championships	4
P3	21	HC use (OCP)	Sailing	15	Olympic Games	4
P4	25	Natural MC	Road cycling	11	World Tour	4
P5	32	HC use (IUD)	Biathlon	12	World Championships	4
P6	24	Natural MC	Road cycling	3	World Championships	4
P7	31	Natural MC	Road and track cycling	15	Olympic Games	5
P8	33	Natural MC	Road cycling	5	World Tour	4
P9	25	Natural MC	Distance running	9	World Championships	4

MC = menstrual cycle; HC = hormonal contraceptive; OCP = oral contraceptive pill; IUD = intrauterine device (Mirena coil).

when you're an athlete it's quite strict which medications you can take…and herbal things (P4).

Four athletes discussed the negative impact of stress on symptoms and symptom severity, with one athlete sharing '*I can feel my symptoms before my period, sometimes when I'm more stressed or when I do a lot of things, or when I have a lot of training*' (P4), whilst another athlete highlighted that physical (e.g., illness or training demands) and psychological stressors caused her cycle-related experiences to be worse (Table 2, theme 1, Stress, P9). Stress was also reported to influence menstrual dysfunction, with one athlete identifying an impact of cumulative stress due to busy competition schedules and team dynamics:

In some teams I've had a lot more stress than I have in other teams… in 2023, it [my menstrual cycle] started to not be so regular… because I raced in Australia, I raced Tour de France and a lot of things that can affect the cycle, and then last year it was a lot of stress mentally, which I think also affected it (P8).

Menstrual irregularities were frequently reported in this elite athlete cohort, with three participants describing experiences of undereating for their energy demands and negative effects on their menstrual health. An additional five athletes mentioned experiences of irregular or no periods, linked with the high energy demands associated with their sports:

I was not eating enough. I was always grumpy. It was just an unhealthy relationship. I think socially as well, I remember going out with my friends and I just wasn't eating or telling them that. I think that was all before I saw the nutritionist who helped me figure it out, like you can actually eat and still be a lightweight rower (P1).

One athlete shared her increased awareness of fuelling for energy demands and avoiding menstrual irregularities, *'I'm very on it, like with my nutrition, because I have quite a fast metabolism so I just know I have to eat a lot to meet the demands. So it's something I'm conscious of because I'm like, OK, even if I'm not hungry I'll still have this snack and having foods at the right time as well*' (P9).

For some of the athletes bleeding was one of the most difficult cycle-related symptoms to manage; '*The bleeding was terrible. It was a nightmare'* (P4). In two instances athletes reported ineffective management of bleeding; '*I did some running training and it [blood] would just, like, run down my leg or in the night all my sheets would be really, really, really bad'* (P4), and '*I was so heavy [the bleeding]. That's why it was literally, like, within an hour I had to change my tampon like four times or I'd leak through every time'* (P9). Heavy bleeding was not experienced by all athletes, with some indicating little inconvenience, such as '*I don't really struggle with that [bleeding] because they [my periods] only last three days and they're not that heavy. So actually I find the symptoms harder than managing the actual bleed'* (P6).

To manage bleeding, athletes discussed several strategies and products to support training and competition. Decisions were informed by issues related to environmental sustainability, product effectiveness, comfort, and accessibility. Despite these strategies, the athletes frequently reported a lack of awareness or information provided about alternative products, usually discovering different options over time. For example, one athlete recounted '*I didn't use tampons until maybe in my late twenties when I discovered [them]*' (P1), and another explained:

Eventually in my twenties I started using a cup rather than tampons. And firstly, it's so much nicer for the planet. It's so much nicer for your body in terms of toxins, so much less painful and also less leaking, for me personally there are no downsides to it in comparison to what I was previously using. But I didn't

Table 2. Overarching and sub-themes for cycle-related symptom management of international female athletes.

Overarching theme	Sub-theme	Example quotations
1. Factors influencing individual management	Symptoms	I find it really difficult to train and wear a sports bra because it hurts, and then with my heart rate monitor underneath as well, I find that makes it a lot more uncomfortable. Both training and competition, just having a sports bra on in general when my boobs hurt is really uncomfortable. (P6)
	Stress	Stress-related things make my periods so much worse, whether that is illness or psychological stress or that kind of thing. Whereas […] if I've trained super hard […] I feel like that's more when it [my period] stops. Stress more, like, makes it worse. So I've identified those things, which is good because I can be prepared. (P9)
	Menstrual irregularities	I really don't think I ever understood the importance of actually having a menstrual cycle as an important marker of health […], and being able to see changes or missing periods as a marker of relative energy deficiency or an eating disorder […]. There was definitely a culture within swimming of, oh, it's so convenient when I miss my period. (P2)
	Bleeding	Honestly, you put an extra extra extra large tampon in the start of the day and luckily our kit is black and you just live with it for the day. Basically, you can't really do anything else. Like I said, sometimes you don't even have a loo. You have to just like, squat somewhere. So yeah, the infrastructure isn't great for that side of things. (P6)
	Menstrual product considerations	Maybe four or five years, I used a menstrual cup. Which personally is my absolute favourite. I just use a menstrual cup and no pads, because I'm still not a pad fan. I think for me it's nicer for the environment because my bleeding was so heavy that it was so many products. So I was like, oh, that's horrible. I also actually have a lot less pain with the menstrual cup. (P4)
	Hormonal contraception experiences	I probably wouldn't go back on hormonal contraception. Now, personally for me, the downsides of not being in tune with my own cycle, as annoying as symptoms are, the fact that I need to know what's going on with it [my menstrual cycle] is a really important health marker for me. (P2)
	Tracking	The Oura ring has been game changing for helping me understand what is going on because sometimes you just think it's in your head… I think that is what would really frustrate me and I'd be like 'is something wrong, am I ill or am I just, like, why am I so up and down, why do I feel so tired'. I kind of feel it validates how I feel, which I think is important, 'cause I'm someone that likes reassurance and stuff like that. (P9)
2. Sociocultural and environmental factors	Training environment	I had the example of what not to do, you know, in terms of having teammates who had really bad eating disorders. I could see how that was impacting them and then it was a motivator to maybe, you know, not go down that road. (P5)
	Support network	I've talked a lot with teammates, I think that was maybe the second biggest help to talk with women that had similar experiences or different [experiences], and what they thought actually helped me more than the doctor because they were like, you could try this. This really helped me. (P4)
	Education	I feel just general understanding of what's normal and what's not normal would be helpful for people to be able to have better autonomy over their body. (P9)
3. Sport science, medicine and coaching support	Training adjustment	I think there's some really cool ideas out there, like train with your hormonal cycle so that you can better adapt to your training… that sounds great. But at the end of the day our schedule dictates the training more than my body's internal rhythms and so I wouldn't say I've made any major changes. I wouldn't even say I've taken a day off if I've had really bad symptoms or anything like that. I just kinda push through it. (P5)
	Coaching and support staff	S&C [the strength and conditioning coach] at that school was a male, and he had more awareness and was happy to talk about it compared to my Olympic team, like, what? How does that even make sense? (P3)
	Medical doctors	There I get a lot of support or I can have a lot of support if I chose to, I can do blood work on a regular basis, which I do. (P7)
	Mistrust in support staff	I was just at that point I had zero trust in her [the team doctor]… I was just like, this is great, I know that you want me to go on the pill, but I honestly don't trust you. (P3)

Table 3. Cycle-related symptom management strategies discussed by the athletes.

Management strategy	Example quotations
Adjusting training	I try to see what kind of symptoms or how my cycle was compared to what it said in the literature. My coaches have never planned my training around my cycle. It's more that I might have an understanding why I do feel a certain way, so it's not like the planning of the training is different. It's more like, depending on how the cycle is affecting me, we adjust the training. (P8)
Downtime	I think I'm a bit more precious of my time when I'm in my mood, because… when I feel like that I need a bit more chill time to myself. So rather than over booking myself with social stuff I'll have, like, this weekend I just want to do one thing with my friends and I want to watch movies or, you know, just have a bit more time to myself. I feel like that's something that helps. (P9)
Hormonal contraceptives	I actually think the pill not only helped those symptoms, but it completely erased like all of my symptoms. (P3)
Hot water bottle	A lot of hot water bottles. (P4)
Journalling	I journal a lot and I realise that I journal more when I'm feeling angsty…so journalling helped. (P1)
Mental reframing	It's not that I'm demotivated. It's, I actually can't today, and that my hormones are causing this and that and actually me being here is a victory and I'm going to take what I can from this, even if it's not what I want from this, and actually that mental reframing would not be possible without me understanding my symptoms. (P2)
Movement	I think movement helps, I go out and for a walk, so anything to do with being active always eases the pain…if I get lower back pain I'll do stretching and stuff like that. (P1)
Nutrition and supplements	In terms of the symptoms, when I'm getting bad cycles, I focus a lot on anti-inflammatory foods. (P9) I started taking creatine 'cause I heard it could help some of the symptoms. I think I could do much more. (P7)
Pain medication	A lot of pain killers, mostly ibuprofen and paracetamol. (P4)I certainly think that if I was having pain, I would medicate it. (P5)
Period products	Now I use period panties. If I'm racing and I know it will be like a long race then I put in a tampon. (P8)
Physiological monitoring	The second half of the cycle, my heart rate is three to ten beats higher, the resting heart rate in the morning, and especially the week before. It's between like 40 and 45 and rather high and I just try to listen to that and if it's like 48, I know, OK, it's a lot going on. So even if I don't feel something, I just know that if I push too hard now, I will be sick. (P4)
Sleep	I try and get better sleep, but I'm always just, my sleep is really light, like in the days leading up to my period, just fidgety. I can't really get to sleep, I wake up in the night. I try and get to bed earlier and prioritise sleep and sort of do everything to try and optimise my sleep. Having less caffeine before bed or yeah, just getting more time in bed. (P6)
Sports massage	If I'm bloated, I'm like super bloated and especially with all the travelling I did last year, sometimes my legs will swell up and I saw a physical therapist, and also masseuse, like a sports massage therapist almost every week just to get, you know, my body going. (P1)
Tracking	Yeah, I definitely have an approach of trying to be more proactive about it [tracking] because I think that's what I found has helped the most; it's not so much doing things in the moment, but it's the things I do before. From my menstrual cycle tracking, when I get to day 15 or something like that or if I start to see a body temperature increase, I start to be more proactive about things. So I try to help reduce the effect of symptoms those couple of days before my period. (P9)

know it existed. I just kind of, everyone else around me just did something else, and I just kind of followed what they did (P2).

Additional factors such as access to products in different locations worldwide affected the choice of menstrual products for bleed management; '*I prefer using organic tampons, but in London you can just pop into any shop and you'd probably find them. Whereas at home, you have to go to like a health food shop…I'd say in terms of your choice, you're a lot more limited'* (P6). Also, individuals presented varying barriers to using certain types of products, for example in cycling one athlete shared, '*It [the menstrual cup] works well and it holds more blood I think, and I don't have to change so often. I have less problems with yeast infections because we're always sitting in those moist shammies [chamois], and a tampon doesn't help. That's a good thing'* (P7).

Two athletes (Table 1, P3 and P5) were using hormonal contraception at the time of interview, whilst others referred to experiences during previous use. Perceptions were mixed in terms of hormonal contraceptive use for managing cycle-related symptoms. For example, '*It [the NuvaRing] helped me a lot. I think that was the first time it [experience of symptoms] was better. My weight was more stable because before I could gain 5 kilograms and lose 5 kilograms in two months or something and my symptoms were mostly really heavy pain and really strong bleeding before, and after [hormonal contraceptive use] it was quite calm'* (P4). By contrast, another athlete recounted:

I first tried taking hormonal birth control like the pill at high school […], I remember that just making things way worse. So then I remember going to the NuvaRing which was, like, a lower dose hormone option and I remember that being a little bit better, but still feeling like my PMS was really bad. I think for me I struggled a bit with feeling depressed as well as anxious and I think it increased those feelings… I started with the copper one and I bled so much, like, I didn't stop bleeding. I bled for like 6 months. I would be bleeding for like a week of the month and so my iron levels were affected, because I was losing a lot of blood (P5).

Three athletes shared their concerns around using hormonal contraceptives because of masking underlying health issues or not being able to 'check in' with their body. This was exemplified in Table 2 (see theme 1, Hormonal contraception experiences, P2), with further examples offered:

I know a lot of cyclists who take hormonal contraception and then, it's not your natural cycle so you don't know if your hormones are balanced… so I think maybe hormonal contraception also sometimes it doesn't tell you the full picture (P6).

I just remember being surprised hearing that people would use the pill to, basically, if they weren't getting a period to make them get a period, to me that seems a really backwards way of solving a problem. Like the problem of what could be REDs [Relative Energy Deficiency in Sport] or low energy availability and that you would, you know, you're treating the symptom rather than treating what could be an underlying problem. I was just always really surprised when hearing about people doing that. I know it's pretty common now (P5).

Eight of the nine athletes reported tracking at least one component related to their cycles, including cycle length, bleeding start date, bleed duration, symptoms, body temperature, heart rate and/or recovery scores to help with individual management of symptoms. For example, '*I would track when my periods were, how long they were and my symptoms leading in and during. I wouldn't track things every single day. I couldn't be bothered with that frankly, but actually starting to track helped me to pick up on those signs'* (P2), and '*I did use it [the tracking app] to see if I'm going to have my period during the races. I think it's useful to know so it doesn't come on unexpectedly'* (P1). Mobile applications (apps) were most frequently reported for tracking, with one athlete sharing the benefit of using an app compared to journalling.

I feel like I didn't know how to use a journal, except to see when your next period is. But right now with apps you track like how your symptoms are, 'cause I remember not writing my symptoms down, so the apps help you know when your symptoms are and your phases of the cycle, which is very helpful. I guess sometimes the apps also tell you, like, this is what you should eat during this time of the month, which I find really helpful (P1).

Additional devices were used to track body temperature, heart rate and recovery. Three athletes shared their experiences of using these devices, for example:

I find it interesting that a lot of the time around my period, my Whoop recovery score is super low…I think they use a couple of metrics to determine your recovery score and actually always on the three days before my period, my Whoop score is in the red. So really badly recovered, which I actually found really interesting that it reflects that (P6).

One athlete, however, did share some uncertainty with these devices in relation to accuracy of data to inform management strategies:

I have the Oura Ring to measure heart rate and [it] also measures temperature, but I am not quite sure about this, I always have the feeling it works in the off season when I'm in one place, but when I travel a lot of it is a little off (P4).

Theme 2: sociocultural and environmental factors in sport

The athletes sampled in this study had different experiences of cycle-related symptom management depending on sociocultural and environmental factors (participant IDs have been selectively omitted to protect athlete anonymity). Training and competition environments were prominent within discussions but there were variations in whether female health experiences had been positive or negative. One of the cyclists shared, *'I think that teams are aware of it [menstrual health] and are really proactive with making sure that their riders are healthy, but I don't know if that happens all the time. I'd say that it [the menstrual cycle] needs to be spoken about a lot more, and I don't think it's spoken about enough'* (P6). Another cyclist recounted that *'It [my menstrual cycle] has been affected by different teams and environments'* (P8) while P1 expressed negative experiences of female health in rowing.

Team environments and travel influenced the implementation of management strategies, with one athlete describing nutritional advice she had received but had not put into practice, '*We can ask our team to give us specific things, but usually I don't want to be a pain in the ass because sometimes we are really in the middle of nowhere and they also have to find it, [they] have a lot of work already. So I never want to ask them and I'm vegetarian, so I already think my God, they have to make special food for me already'* (P4). One athlete also experienced challenges related to competition environments and accessing facilities to manage bleeding, '*Unfortunately, a lot of the times when we race in Africa, it's honestly that if you have your period*

on race day, it's just a nightmare. You have one porta-loo for about 60 athletes and that, like, managing it over there I'd say is a struggle'.

Two athletes shared the importance of teammates in their training environment to have conversations with and feel supported when managing cycle-related symptoms, for example '*I feel like mostly my conversations and support has come from my teammates. I feel I've been really lucky to have teammates that do talk about it [the menstrual cycles] at times, especially at kind of important times in my career, there were people that talked about it'* (P5). Partners and families were also mentioned in the context of support networks, with one athlete commenting '*I think it's helpful to have a husband who reminds me, like, OK, you're acting this way because of this [your menstrual cycle], having someone who understands definitely helps'* (P1), and another athlete reported '*I speak with my parents about my menstrual cycle a lot, so we try to just search information with my parents sometimes'* (P4). The same athlete shared how her mother had encouraged her to track her cycles and seek support from a doctor; '*My cycle was really not regular, like, I had a diary and remember sometimes it was 74 days, 86 days because my mum, since I was young she always said track your cycle, write it on the paper'* (P4).

In some instances, a lack of education and information within society had a negative effect on cycle-related symptom management. For instance, '*There was not any education from the teachers or schools or my mom. I honestly, I don't even know where I learned all these things'* (P1). Another two athletes expressed their opinions on the lack of knowledge and education about cycle management, for example:

> *The knowledge is the power, right? The knowledge, like, understand your own body and what it's going through, and why it's behaving the way it is and that is something that no one taught me, that I mostly figured out myself and from other people on social media, frankly. And, like, I don't blame anyone in my life for not being able to give me this knowledge because they didn't have it themselves. Like, my mum and my aunts and my grandma weren't tracking their cycles on an app, they didn't have this knowledge either. And yeah, it's frustrating* (P2).

Similar reflections were outlined from sociocultural perspectives, with one athlete recalling '*I think education is important, I'm not sure what the situation is like right now but growing up, culturally, you didn't talk about it [the menstrual cycle]',* and another providing contrasting experiences from two different environments:

> *You don't talk about it as openly. I've been in the UK for uni, but I go back and forth quite a lot… I'd say I'm definitely more comfortable in the UK, like when we travel with the national team I'm definitely not as comfortable as when I'm around people here [in the UK]. So you know, talking about it [the menstrual cycle] and if I went to a race with my team here [in the UK], I'd feel a lot more comfortable talking about it compared to being around my home national team.*

One athlete recognised a shift in terms of the taboo and awareness of the menstrual cycle with increased education:

> *I think it has become less stigmatised and people, not only female athletes but professionals around the whole of cycling are more aware and treat it more maturely than 10 years ago. I think personally I've changed a lot and my perspectives have changed a lot over the last 10 years. Ten years ago I didn't know a thing about my menstrual cycle. I just knew that it was annoying, but nothing more. And that has changed* (P7).

Despite positive developments in awareness, a conspicuous absence of cycle-related symptom prevention and management strategies remains.

Theme 3: Sport science, medicine and coaching support

Symptom management was discussed in relation to the training process and competing, with one athlete explaining:

> *The three days before my period I feel terrible, I know at the start of the session if I can't do it mentally, and I'm just so unmotivated. So I'm like, OK, instead of doing it badly let me just take an active rest day or do something else and then two days later, I just do the session then instead of missing the session* (P6).

However, there were mixed approaches in terms of training adjustment versus 'pushing through', and how these strategies were communicated between the athletes and their coaches. For example, one athlete reported, '*When you have 60 races, you can't really train a lot around your cycle because you are just racing'* (P4), while another stated '*Oh, it's basically down to me, I think there are resources [online] if you search for them [to help inform training adjustment] but yeah, it's mostly just me'* (P7). Input from coaches to support training adjustment was varied, with one athlete offering a more collaborative approach:

> *Eventually we [me and my coach] learned to knock off the intensity, go long, go slow, stay in the water. Because actually, my symptoms, such as cramps, would always feel better when I came out of the water than before I'd gone in, but there was no point in trying to go hard* (P2).

Positive experiences of supportive (male) coaches were also shared, '*I was really lucky to have a really supportive coach*

who had also been through a lot with me already, like a lot of injuries, a lot of illnesses. He really knew me very well' (P2), and '*I think when I start complaining, he's just like, he gets it pretty fast, and we've been together so long that he's trained me, been with me since I started cycling. So, like, it is actually really nice in that sense that I can be so open and that has really helped as well'* (P6). However, these experiences were not consistent, with two athletes feeling that their coaches would make incorrect judgements or perceive cycle-related symptoms as an excuse:

> *It's a funny topic with male coaches. Of course we can tell our national coach, for example, oh today I feel bad because I got my period, or I will have my period in two days. I always feel like the coach thinks it's an excuse. We want to be good, and we want to train properly. It could be less stigmatised* (P7).

Working with support staff to help manage cycle-related symptoms was mixed, as highlighted in Table 2 (see theme 3, Coaching and support staff, P3), while one athlete described a positive example of combined support from a nutritionist and online sport science information; '*I would change my diet leading up to it [my period] a little bit, I did feel like it helped. I would do that with a combination of help from my nutritionist at the time, and also I used to have the FitrWoman app, and I didn't really use it to track my cycle because I didn't really like it for that, but I did really like it for the cycle related recipes*' (P2).

Experiences of receiving support from medical doctors were also mixed. One athlete account was highly positive; '*Now actually we have a team doctor. He's a gynaecologist, he speaks a lot with us about this [the menstrual cycle]… Personally, I think he is a really good team doctor because he always checks in when you had your period, it's really helpful'* (P4). Furthermore, advice on the use of hormonal contraceptives to prevent bleeding during competition had been well received, which was considered unusual in this athlete's specific cultural environment:

> *I remember talking to a sports doctor about trying to change my cycle so that I don't have my period when I'm racing, because it's uncomfortable when you have your period and sitting on a boat, and he was the first one who, like, kind of… asked me if I'm interested in taking the pill in [my home country]. We don't take the pill, like, no one talks about it* (P1).

Unfortunately, there were examples of mistrust in the information medical doctors provided, as indicated in this response:

> "*Do as much as you want [back to back pill packets]" is literally what I was told and I ended up having, like really really bad stomach pain for a while and after seeing six doctors, someone finally told me, or worked out, that I had an inflamed ovary, and it being the combination of being on the pill for a while and not having enough full breaks from it. And I'd been on it for maybe five years at that point as well. It took six doctors to work out what's going on. I was in so much pain that I couldn't walk when it was at its worst, and it was a really simple fix, I just stopped taking my pill, and then, when I started taking it again, I was really careful about being really diligent with making sure I always had full breaks, no matter how inconvenient they were to me. I found it absolutely gobsmacking that I had taken something, and I was medically advised, and ended up really poorly. I think some of that is on me, right, like some of it is educating yourself about the medicine you're taking. But some of it is, like, you trust your medical professionals, and there's so little good information out there about women's health* (P2).

One individual shared their disappointment more broadly, which indicates a high degree of inconsistency in how international athletes experience menstrual health support; '*What I find astounding is the lack of awareness or action on the part of the support team. Like, we're in an Olympic level institution'* (P3).

Discussion

The purpose of this study was to examine menstrual and hormonal contraceptive cycle-related symptoms and report management practices of international female athletes, and the contextual factors influencing these practices. Overall, a variety of symptom management strategies were reported (see Table 3 for a summary), but experiences varied individually and were influenced by sociocultural and environmental factors. Management strategies were often reactive and inconsistent between and within athletes and aimed predominantly to alleviate physical rather than psychological symptoms. Moreover, support from coaches varied, with some athletes describing collaborative training adjustments and others a 'get on with it' approach. Similarly, sport science and medical support varied, with mistrust highlighted as a concerning observation. Symptom-specific management strategies were lacking, seemingly due to limited knowledge of effective options.

Previous research has outlined the prevalence and severity of cycle-related symptoms in female athletes, with pain, fatigue and mood changes commonly reported as severe.[11,32] Symptom management has predominantly been self-directed, with individuals often using pharmaceutical approaches. For example, Kiemle-Gabbay et al.[32] reported that 83 of 225 female athletes used hormonal contraceptives to manage symptoms, and 28 used them to delay or suppress menstruation for important events. Furthermore, NSAIDs were used by 230 of 325 athletes for menstrual pain relief, alongside non-pharmaceutical strategies such as heat, which was used by 336 of 436 athletes.[32] In the present study, pain management was most consistently addressed through hormonal contraceptive

use. While some athletes reported effective pain relief with analgesics (e.g., P4 '*A lot of pain killers, mostly ibuprofen and paracetamol'*), experiences with hormonal contraceptives were mixed (e.g., P2 '*I probably wouldn't go back on hormonal contraception'* versus P3 '*The pill… completely erased all my symptoms'*). Several athletes described adverse effects of hormonal contraceptive use causing increased symptom burden and challenges with ongoing bleeding. These findings align with prior research reporting mixed responses to hormonal contraception within female athlete cohorts[33] and highlight that this strategy is not an effective symptom management option for all athletes.

Non-pharmaceutical strategies reported in the present study varied widely between athletes. Movement, such as low-intensity exercise and stretching, were reported for menstrual cramps or lower back pain, whilst nutritional modifications (e.g., focusing on anti-inflammatory foods) and supplementation (e.g., creatine use) were mentioned to help manage symptoms. Inflammation has been proposed as a potential mechanism underlying some cycle-related symptoms, supported by associations between high-sensitivity C-reactive protein (hs-CRP) and pain, bloating, and breast tenderness.[34] As a result, anti-inflammatory dietary approaches have been extrapolated into practice, despite limited direct evidence in athletes. While not athlete-focused, a systematic review of nutritional interventions highlighted no negative effects on menstrual cycle symptoms, with some micronutrients (e.g., turmeric and vitamin D) showing a positive effect on symptom severity.[15] Furthermore, a recent systematic review of randomised controlled trials has shown that physical activity, nutrition and other self-management strategies may effectively alleviate menstrual cycle symptoms.[13] These reviews suggest that a 'first, do no harm' approach[35] may be useful when considering practical symptom management strategies in sport contexts.

Overall, scientific evidence supporting the effectiveness of non-pharmaceutical strategies to reduce symptoms remains inconsistent. This appears largely due to variability in methods to determine symptoms and inconsistent doses and durations of treatments, with nutritional interventions also not adhering to dietary reference values or safe upper limits.[15] Strict anti-doping regulations are an important consideration in elite sport and may influence what nutritional strategies and supplements are safe and viable options for symptom management. Female athletes have previously been reported to rely on trial-and-error approaches,[11] which is perhaps unsurprising given the complex and multifactorial contributors to cycle-related symptoms, including biological, behavioural, and contextual factors.[34] Nevertheless, the present study highlights a pressing need to better inform athletes and support staff about available symptom management options that are based on scientifically sound mechanisms and do-no-harm principles. Moreover, appropriate athlete support should be in place when trialling strategies in practice.

Management strategies reported in the current study were predominantly implemented to reduce physical symptoms and focused less frequently on psychological and social symptoms. While multiple athletes reported the negative influence of stress on cycle-related symptoms, few strategies were mentioned to manage or reduce stress. One exception was the example provided in Table 3, where one athlete (P9) reported proactively seeking downtime (*'rather than over booking myself with social stuff… I want to watch movies or… just have a bit more time to myself'*). Likewise, few management strategies were implemented in relation to contextual factors, such as the negative effects of competition and travel on symptoms, or the challenges associated with bleed management in certain environments. These findings show that critical psychosocial factors are currently being overlooked in terms of providing holistic support to elite female athletes from a symptom management perspective.

Cycle and symptom tracking was common practice amongst athletes in the present study and was described as a means of increasing self-awareness and understanding symptom patterns, which is consistent with previous findings in high-performance athletes.[4] However, increased awareness did not consistently translate into actionable symptom-management strategies. Notably, symptoms such as bloating and breast pain were frequently described as difficult to manage, with athletes reporting limited knowledge of effective options. These findings suggest that tracking alone is insufficient without parallel knowledge, education and applied support to guide implementation of management strategies. Research has advocated for an athlete-centred approach, and female athletes have expressed a desire for supportive sports environments with meaningful discussions about cycle-related symptom management.[11] Consequently, there is a need to pursue further research on evidence-based management options that address the full array of biopsychosocial symptoms to inform applied practice, whilst also considering sociocultural environments and support.

In the absence of structured support from coaches or practitioners, athletes often sought informal support from teammates, friends and family members. Peer support primarily focused on practical aspects of bleed management, including recommendations for menstrual products. Similar patterns have been reported previously in elite sport, where teammates are key sources of support for coping with menstrual cycle challenges.[4,9] While peer support may address immediate practical needs, it does not substitute for evidence-informed guidance on symptom management. Medical support was reported to vary in the present study and despite some positive experiences, the negative experiences cannot be ignored; for example, a gynaecologist prescribing herbs for breast pain, leading to anti-doping concerns (P4), and a doctor prescribing back-to-back contraceptive pills, resulting in debilitating health outcomes

(P2), were striking. Poor menstrual health awareness among coaches and practitioners compromises the quality of support that can be provided to elite female athletes, who have previously reported feeling frustrated and dissatisfied at receiving contradictory and uncertain advice.[36] By contrast, informed support staff and a strong coach-athlete relationship can help to optimise training outcomes (e.g., '*Eventually we [me and my coach] learned to knock off the intensity, go long, go slow, stay in the water. Because actually, my symptoms, such as cramps, would always feel better when I came out of the water than before I'd gone in'* (P2). Therefore, menstrual education and effective communication is required of all stakeholders, including athletes, coaches and practitioners.[37,38]

Access to menstrual products and openness of discussion varied across countries and cultural contexts, which was noticeable for these international athletes who experienced training and competing in a variety of locations (e.g., '*If I went to a race with my team here [in the UK], I'd feel a lot more comfortable talking about it [the menstrual cycle] compared to being around my home national team'*, and '*A lot of the times when we race in Africa, it's honestly that if you have your period on race day, it's just a nightmare'*). Stigma and silence shape communication and access to support within coaching and medical environments.[39] Moreover, sociocultural factors—such as access to facilities and healthcare, gendered norms, perceptions of menstruation and lack of social support—may influence cycle-related symptom management amongst athletes from diverse cultural backgrounds.[40] These effects remain largely underexplored in sport research.

Strengths and limitations

Existing research has shown the prevalence[1,2] and perceived negative effects of cycle-related symptoms on training and sports performance,[7,8] but this is the first study to highlight symptom management strategies currently being used by international female athletes and contextual factors relating to the individual, their environment and support structures. This holistic approach, together with the calibre of participating athletes, are strengths of the current study. The sample comprised international-level (tier 4–5) individual female athletes representing aerobically-dominant outdoor sports, which although may limit transferability to other sport contexts (e.g., team, power and indoor sports), the results provide in-depth insight into a unique and understudied population. The sample may be biased towards athletes who currently implement cycle-related symptom management strategies, as they may have felt they had information to discuss compared to athletes who currently do not implement any management strategies. Therefore, cycle-related symptom management across the entire tier 4–5 female athlete population may be more limited than the findings in the current study imply. Junior and pathway (i.e., development-level) athletes were not included, as the study aimed to describe current practices among the best in the world (e.g., senior international and Olympic competitors). Future research could examine whether younger or lower-tier athletes, and athletes from other sports and cultures, adopt different approaches to cycle-related symptom management.

It should be highlighted that a male researcher (SS) was involved in conducting the interviews, which may have created some discomfort for the female athletes when disclosing personal information relating to their hormonal cycles.[7] To mitigate for this, we asked the participants in advance whether they felt uncomfortable discussing these topics in the presence of a man (which they did not), and we included a female researcher (NB) in all interviews. We could have chosen not to involve a male interviewer, but this would have been a sex-based decision unrelated to expertise or experience. Given the openness displayed by the female athletes during the interviews, the mixed-sex dynamic did not appear to influence or limit the degree to which the participants shared their experiences.

Conclusion

This study provides unique descriptive insight into how international athletes currently manage cycle-related symptoms in high-performance sport contexts. Importantly, while symptom awareness and cycle tracking were common, these practices did not consistently translate into proactive or symptom-specific management strategies. Athletes often relied on pharmaceutical pain management for physical symptoms and demonstrated insufficient strategies to manage psychosocial symptoms or specific symptoms such as breast pain and bloating. The findings also highlight the diverse individual, sociocultural and environmental considerations that influence symptom management, and the importance of coach support and practitioner expertise. Collectively, these results indicate a considerable gap between awareness and actionable processes, underscoring the need for applied research that examines safe, feasible, evidence-informed cycle-related symptom management strategies within elite sport environments that are considerate of contextual factors.

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Ethical considerations

This study was approved by the Swedish Ethical Review Authority (ref. 2024-04373-01).

Consent to participate

Written informed consent was collected from each participant prior to data collection.

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Supplemental material

Supplemental material for this article is available online.

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