



Menstrual cycle perspectives in elite Indian female badminton athletes and coaches: A qualitative focus group study

Tanugatri Majumder^{1,2} , Dola Saha³ , Dionne A Noordhof⁴ ,
and Øyvind Sandbakk^{5,6}

Abstract

Objective: To explore how elite Indian female badminton athletes and their coaches perceive the menstrual cycle (MC), its influence on training and performance, and the communication dynamics surrounding it, using focus group discussions (FGDs).

Methods: Eight elite female athletes and six national-level coaches from three premier Indian badminton academies participated in separate FGDs. Discussions were moderated by an all-female research team, audio-recorded, transcribed verbatim, and thematically analysed using an inductive approach.

Results: Five themes emerged: (1) perceived relevance of the MC in elite badminton in India, (2) influence of MC on training and performance, (3) MC-related practices and integration into training planning, (4) communication dynamics around the MC in training settings, and (5) personal reflections through lived experiences. Athletes acknowledged phase-specific changes in physical and emotional states but reported persistent discomfort discussing the MC with male coaches. Coaches demonstrated growing awareness but limited phase-specific understanding and tended to equate the MC with the bleeding phase. Across both groups, “open conversation” emerged as a shared indicator of progress toward destigmatization.

Conclusion: Despite increasing awareness, the MC remains under-discussed and under-integrated into training systems within the Indian elite badminton community. Findings underscore the need for structured MC education, trust-based communication strategies, and individualised training modifications. Embedding these within high-performance environments may promote athlete well-being, equitable communication, and sustainable performance.

Keywords

Communication, fatigue, health, mood, pain, racket sports, training capacity, trust

Reviewer: Richard McGrath (University of South Australia, Australia)

Introduction

Pursuing excellence in Olympic sports such as badminton requires physical, technical, and psychological capacities.^{1,2} For female athletes, performance may also be influenced by menstrual cycle (MC)-related experiences, as many report fluctuations in energy, mood, concentration, and training capacity.^{3,4} Notably, MC-related performance effects vary widely across the literature; a recent review⁵ reported substantial inconsistencies across studies, with the proportion of athletes perceiving negative effects ranging from 3% to 100%. These disparities likely reflect both inter-individual biological variability in MC experiences and methodological heterogeneity, alongside recall bias and contextual differences across cultural settings. Despite the growing recognition of its perceived impact, the MC remains an under-discussed and often stigmatised

¹Department of Exercise and Sports Science, Manipal College of Health Professions (MCHP), Manipal Academy of Higher Education (MAHE), Manipal, India

²Department of Sports Science and Yoga, Ramakrishna Mission Vivekananda Educational and Research Institute (RKMVERI), Belur Math, India

³Department of Health Information Management, Manipal College of Health Professions (MCHP), Manipal Academy of Higher Education (MAHE), Manipal, India

⁴Centre for Elite Sports Research, Department of Neuromedicine and Movement Science, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology, Trondheim, Norway

⁵School of Sport Sciences, UiT The Arctic University of Norway, Tromsø, Norway

⁶Department of Physical Performance, Norwegian School of Sport Sciences, Oslo, Norway

Corresponding author:

Tanugatri Majumder, Manipal College of Health Professions (MCHP), Manipal Academy of Higher Education (MAHE), Manipal, Karnataka, India. Email: tanugatri.sportsscience.8@gmail.com

topic within elite sporting environments, particularly in socio-culturally conservative settings like India.⁶

Previous research indicates that female athletes often face difficulty discussing MC-related concerns with coaches, partly due to limited awareness and persistent taboos.^{7–9} In India, athletes have reported greater comfort communicating with female coaches^{6,10}; however, female representation within the coaching ecosystem remains limited. Currently, it is unclear how Indian coaches perceive, communicate about, and integrate MC-related considerations into training and competition planning within elite sport environments.

Badminton is one of the most widely played sports in India. Given the sport's widespread popularity and international success, especially among Indian women,¹¹ understanding potential MC-related challenges in the Indian badminton ecosystem is particularly relevant. Currently, little is known about how elite Indian badminton athletes and coaches perceive and navigate MC-related topics in high-performance environments.

The existing literature has yet to explore in depth how elite Indian female badminton athletes and their coaches perceive and navigate MC-related challenges within high-performance environments. While recent Indian studies have begun to document MC awareness, practices, and beliefs among female athletes more broadly,^{6,10,12} there remains a critical need to understand the lived experiences and training-related implications of the MC within the specific cultural milieu of Indian badminton. To address this gap, the present study employs a focus group discussion (FGD) approach to gather qualitative insights from both elite Indian female badminton athletes and coaches in India. FGDs allow for the exploration of sensitive topics in a safe and dialogic environment, helping to uncover nuanced perspectives that may not emerge through quantitative methods alone.¹³ Accordingly, this study utilises a dual-participant design involving separate FGDs to explore how elite Indian female badminton athletes and their coaches perceive the MC, its influence on training and performance, and the communication dynamics surrounding it.

Methods

Participants

A total of fourteen participants were recruited using purposive sampling, comprising eight elite female Indian badminton athletes (coded FA1–FA8) and six elite-level badminton coaches (coded C9–C14). The sample size ($n = 14$) was deemed sufficient based on the information power principles,¹⁴ whereby a more specific and information-rich sample aligned with the study aim requires fewer participants. Participants were drawn from three premier high-performance badminton training academies in India: Padukone–Dravid Centre for Sports Excellence (PDCSE),

Bengaluru, Pullela Gopichand Badminton Academy (PGBA), Hyderabad, and National Centre of Excellence (NCoE), Guwahati. All participants shared a common sport and performance level (international or national elite), ensuring a coherent context for discussion. All were proficient in English, allowing them to communicate effectively during FGDs. While each participating athlete had at least one of her current coaches in the coaches' FGD, not all athlete–coach pairs were directly matched; the coach group also included additional elite coaches from the same centres.

Female athletes. Athletes were eligible if they were 16–30 years old, had a minimum of five years of continuous professional training in badminton, and had competed in international tournaments in Under-17, Under-19, or Senior Women (open age) categories. Eight internationally competitive female badminton athletes (age range: 16–22 years, mean = 19.38 ± 2.37 years) took part. As of June 2025, six were ranked in the BWF women's singles rankings (ranging from World No. 85 to 976). Of the remaining two, one had been a top-10 athlete in the BWF World Junior Rankings, and the other had recently competed in the 2025 Yonex German Junior International.

Coaches. Coaches were eligible if they had over five years of experience training female badminton athletes at an international level and had coached athletes in Under-17, Under-19, or Senior Women (open age) categories. The coach group ($n = 6$; age range: 27–61 years, mean = 37.67 ± 10.38 years) consisted of five males and one female, each with six or more years of elite coaching experience. Collectively, their athletes had achieved elite success, including medals at events such as the Olympics, Badminton Asia Team Championship, and Lagos International Classics.

All participants provided informed digital consent. For athletes under 18, parental consent and athlete assent were obtained. Participants' details are summarised in Table 1 (athletes) and Table 2 (coaches). The study was approved by the Institutional Ethics Committee of RKMVERI, India (Approval ID: RKMVERI/IEC/DSSY/2024-06/002).

Methodology

The study was conducted in seven structured phases. Two separate FGDs were conducted, one with athletes and one with coaches, to facilitate open discussion within peer groups.

Phase 1: recruitment. Participants were recruited purposively based on the eligibility criteria described above. Eligible individuals were contacted through their training centers (via e-mail and phone) after institutional permission was obtained. The study's aims, procedures, and

Table 1. Characteristics of athletes (n = 8) participating in the FGD.

S.No.	Participant Code	Training details			Educational details			
		Age (years)	Years of Training in Badminton	Highest Level of Competition	Age Category of Participation	Educational Qualification	Physical Education / Sports Science Degree	Previous MC-related Workshop Attendance*
1	FA1	21	12	International level	Senior Women (Open Age)	In College	No	Yes
2	FA2	18	8	International level	Under-19 Girls	Completed Schooling	No	Yes
3	FA3	22	11	International level	Senior Women (Open Age)	Completed Graduation	No	Yes
4	FA4	17	6	International level	Under-17 Girls	In High School	No	No
5	FA5	19	9	International level	Senior Women (Open Age)	In College	No	No
6	FA6	22	10	International level	Senior Women (Open Age)	Completed Graduation	No	No
7	FA7	16	6	International level	Under-17 Girls	In High School	No	No
8	FA8	16	7	International level	Under-17 Girls	In High School	No	Yes

*MC-related workshop: Indicates whether the participant had attended one or more educational workshops, seminars, or awareness sessions on menstrual cycle prior to participation in the present study.

Table 2. Characteristics of coaches (n = 6) participating in the FGD.

S.No.	Participant Code	Sex (biological attributes of a person, typically categorized as male or female)			Trainee details			Educational details		
		Age (years)	Male	Female	Years of Training Female Athletes	Highest Level of Female Athletes Trained	Age Category of Female Athletes Trained	Educational Qualification	Physical Education / Sports Science Degree	Previous MC-related Workshop Attendance*
1	C9	61	Male		40	International level	U-17 and Senior Women (Open Age)	Completed Graduation	No	Yes
2	C10	27	Male		5	National level	U-17 and U-19 Girls	Completed Graduation	No	No
3	C11	45	Male		10	International level	Senior Women (Open Age)	Completed Graduation	No	No
4	C12	36	Male		9	International level	Senior Women (Open Age)	Completed Graduation	No	No
5	C13	38	Female		10	International level	U-15 and Senior Women (Open Age)	Post-Graduation Completed	No	Yes
6	C14	39	Male		8	International level	U-15 and Senior Women (Open Age)	Completed Post-Graduation	Yes	No

*MC-related workshop: Indicates whether the participant had attended one or more educational workshops, seminars, or awareness sessions on menstrual cycle prior to participation in the present study.

confidentiality measures were explained, and each participant completed a brief online form to provide demographic and background information (training history, education) and to confirm eligibility. Participants were reminded that participation was voluntary, and that pseudonyms (FA1–FA8 for athletes, C9–C14 for coaches) would be used in transcripts.

Phase 2: development of the FGD guide. A semi-structured FGD guide was developed based on prior research on the MC in sport,^{7,15} following Krueger's guidelines for focus group interviews.¹⁶ The guide addressed perceptions of the MC in elite badminton, phase-related influences on training and performance, MC management practices, and coach–athlete communication. It consisted of six open-ended questions and was used for both groups with minor phrasing adjustments. These domains served as discussion prompts rather than predetermined analytical themes, allowing themes to emerge inductively from the conversations. Notably, if a participant's response was more pertinent to a different domain than the question asked, it was reclassified during analysis to reflect their experience accurately. The full FGD guide is provided in the Supplementary Material.

Phase 3: scheduling and briefing. The FGDs were scheduled at convenient times using a scheduling poll and direct communication. Athletes' FGD took place online on November 2, 2024 (5:00 PM IST), and Coaches' FGD on November 9, 2024 (2:00 PM IST) via Microsoft Teams. At the start of each FGD, the lead researcher (TM) gave a structured briefing, reiterating the study objectives, introducing the discussion topic and clarifying MC-related terminologies that would be used during the FGD to ensure a common understanding among participants, acknowledging the support of the BWF (which funded the study) and the operational collaboration with the Simply Sports Foundation (which assisted in recruitment). It was emphasised that there were no "right or wrong" answers and that honest, diverse perspectives were welcome. Both the lead researcher and the FGD moderator (DS) were female, which was intended to minimise potential discomfort in discussing menstrual issues, especially for younger athletes. This gender matching was implemented to foster empathy and psychological safety, in line with best practices for researching gendered health topics.¹⁵

Phase 4: pre-discussion guidelines. Prior to the FGDs, participants received the guidelines outlining how to use Microsoft Teams and establishing ground rules for the discussion (refer to Supplementary Material).

Phase 5: FGD procedure. Athlete's FGD lasted approximately 80 min, and Coach's FGD lasted about 90 min. The moderator ensured that all participants had

opportunities to contribute and gently guided the conversation to cover the key topics. Open-ended prompts and follow-up probes¹⁷ were used to elicit deeper reflection or clarification when needed. The group format allowed participants to build on each other's points, enabling multi-layered dialogue. FGDs were stopped as the research team agreed that data saturation had been reached (similar ideas and narratives were recurring).¹⁸

Phase 6: data recording and transcription. With consent, both audio and video were recorded for accuracy. The recordings were transcribed verbatim. The lead researcher reviewed each transcript multiple times against the recordings to ensure accuracy and to become deeply familiar with the content. Since English was a second language for most participants, minor grammatical corrections were made in quoted excerpts for readability, but care was taken not to alter the meaning or nuance of their statements. These minor edits (e.g., completing a sentence or correcting tense) were done in consultation with the moderator to ensure the participants' intended meaning was preserved.

Phase 7: data analysis. Data was analysed using inductive reflexive thematic analysis. Transcripts were imported into MAXQDA (VERBI Software, Berlin, Germany) to assist with coding and visualisation.

Coding was conducted iteratively by the first and second authors. First, descriptive codes were applied to capture basic content (what was being said). Next, interpretive codes were developed to represent underlying meanings or implications (why or how something was said, what it signified about attitudes or experiences). The authors then met regularly to compare coding decisions, discuss discrepancies, and refine the themes through collaborative consensus. Similar codes were clustered into preliminary themes and subthemes. The team followed the interactive model of Miles, Huberman, & Saldaña,¹⁹ and the emphasis was on collaborative interpretation throughout the analytical process.

Importantly, coding was not constrained by the order of questions asked during the FGDs. If a participant's response under one question provided insight into another thematic area, it was coded accordingly. This flexible coding ensured that the resulting themes genuinely reflected the content of the discussions, not just the structure of the guide. The final set of themes was distilled into five overarching thematic domains, as outlined in the Results. Credibility of the analysis was strengthened by the consistency of findings across both groups for several themes, the use of ample verbatim quotes to support each theme, and a review of the analysis by the moderator to confirm that the themes resonated with the raw discussions.

Results

The thematic analysis of the athlete and coach FGDs revealed recurring concepts centered on the MC's perceived influence on training, performance, and communication in elite badminton.

Theme 1: perceived relevance of the MC in elite badminton in India

Athlete perspectives. Athletes consistently recognised the MC as an important component of health and sports performance, despite perceiving it as an under-discussed topic within elite badminton in India. Athletes explicitly described the MC as a “very important topic” in sports (especially FA3, FA4), reflecting a shared perception that it deserved greater attention within elite badminton. Although athletes were initially hesitant to contribute openly to the discussion, they gradually became comfortable and began sharing their personal MC-related experiences, indicating the limited opportunities to discuss the MC within routine sporting environments. Experienced athletes stressed the need to normalise the MC topic, particularly to support younger teammates. For example, “*The menstrual cycle is a very important topic that needs more attention in elite sport... If we talk more openly, juniors might feel comfortable sharing.*” — FA1.

Coach perspectives. Coaches also recognised the importance of the MC within elite badminton, although their understanding often remained limited to menstruation (just the bleeding phase) itself rather than the phases of the broader MC. Many used “*period*” and the euphemism “*problem*” interchangeably to refer to the MC. A common admission was that coaches lacked detailed knowledge about the different phases of the MC. One coach acknowledged the uncertainty: “*It is very important. We don't know if an athlete can train during the first or second day. Honestly, we don't know much about it.*” — C11. Nonetheless, coaches noted a cultural shift beginning to take place. “*Few awareness programs are happening... The beginning has been made,*” observed C9, while C10 added, “*The scenario is changing currently. I try talking to my athletes.*” This indicates that despite improved openness, awareness around the topic is still developing.

Cross-group synthesis. Both groups agreed that the MC *matters* in elite badminton, but their approaches to it differed. Athletes emphasised lived experiences, whereas coaches highlighted their emerging awareness and need for knowledge. There was mutual recognition that an “open conversation” about the MC is a marker of progress in breaking the stigma. However, misconceptions about MC phases (e.g., equating the entire MC to just the bleeding phase) and gender-related discomfort persist. These findings point to

a need for targeted education and structured dialogue to fully destigmatise the MC within training environments.

Theme 2: influence of MC on training and performance

Athlete perspectives. Athletes consistently reported cyclical changes in strength, energy, mood, and focus. The premenstrual and bleeding phases were almost unanimously cited as the most challenging. Common symptoms included fatigue, cramping, bloating, mood swings, and a general sense of reduced agility or endurance, particularly on the first one or two days of the bleeding phase. One athlete summarised, “*Before periods, mood swings. On the first day, stomach cramps, reduced mobility, and reaction time are affected; I get tired faster. Once I start training, I don't get cramps as much.*” — FA1. Another shared, “*On the first and second day, I take pain meds; I can't get out of bed... After the second day, once I start training, it gets better.*” — FA3. Interestingly, many athletes noted that exercising often alleviated their discomfort, describing that after warming up or engaging in light training, their pain and lethargy improved. Still, a few admitted to experiencing performance dips during the bleeding phase; e.g., “*During periods, I get lower back pain, and I don't perform well.*” — FA8. In sum, athletes portrayed the MC's impact as cyclically disruptive yet manageable through experience and self-awareness. They emphasised that symptoms and effects are highly individual; each athlete learns over time how her own body responds and how to cope.

Coach perspectives. Most coaches candidly acknowledged a limited understanding of phase-specific MC effects. Some were not aware of the MC beyond the bleeding phase. “*I don't clearly know. I've never trained them according to their menstrual cycle,*” admitted C9. Many coaches said they recognised certain changes in athletes (like signs of discomfort or mood shifts) but only react when issues become evident. Coaches often learned about MC impacts through specific incidents. For instance, C10 recounted: “*Once, very unexpectedly, an athlete left in the middle of a match. I didn't know what was happening until another player guessed she was on her period... Later, I told her to rest, but she wanted to continue.*” This incident taught him the importance of being alert to such possibilities. Coaches also gave examples of noticing reduced energy or emotional sensitivity in some athletes at certain times. “*Some girls look lethargic on the first or second day... younger ones show fewer emotional changes than older girls,*” observed C13. C14 added a practical lesson: “*A young player once started crying during training... she had started her period suddenly and didn't have a pad. After that, I told all the girls, 'Carry pads, be prepared'.*” These anecdotes illustrate that coaches often respond in a

reactive manner (addressing issues as they arise) rather than proactively adjusting training for the MC.

Cross-group synthesis. Athletes and coaches agreed that the MC can tangibly affect performance and training, but there was a disconnect in perspective. Athletes' understanding was rooted in personal, embodied experience and trialled coping strategies (like continuing to train gently to feel better), whereas coaches' understanding was observational and sometimes fragmentary, informed by notable events rather than systematic knowledge. A recurring underlying issue was *silence* or limited communication: athletes might not always report how they feel, and coaches might not always inquire, leading to missed opportunities to adapt. Both groups, in different ways, highlighted the absence of structured, evidence-based guidance on handling MC fluctuations.

Theme 3: MC-related practices and integration into training planning

Athlete perspectives. Many athletes engaged in some form of MC tracking or preparation, albeit informally. Several athletes (e.g., FA1, FA3, FA5, FA6) said they use smartphone apps or simple calendars/academy-provided forms to log their MC dates and symptoms. "I track my periods and even my symptoms — it helps me manage during tournaments. I use dark colours and ask my co-athletes to check for stains," shared FA1, highlighting practical adaptations. Another mentioned, "I use our academy's Google Form or a health app to keep track of my cycle," — FA3, indicating that at least one training center provided a way to report MCs (even if coaches were not actively using the data yet). Others were less systematic: "My mother tracks my dates; I don't use any app," admitted FA4, suggesting reliance on family support. Across these accounts, a key concern was avoiding embarrassment: athletes universally noted preferences for wearing dark-coloured shorts or skirts during their bleeding phase to prevent visible staining, and many carried spare pads and even an extra change of clothes in their kit. Some athletes also mentioned self-imposed adjustments, like slightly reducing their training intensity or ensuring they get extra sleep during the bleeding phase. Importantly, a few expressed a sense of guilt or anxiety about missing training when symptoms were severe. "I feel guilty if I miss training because of periods. Thankfully, now the white uniform has gone," said FA6. This underscores that while athletes often push through discomfort, they are also relieved when structural accommodations (like uniform changes) are made to ease their burden. Overall, the athletes' practices showed proactivity and resilience, but these were largely *self-driven* rather than coach-driven.

Coach perspectives. Coaches generally confirmed that they do not formally track their athletes' MCs or incorporate that information into planning. "Tracking or planning training as per the MC is not in practice. But it's definitely feasible if working with a small elite group," noted C9, implying willingness if guidance were available. C11 similarly said, "I ask them to take a break if needed, but we don't track it," reflecting an ad-hoc approach — they react supportively when told of an issue, but do not anticipate or monitor MCs proactively. A couple of coaches voiced skepticism or concern about athletes potentially overusing the MC as an excuse. "Some athletes use periods as an excuse to escape training — especially under-17 and under-19 players," claimed C12. C14 echoed, "Tracking is important to know if it's a genuine concern or an excuse." These comments suggest that a minority of coaches suspect that some younger athletes might occasionally pretend to have menstrual issues to avoid training. Whether or not this is accurate, it indicates a trust gap and highlights why open communication is crucial to differentiate normal requests for rest from any misuse. Coaches also admitted to having minimal knowledge about athletes' use of hormonal contraceptives (HC) or other medical menstrual management; most said athletes did not volunteer such information, and they didn't feel it was their place to ask. "I guess some might be using it (contraceptive pills), but we as coaches wouldn't know. They are not open about sharing," said C10. This points to an information blind spot: if athletes manage MCs medically, coaches remain unaware, which could affect training (e.g., if a pill reduces symptoms, coaches might not realise an athlete's improved condition is due to medication rather than the absence of issues). In summary, coaches recognised that integrating MC considerations into training planning is largely *absent* at present. They cited various reasons: lack of know-how, cultural reservations about discussing such matters, or simply not having considered it systematically. However, some coaches indicated that it *could* be done (especially with small groups), which suggests openness to change if provided with the right tools or education.

Cross-group synthesis. Athletes privately track MCs and adapt (e.g., by carrying supplies, adjusting effort levels, or quietly taking pain relief), but these efforts happen in the background. Coaches, on the other hand, lack systems or protocols: MC considerations are not built into training calendars or player monitoring. This disconnect means potential opportunities for performance optimisation or better athlete care are missed. Both groups hinted at feasibility and interest: athletes have shown they can manage data about their MCs, and coaches indicated that using such data is possible. For integration to occur, the barrier of mutual hesitation must be overcome. Right now, the approach to MC in training is more *reactive* (addressing

problems when they become evident) than *preventive* (planning around expected fluctuations). The consensus was that more structured education and open discussion could bridge this gap, enabling MC-aware training adjustments in the future.

Theme 4: communication dynamics around the MC in training settings

Athlete perspectives. Athletes reported varying levels of comfort in discussing MC matters with coaches or teammates, largely depending on their age/experience and the context. Comfort appeared to be dependent largely on the age of the athlete, trust and the gender of the coach. Senior athletes (e.g., FA1, FA3, FA5) generally felt they could bring up an issue if needed. *"I can comfortably talk to coaches about periods,"* stated FA1, reflecting confidence that came with maturity and perhaps positive prior experiences. Another athlete reflected on her personal growth, saying, *"I've reached a stage where I can talk to coaches about it, but earlier I was very shy."* — FA3. FA2 added: *"I might talk to male coaches, but I don't speak to male co-athletes,"* meaning she would talk to her coach but not necessarily her male training partners. Some younger athletes were still reticent. *As one 16-year-old explained, "I'm not comfortable discussing it with coaches, especially male ones. It still feels awkward."* — FA8. Many athletes described that their comfort grew over time as they observed supportive reactions. *"I used to be uncomfortable, but now I can talk about it,"* said FA5, implying that previous openness had been met without negative judgment, thereby reinforcing her willingness to speak up in the future. Athletes also underscored the role of *trust*: if they felt a coach was understanding and approachable, they were more likely to inform them about an MC-related problem (like needing a lighter session or a short break). However, if they feared a dismissive reaction or sensed awkwardness, they would rather stay silent and push through.

Coach perspectives. Coaches acknowledged that communication about the MC during training has become more open, although it remained a sensitive topic. They often learned of an athlete's menstrual status indirectly. *"Initially, they say 'stomach ache.' Then I tell them, 'It's okay, you can tell me if you're on your period.' Gradually, they start saying it openly,"* explained C10, illustrating how coaches may need to give "permission" to speak plainly. Female coach C13 highlighted the special role she played: *"I'm comfortable talking because I'm a female coach. But when athletes are trained by male coaches, I often pass on the message and encourage them to speak directly next time."* She often acted as a go-between; an athlete might confide in her, and she would inform the male head coach as needed, while also urging the athlete

to self-advocate. Male coaches, in turn, expressed that they try to be approachable, but also rely on cues. C14 noted generational differences: *"Senior athletes speak openly. Juniors use terms like 'back pain' or 'stomach pain.' Most don't say anything and train no matter what day it is."* This suggests that older athletes perhaps have more confidence or urgency to speak up (maybe due to having experienced the consequences of not doing so), whereas younger ones may still be shy or trying to prove themselves by not appearing to ask for special treatment. Coaches recognised that trust was critical: if an athlete trusts that the coach will respond supportively and maintain confidentiality, she is more likely to be candid. Some coaches mentioned they occasionally initiate check-ins if they suspect an athlete is struggling (e.g., quietly asking *"Are you having any women's issues today?"*), but such practice was not uniform.

Cross-group synthesis. Communication about the MC in elite badminton is clearly in a transitional phase. On the surface, it is more open; however, much of this communication is still encoded in indirect language or mediated by third parties (like a female coach or a trusted senior athlete). Both athletes and coaches indicated that *how* things are said often matters as much as *what* is said. Many athletes need to learn that it is acceptable to directly state their needs, and many coaches need to learn how to signal acceptance and understanding. The persistence of euphemisms (e.g., *"that time of the month," "issue," "not feeling well," "stomach ache"*) shows that full normalisation has not been achieved; the word *"period"* still carries discomfort for some. One encouraging sign is that once open communication occurs and is met with support, it creates a positive feedback loop that encourages more openness. Still, the reliance on female intermediaries, such as coach C13, highlights that structural barriers persist in male-dominated coaching settings. Ultimately, both groups see value in transparent communication for athletes' well-being, but it will require continued cultural shift and perhaps formal protocols to become a truly routine aspect of coach–athlete interaction.

Theme 5: personal reflections through lived experiences

Athlete perspectives. Many athletes recounted how intense training, competition travel, or health issues affected their MC, and how they learned from those experiences. For instance, FA1 said, *"Whenever I overtrain or travel frequently for tournaments, my periods get delayed or become irregular. My symptoms also worsen under these conditions."* This indicates awareness of the impact of training stress on MC regularity. FA4 shared a health challenge: *"My periods used to be very irregular and painful... after starting medication, they became regular but with cramps,"*

highlighting that some athletes may have underlying conditions that require medical intervention. Beyond physiology, athletes spoke about moments of embarrassment that later turned into growth. *FA3* provided a poignant story: *“Once during a camp abroad, I realised I had stained the chair after dinner. I was very embarrassed, but my male co-athletes behaved with maturity and empathy — that support meant a lot.”* In this situation, instead of ridicule or scorn, she received understanding from her peers, which she described as a formative experience in reducing her own shame. It showed her that men (peers, in this case) could be allies rather than sources of discomfort. Other athletes described taking on advocacy roles: e.g., *FA6* mentioned she had educated her younger sister about menstrual health, and *FA3* noted she encourages junior athletes at her academy to speak up about any MC-related issues, applying lessons from her experiences.

Coach perspectives. Coaches, too, shared experiences that altered their perspective on the MC. *C9* recounted a childhood anecdote: *“When my younger sister first got her period during a tournament, I scolded her without knowing what had happened. I felt so guilty later. That was my first lesson about periods in sport.”* This early personal incident clearly left a mark, making him more sensitive as he grew into a coach. Other coaches pointed to moments within their coaching careers that opened their eyes. *C10* mentioned, *“When I played mixed doubles earlier, my partner had polycystic ovarian disease (PCOD). I didn’t know what that was... Now, if a female athlete gains weight, I ask our physiotherapists to check. I’m learning.”* In his case, a teammate’s medical condition (PCOD) educated him about how MC issues can present (e.g., weight fluctuations or irregular MCs) and the importance of involving medical professionals. *C13* highlighted the regret coaches feel when ignorance leads to improper reactions: *“When a coach doesn’t know, and the athlete doesn’t communicate, the coach may react harshly. Later, when we realise she was on her period, we feel guilty.”* This comment underscores that coaches, after the fact, often wish they had responded with more understanding and vow to handle such situations better going forward. Many coaches expressed a desire for more knowledge and structured support (like workshops) precisely because they want to avoid repeating past mistakes and because they genuinely care about their athletes’ well-being. The overarching pattern in coaches’ reflections was movement from unawareness or misconception (sometimes resulting in a negative or unsupportive reaction) to increased awareness and empathy. Experience, whether direct or through athletes they coach, has been a powerful teacher in showing them the importance of addressing MC with the same professionalism as any other aspect of training.

Cross-group synthesis. The personal reflections of athletes and coaches converge on a key point: *experience breeds understanding*. Athletes who might have once been mortified by a menstrual mishap learned that acceptance is possible and that they can be role models for others. Coaches who may have once overlooked or mishandled an athlete’s situation came to realise the importance of compassionate and informed responses. These experiences humanise the issue beyond abstract “policy” or “science”, reminding everyone that real individuals face these challenges and that empathy and learning are ongoing processes.

Discussion

The current study aimed to explore how elite Indian female badminton athletes and their coaches perceive the MC, its influence on training and performance, and the communication dynamics surrounding it, using FGDs. Five key themes emerged from the FGDs: perceived relevance of the MC, influence of MC on training and performance, MC-related practices and integration into training planning, communication dynamics, and personal reflections through lived experiences. Athletes described phase-related fluctuations in fatigue, pain, mood, and training capacity, and reported that they often manage these independently. In contrast, coaches demonstrated increasing awareness but notable gaps in phase-specific knowledge, leading to predominantly reactive rather than proactive responses. Communication around the MC was limited, particularly in earlier career stages, with athletes often hesitant to disclose concerns unless necessary, reflecting reliance on self-management.

Athletes perceived the MC to be relevant and considered it to influence training and performance. However, its practical significance is interpreted inconsistently across individuals. Although both athletes and coaches acknowledged the importance of the MC within elite badminton, athletes’ perceptions were largely informed by lived experiences, whereas coaches’ understanding (especially among males) often remained limited to menstruation (or just the bleeding phase) itself rather than the phases of the broader MC. Consistent with prior research,^{3,4,6,20} athletes reported phase-related fluctuations in fatigue, pain, mood, and training capacity, supporting the notion that MC phases can influence performance, although responses remained highly individual. Notably, these findings indicate that athletes possess experiential awareness of MC-related changes, yet it remains to be determined if these changes are consistent within an individual.²¹

Regarding MC-related practices and their integration into training planning, the study highlights a structural imbalance in how MC-related matters are handled. Athletes have largely internalised the responsibility for managing their menstrual challenges, tracking their own MCs, adjusting their behaviour or gear, and often suffering

in silence if needed. Coaches, on the other hand, have taken a reactive stance, stepping in only when an obvious issue arises, rather than proactively integrating menstrual considerations into training regimens. This dynamic reflects what has been described in other contexts as the “individualisation of responsibility”,²² wherein female athletes shoulder the burden of navigating physiological challenges that the sports system does not formally acknowledge. In Indian sports culture, where the MC has traditionally been considered a private matter, this imbalance may be even more pronounced. The indicated lack of knowledge among coaches might also explain the limited adjustment of training according to the MC. This likely reflects a gap in MC phase-specific knowledge as reported by the coaches in the present study. It also aligns with previous findings showing that while a substantial proportion of athletes report adjusting training based on MC-related symptoms, only a small minority systematically plan training according to the MC.²⁰

With respect to communication dynamics in training environments, the findings align with prior research showing that elite sportswomen often perceive MC-related performance effects but rarely discuss them openly with support staff.²³ However, communication barriers were reduced only when trust was established, resulting in lower athlete anxiety and improved coach understanding. Consistent with Höök et al.,⁷ openness was influenced by the coach–athlete relationship and the gender of the coach. Targeted coach education and deliberate relationship building may therefore shift MC discussions from crisis-driven disclosures to routine, matter-of-fact communication. Equipping coaches, especially male coaches, with MC-related health knowledge and explicitly signalling openness may encourage earlier reporting, while empowering athletes’ menstrual health literacy²⁴ can normalise communication as part of the everyday training dialogue. Together, the persistence of limited communication, reliance on athlete-led self-management, and predominantly reactive coaching responses highlight the need for more systematic, rather than reactive, integration of MC-related considerations within elite badminton programs in India and similar high-performance environments.

Strengths and limitations

This study’s strengths include focus on a culturally specific elite population, inclusion of both athletes and coaches from multiple high-performance academies, and the use of all-female moderators, which likely enhanced candour. Inductive analysis allowed themes to emerge organically. Limitations include the small, sport-specific sample, English-language FGDs that may have constrained expression, and reliance on self-reported perceptions rather than objective performance or physiological measures. Nevertheless, these subjective accounts are central to understanding lived experiences and behavioural responses.

Practical applications

Based on the study findings, several practical steps are recommended to better integrate MC considerations into elite badminton (and potentially other sports) in culturally sensitive ways:

- (a) **Educate coaches (and athletes) on MC-related health:** As coaches demonstrated growing awareness but limited phase-specific understanding, integrating MC-related content into coach education programs may support more informed and proactive responses. Workshops led by sports physicians or physiologists could cover topics such as typical symptoms, the range of normal MC variation, how hormonal contraceptives may factor in, and common misconceptions (e.g., clarifying that training can often continue safely during the bleeding phase and that responses are highly individual). Parallel sessions for athletes can support symptom management, informed help-seeking, and communication of needs.
- (b) **Normalise MC-related dialogue:** Given the observed communication practices, particularly in early career stages, coaches and support staff should foster environments where discussing the MC is not taboo. Coaches can initiate this normalisation by using appropriate terms (“period” or “menstrual cycle”) and reassuring athletes that raising MC-related concerns is acceptable. The aim is to enhance psychological safety, so athletes feel comfortable communicating MC-related discomfort rather than managing it in silence.
- (c) **Encourage athlete-led MC tracking and adapt training and competition plans when needed:** Athletes in this study largely self-managed MC-related challenges. Supporting this through voluntary tools (smartphone applications or training diaries) and athlete-controlled data sharing may help translate self-management into structured, individualised training adaptations. Recent work²⁵ highlights that athlete-driven, context-sensitive MC monitoring can inform training decisions without imposing rigid or generalised approaches. Where athletes are comfortable, selective sharing with coaches may help identify individual patterns while maintaining autonomy.
- (d) **Address practical barriers:** External stressors related to the MC should be proactively minimised. Providing flexible uniform options, ensuring access to suitable restroom facilities, and making sanitary products available in training and competition settings signal institutional support. Including MC-related items in standard competition travel checklists may further reduce anxiety and stigma.

When implemented with sensitivity and respect for individual differences, such approaches may support athlete well-being and promote more consistent performance across the training and competition calendar.

Conclusions

This study provides novel insight into how elite Indian female badminton athletes and their coaches perceive and manage the MC in a high-performance context. Across five key domains: perceived relevance, phase-related influences on training and performance, MC-related practices, communication dynamics, and personal lived experiences, findings indicate that while awareness of MC-related influences is increasing, its integration into coaching practice remains inconsistent and largely indirect. Cultural taboos and communication barriers continue to limit proactive engagement, particularly in male-dominated environments where formal MC education is often lacking. Athletes were more willing to communicate MC-related concerns when trust and empathy were present, yet many still managed symptoms privately and adapted training independently. These findings underscore the need for a culturally sensitive, athlete-centred approach within elite badminton programs in India (and similar environments elsewhere), integrating targeted MC education for athletes and coaches, routine and respectful communication, and flexible training practices that acknowledge individual variability. Recognising the MC as a normal component of athlete health is essential to reducing stigma, supporting athlete well-being, and fostering more equitable and effective high-performance coaching environments.

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ORCID iDs

Tanugatri Majumder  <https://orcid.org/0000-0002-0780-0823>

Dola Saha  <https://orcid.org/0000-0003-0560-9109>

Dionne A Noordhof  <https://orcid.org/0000-0002-1630-4696>

Ethical considerations

This study was approved by the Institutional Ethics Committee of Ramakrishna Mission Vivekananda Educational and Research Institute (RKMVERI), Belur Math, India (Approval ID: RKMVERI/IEC/DSSY/2024-06/002).

Consent to participate

Written informed consent was obtained electronically from all participants prior to participation. For participants under 18 years of age, parental consent and participant assent were also obtained.

Consent for publication

Written informed consent for publication of anonymised participant quotations was obtained from all participants. For participants under 18 years of age, parental consent and participant assent for publication were also obtained.

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Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability statement

The datasets generated and analysed during the current study are not publicly available because they contain information that could compromise participant confidentiality. De-identified data may be made available from the corresponding author upon reasonable request, subject to applicable ethical considerations.

Supplemental material

Supplemental material for this article is available online.

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