

# International female rugby union players' perceptions of how the menstrual cycle affects players on and off the field

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## Abstract

There is limited research on female rugby players, particularly concerning how the menstrual cycle affects performance. This study explored international female rugby players' perceptions and experiences of how the menstrual cycle impacts both on and off-field performance. Twelve international female rugby players (aged  $26 \pm 3.5$  years) representing eight nations participated in one-to-one semi-structured interviews. Reflexive thematic analysis identified three themes: (1) cycle-sensitive behaviour modifications, (2) the mental burden of the menstrual cycle, and (3) audience apprehension. Athletes reported adjusting training routines to manage menstrual symptoms, with abdominal and breast pain often prompting avoidance of contact drills. Tight-fitting kit exacerbated discomfort during bloating, and concerns about leakage, odour, and visibility of menstrual products disrupted performance focus. The findings highlight the need for greater awareness and support around menstrual health in elite rugby. Future researchers should prioritise developing strategies to minimise the menstrual cycle's impact both on and off-field performance.

## Keywords

Audience apprehension, clothing, pain, psychological stress, women's sport

## Introduction

A key focus within women's sporting health research is the menstrual cycle. The menstrual cycle typically lasts 28 days, though hormonal fluctuations and symptoms vary by individual, generating different experiences.<sup>1</sup> Bruinvels<sup>2</sup> reported that 51.1% of 1073 elite female athletes experienced a performance impairment due to menstrual symptoms. Oester<sup>3</sup> reported similar findings in their scoping review; however, they emphasised inconsistencies in the perceived impact of the menstrual cycle and sporting performance. Their review highlighted phase and athlete-specific discrepancies, with training avoidance or disruption highly attributed to abdominal, lower back and breast pain, menorrhagia, fatigue, and menstrual/gynaecological dysfunctions. Psychological symptoms such as anxiety, stress, and low mood were also recognised, contributing to performance detriments.

An additional concern was noted in the Brown<sup>4</sup> study, where some athletes noted their mental focus was impaired when experiencing heavy menstrual bleeding and leakage. These concerns were reflected in previous literature, with

athletes associating visible leakage and negative audience reactions as distractions from their on-field performance.<sup>5,6</sup> Prior to the recent literature discussing mental performance detriments, Schaumberg<sup>7</sup> suggested that athletes often resort to behaviour modifications or avoidance strategies to manage their menstrual cycle performance challenges. Collectively, the literature highlights a clear link between menstrual-related anxiety and sport-specific performance challenges.

Recent efforts in elite sport have started to address menstrual-related anxieties, particularly kit colour. In

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2023, the English and Canadian Football Associations, along with Nike, introduced blue and black kits.<sup>8</sup> That same year, Wimbledon relaxed its all-white dress code, allowing dark shorts for female players,<sup>9</sup> and the Irish Rugby Union<sup>10</sup> switched from white to navy shorts for the Six Nations. While these changes help ease fears of visible leakage, deeper cultural and communication challenges remain, requiring interventions that tackle more than the current surface-level solutions.

Findlay<sup>5</sup> were the first to investigate the menstrual cycle experiences of international female rugby players, reporting that fatigue and abdominal pain negatively affected performance and limited athletes' readiness to train or compete. More recently, Hayward<sup>11</sup> surveyed perceptions of professional female rugby players regarding their menstrual cycle and performance. Key barriers identified included a lack of psychological support and education, fatigue, and a perceived increased risk of injury. Although the study involved international-level athletes, the sample was limited to a single nation. Currently, no researchers have explored and compared different international teams and how their athletes are impacted by the menstrual cycle or what practices they have in place. While surveys are widely used to obtain interpretations of athlete experiences and perceptions of their menstrual cycle, qualitative data can be restrictive. The format of surveys can restrict the depth of insight and offers limited opportunity to challenge responses or further explore the nuanced, individual nature of symptoms. Consequently, exploring players' experiences is needed to inform strategies that better support athletes' performance and menstrual health.

The current study builds on recent literature by exploring the experiences and challenges of 12 international female rugby players, focusing on the nuanced ways the menstrual cycle impacts performance both on and off the field. It aims to examine how athletes perceive these impacts, as well as any strategies implemented internationally to mitigate their impact on the players. The primary research question is: What are the perceptions and experiences of international female rugby union players regarding the menstrual cycle?

## Method

A cross-sectional qualitative study design was adopted, involving semistructured interviews with international female rugby union players. An interpretivist framework guided the study, underpinned by ontological relativism (reality is multiple, socially constructed, and mind-dependent) and epistemological constructionism, which views knowledge as subjective and co-constructed.<sup>12</sup>

## Participants

Following institutional ethical approval (SAHPS\_PB\_2022-001), convenience and systematic sampling were used.

Overall, 25 teams were contacted (9 UK-based teams and 16 international teams), with six responding positively. Interested teams shared the participation criteria and study information with eligible players. The criteria for inclusion required athletes to hold a current contract within a national/international setup for at least one season, representing the highest level of women's rugby performance. Interested participants contacted the lead researcher to receive a consent form and information sheet, returning signed consent electronically. In total, 12 athletes participated in the study, aged  $26.0 \pm 3.5$  years (range 22-33 years), representing eight nations; Australia ( $n=2$ ), Belgium ( $n=1$ ), England ( $n=3$ ), Ireland ( $n=1$ ), Scotland ( $n=1$ ), South Africa ( $n=1$ ), USA ( $n=1$ ) and Wales ( $n=1$ ).

## Interview guide

A semi-structured interview was chosen to prompt conversation surrounding relevant topics and gain insight into athlete's experiences.<sup>13</sup> An initial interview guide was developed and piloted with athletes from a Championship One-level club to assess question clarity, structure, and timing.<sup>14</sup> Following the first pilot, amendments were made to phrasing and question order. A second pilot confirmed the effectiveness of these changes.

The final interview guide (available on request from first author) incorporated open ended questions exploring participants' perceptions of their menstrual cycle and its perceived impact on both on and off-field performance. For example: "How do you feel your menstrual cycle impacts your preparation for a game day?" Participants were encouraged to share rugby-specific examples demonstrating how their menstrual cycle interacted with the sport. Interviews concluded with questions on menstrual cycle-related barriers, prompting further reflection on how these challenges affect performance.

## Procedure

Interviews were conducted following the 2022 Women's Rugby World Cup and the start of the 2023 Women's Premiership rugby season. All interviews took place online, lasted  $32.8 \pm 8.2$  min in length (range 24-40 min). Recordings were exported from Zoom and transcribed verbatim by the lead researcher. In total, 369 min of audio were collected, resulting in 49,411 words of transcribed data.

## Data analysis

Braun and Clarke's<sup>15</sup> six-step guide to reflexive thematic analysis was followed, emphasising continuous association, reasoning, and familiarisation with participant's responses. This process commenced with early familiarisation of the data through transcript creation and cross-checking

against interview recordings. Initial codes were then identified, outlining key features supported by text extracts. These codes were organised into a thematic map to explore patterns and relationships across the dataset. Critical friends (experienced researchers in sport psychology, qualitative methods, and women's health) encouraged reflexivity and supported the refinement of themes.<sup>12</sup> The final stages involved reviewing, defining, and naming themes forming the foundation for the written report.

## Results

The perceptions and experiences of the participants' menstrual cycle and its interaction with their on and off-field performance were separated into three themes: (1) cycle-sensitive behavioural modifications, (2) the mental burden of the menstrual cycle, and (3) audience apprehension. Verbatim quotes are presented within the themes, with the participants' identities protected through pseudonyms.

### *Cycle-sensitive behavioural modifications*

Within this theme, participants indicated the individual changes they noticed across their cycle and the subsequent behavioural adaptations. Symptoms associated with the bleed phase of the participant's menstrual cycles were reported to cause athletes to under fuel, and led to some athletes avoiding elements of contact and exercises within the gym. In addition to avoiding certain tasks, athletes altered their warm-up either by extending its duration and prescribing more exercises or by altering the intensity/ physical demand of the exercises. The interviews highlighted that both physical and psychological menstrual symptoms were central to these reported behaviour modifications. Psychological, physical, and emotional symptoms experienced by athletes throughout their hormonal cycle have repeatedly been reported their symptoms have detrimental impacts on their performance. Participants suffering from abdominal pain described their pain as unbearable or severe, with Charlie noting: "I definitely get really bad cramps, to the point where like I would be like bedridden on day one, like not being able to function".

The consequence of pain appeared to run deeper than not being able to physically participate or perform. Several participants alluded to the consequence of fatigue and or lack of sleep to the specific ways their cycle impacts their performance: "I'm tired, I'm not really functioning because I'm in pain I'm not switched on so like my reaction times are slower I'm definitely not fast, so all in all I just feel quite sluggish" (Charlie). One participant made note of their functionality on the pitch and the implication fatigue has on their on-field behaviour: "When I haven't slept, I'm just not really useful, I'm all over the place, I can't perform for myself or the team" (Elle).

Elle and Hollie both discussed how they suffered from endometriosis and elaborated on the additional challenges they faced with this gynaecological condition. Both participants reported an increase in defecation throughout the bleed phase, with Elle further noting the discomfort caused by this symptom: "I have trouble going to the toilet, it's [defecation] incredibly painful and I am always sat there for a long time, its constant in the first two days [bleed phase]". Although Elle did not report a direct link to the consequence of increased and painful defecation upon their performance, it can be inferred that the associated symptoms of reduced appetite and heightened fatigue may have contributed to dehydration and under-fueling. These factors, in turn, have the potential to exacerbate fatigue and diminish performance.

Participants perceived an elevation in body temperature during the luteal and menses phases of the menstrual cycle, noting that low-level activities led to a rise in sweat rate. Consequently, this rise in sweat rate, combined with poor fuelling due to pain or sickness could represent additional fuelling challenges for menstruating athletes: "I remember it starting during a skill session once and I was getting the sweats. I just remember standing in the gym like in full-blown sweats. I was like, I'm gonna die, I'm so hot" (Charlie).

Athletes recounted the unique challenges of managing performance development when on the menses phase of their cycle, sharing specific ways fatigue manifested itself within the population. A reduction in the volume of weight lifted across the luteal and menses phase was recognised: "I don't think I lift as much. I'm not exactly sure when it is but, like right now I'm meant to get my period kind of soon and I feel like more tired than I normally do" (Billie).

Drew described altering training sessions to account for fatigue in the menses phase, prioritising from over intensity: "So in the gym I always try to lift either as heavy and like in that phase (menses/bleed) I don't push myself so much like I try and get good form over like heavy weights, I know I can't do it". Similarly, reports of reduced strength were relayed by Katie: "I bench pressed the same weight that I did last week when and it felt easy, and this week it's feeling really hard instead of being like, I just feel so weak today".

Participants reported greater attention to their warm-up for certain movements within the gym due to the exacerbation they pose on their current symptoms:

I warm up a certain way, and I have to really pay attention to my back, and usually I wouldn't do so many back exercises before gym. But I find that if I don't, it's just really painful, especially when I do my main lifts like squats and deadlifts. (Georgia)

During the bleed phase, the contact element of rugby posed challenges for athletes. While complete avoidance of contact

drills and subsequent elements of contact was not recounted, many reported reduced perceived intensity and general preparedness when training for content. Participants noted a link between abdominal contact and menstrual cramps, with some expressing apprehension about heavy contact worsening their pain:

I hate scrummaging when I'm on like day one and day two because I was in the front row, and the pressure in my tummy hurts. I think it's just like the contact side of things, to be honest, because if I get hit in the stomach, it is a little bit tender. (Georgia)

The challenge of contact expanded beyond abdominal pain, with tender breasts a significant symptom reported by several athletes in the luteal and bleed phases of their cycle. Georgia reported: "My boobs get really tender, tackling, being tackled it's so sore and sometimes I can't bear it, feel like they need pads" while Elle noted: "I do what I can to avoid it, sometimes I try to chat to the physio, even if nothing is wrong". These accounts emphasise how athletes alter their physical behaviour to avoid such discomfort. However, altering techniques or avoiding contact skills training can hinder the athlete's proficiency in essential techniques. In some instances, the participant reported that during a game, if their symptoms were bad, they would avoid tackling where possible. Hollie highlighted the connection between contact avoidance, their injury history, and their hormonal cycle, stating: "All of my bigger injuries I've had the week just before my period starts or on my period I generally just feel my body doesn't fancy it, I won't push myself to (tackle opponents) as hard".

The participants implied a greater need to understand potential technical and behavioural detriments they are susceptible to across their cycle. The participants inferred symptoms such as pain distracted them whilst playing, thus leading to an inaccurate perception of increased injury risk during the menses phase.

### *The mental burden of the menstrual cycle*

Participants noted the prevalent psychological burden of the menstrual cycle throughout their interviews, outlining negative impacts on their emotions, mental preparation for training, match day performance, and the pressure to be on top form to guarantee selection. The additional mental load of the menstrual cycle illustrated that participants focused more time on combating feeling low, less resilient to feedback, and an overwhelming demand to perform even though they felt drained, as opposed to preparing for optimal performance.

Low mood was a prominent theme and there were reports of feeling more tearful, angry, and irritable prior to menstruation. Drew stated: "I feel the most just before

the period (late luteal), like I feel so low, I really don't want to do anything". A further participant reported: "I am reporting feeling low on my well-being, they (performance staff) can see that you're at that time of the month, even I know it's coming because I normally feel quite low" (Hollie).

Fluctuations in mood were also reported by the participants, in addition to conveying a complex relationship between such feelings. Experiencing multiple emotions simultaneously or rapidly shifting between them left some athletes feeling mentally exhausted even before their training began.

I would usually be a little bit more emotional. So, the week before I bled. I'm like why am I? angry, or heightened in whatever the emotion was that I was feeling like, I wanna cry more, but like I'm not really a crier, and you'd have those days when I'm so angry, and by the time you have got to training I already feel like I've ran a marathon. (Katie)

Participants reported consistent mental pressure to perform at their best to ensure selection, which intensified during the late luteal and menses phases of their cycle. They highlighted the additional psychological burden their menstrual cycle place on them, particularly during their bleeding phase.

We put a lot of pressure on each other to be consistent. I think, you put a lot of pressure on yourself. I feel like I let people down if I don't perform, even if I was like oh I'm really not in a good place (menstrual symptoms). I'm not going to be able to put anything in the session; they (players) will think I'm not trying. (Elle)

The athletes noted during menses, heightened emotions led them to over analyse their training outcomes and performance: "I was so like, I don't know, mentally drained like I literally felt I didn't cry every second of training, I think I was just really hormonal" (Imogen). However, the consequence of leaking or being caught short manifested itself as the most pressing psychological burden on the athletes. Several participants described the extensive measures they took to minimise the risk, which often diverted their attention from their performance during competition or training:

I'm really like funny like I can't go for a wee and not change my pad or tampon. I've been through like a ridiculous amount of a Rugby game. But then again, it was more stressful because I had a pee before the warm up, so I need to bring another Tampon, and then I need to wee after. So, I needed to bring another Tampon, and then I need to wee at half time, so I had to run back in to get a new tampon. It's just like it is like a never-ending cycle. (Charlie)

The psychological burden of the menstrual cycle for international rugby players extended beyond managing physical symptoms. Some players recounted concerns about approaching those in control of selection, including medical staff. Billie shared that when they felt menstrual symptoms had negatively affected their performance, they chose to refrain from seeking assistance or necessary care out of fear of being pulled from the team sheet:

If I really haven't slept and I am in pain (abdominal), I think it's hard as our coaches are quite demanding and require a lot from us and the medical team. But they rely a lot on the medical team's opinion, and if the medical say they should not be training, I know some times I shouldn't be, then the coaches are more likely to bare that in mind with selection. If people don't view it (menstrual pain) as a thing, then when you don't perform at training, the coaches won't select you; all they care about is whether you are selectable. (Elle)

Apprehension about disclosing menstrual-related struggles to staff due to past experiences or observations was a common theme among participants. One athlete referred to the impact of a coach's previous behaviour and reactions on their willingness to disclose struggles: "They (coaches) don't give a ..... I've seen the way that they speak to some people, and I wouldn't want to ever be vulnerable in front of them, I wouldn't be able to tell them I'm struggling (with symptoms) (Ali)". The same participant reflected on the stigma surrounding periods, stating: "It (periods) shouldn't be so embarrassing, but it is". Another athlete emphasised the lack of recognition for menstrual-related discomfort in performance discussions: "You could be dealing with the worst cramps, and it's not seen as like a viable reason to be kind of struggling and being able to train" (Billie). These insights highlight the mental burden of the menstrual cycle on players. Athletes who felt unable to perform at their usual level believed their coaches would dismiss the legitimacy of their menstrual-related performance issues, reinforcing the mental pressure of deselection. Discussions around menstruation were often stigmatised, leading athletes to perceive them as carrying a negative connotation that could impact their standing or performance evaluations.

### *Audience apprehension*

Athletes revealed the stigma surrounding menstruation and others' perceptions of it had a profound impact on their performance. This theme explores the perceived fear and apprehension surrounding menstruation and the strategies participants employed to navigate the stigma.

A clear connection between apprehension, stress, and fear of leakage was evident among the participants. However, getting caught short or managing a heavy cycle

was not the only challenge athletes had to contend with before stepping onto the pitch. Participants referred to the added pressure of kit colour, particularly the anxiety associated with wearing white, which exacerbated concerns about leakage: "Our international kit we will wear white. So, if I'm having a heavy flow day, I'll just need to make sure that I'm changing pre-kick off" (Hollie). The added psychological burden related to short colour was recognised within International teams and Premiership clubs. Georgia considered themselves to be "lucky" in comparison to their teammates in international teams who wore light coloured shorts. They implied they were fortunate, only to encounter the burden at the club:

I've been lucky that the kit that I've got (internationally) has been like the darker green. But at club it's a light colour. I know that's not great for us, and I feel for the England girls, and like they're wearing white all the time, like imagine in a game if they have a bit of leakage, or that they get that period without realising. (Georgia)

Some athletes introduced further kit challenges they face in women's rugby. Charlie expressed discomfort with the tightness of clothing, saying: "The shirts are really fitted, so obviously when you feel a bit more bloated it's a struggle, not to mention how hot they make you feel" (Charlie). Ali also raised concerns about kit sizing, noting the lack of properly fitted apparel for women's teams: "We don't get anything that is solely women's sizing, all the kits are men's, just hand-me-downs, they just don't take us into account". Francis further addressed the challenge of associations with a men's team, highlighting another layer of frustration for female athletes:

We mimic the men's program in terms of the kit. I do think the club should have the same kit because we are one club, and for the public to see us doing the same is really good. But they (directors of rugby) could probably take into consideration periods a bit more, maybe not white shorts, maybe shorts that aren't men's fit. (Francis)

The fear of being caught with visible blood on the shorts demonstrated itself as the biggest concern among participants, with many recounting experiences of leakage and the extreme measures taken to prevent it. Elle described the precautions they take to avoid leakage, particularly during training and matches where bathroom breaks are limited:

I'll need to wear the tampon, and then a pad just because sometimes when you're training or playing you can't go to the toilet necessarily, not when you need to (due to leakage), due to strict timings, especially if I'm bleeding and leaking very heavily, which is often the case, so I will need to wear a pad as well in case I leak. (Elle)

Athletes referred to additional changes they had to consider when playing during menses. They noted that to reduce the fear and burden of leaking, they would wear undershorts as an additional layer of protection. Charlie stated this precaution was necessary regardless of flow: "Sometimes it doesn't even matter if you're really heavy or not, you have to wear them (undershorts) as someone can pull down your shorts in a tackle or a maul and everything would be seen". However, Francis who opted for undershorts if heavy bleed days coincided with game days, described the physical and psychological discomfort they feel when wearing the undershorts: "I just am worried the whole time about how stupid I look and people will know because I have to wear the horrible, really uncomfortable black undershorts" (Francis). The participant expressed the physical discomfort the undershorts brought while playing, accentuating the concern of how they appear in front of their audience. Instead of focusing on the game strategy or the specific task performed, e.g., rucking over a ball, the athlete would be focused on not appearing to have leaked, potentially using unfavourable movement patterns to do so.

The perceived taboo associated with leaking was affiliated with the odour experienced during the bleed phase of the menstrual cycle, particularly during close-contact situations. Drew reflected on this discomfort: "I know some forwards like myself dread scrummage time, but yeah, unless you're in a scrum, where you have to get so close to your team, I guess it's (smells and menstrual blood) just something you think about."

Ali recounted the apprehensions they experienced during scrums and line-outs. With half the team positioned near or in direct alignment with a teammate's groin, the nature of the sport amplified feelings of self-consciousness during menstruation. Ali reflected on their discomfort, particularly when hygiene routines were disrupted by a busy schedule:

Sometimes obviously like I'm, very self-conscious of like smells. So if I've come from work and not showered in between work and training, or something, and I'm on my period I'll be really conscious of like being close to other people, like when I'm on my period and being line outlifted, or in the front five of a scrum to me would be horrible like i'd be like so self-conscious. (Ali)

The proximity and specific movements performed in the sport of rugby create a unique environment for female athletes to navigate, adding another layer of psychological pressure. In addition to managing performance expectations, they also contend with how they are perceived by teammates and external audiences.

## Discussion

This investigation explored international female rugby players' perceptions of their menstrual cycle experiences

on and off the field. The study provided first-hand insights into the experiences and extended impact of the menstrual cycle across women's rugby union globally. The diverse representation of athletes included eight international teams, six Premiership Women's Rugby teams, and perspectives from both hemispheres. Players were largely driven by psychological and physical symptoms of menstruation, e.g., abdominal pain, anxiety, and stress. Fatigue, abdominal pain, and issues with fuelling were reported by the majority of athletes within this study, often impairing their perceived capacity to perform.

Breast pain was evident in participants during the luteal and menses phases of their cycle. Hubbard<sup>16</sup> and Ramakrishnan<sup>17</sup> linked progesterone, edema, and breast pain across the two phases. However, no rationale was discussed regarding symptom exacerbation brought on by physical activity and the subsequent activity avoidance. Brisbane<sup>18</sup> stated 63% of the rugby-playing participants sustained breast injuries from player-on-player contact and concluded that the majority of players would experience a breast injury in their playing career. Bibby<sup>19</sup> reported 51.9% (15 s rugby) and 64.3% (7 s rugby) international female rugby players sustained at least one contact-induced breast injury each year, in contrast to Brisbane's<sup>18</sup> career estimation. However, Wakefield-Scurr<sup>20</sup> noted female rugby players were reluctant to report breast injury to coaches or medical staff. Although Brisbane<sup>18</sup> and Bibby<sup>19</sup> offer quantitative data on breast injuries in rugby, athletes in this study revealed hesitancy to report such injuries, echoing Wakefield-Scurr<sup>20</sup> and underscoring the limitations of current injury surveillance systems, which fail to capture contact-induced breast trauma.

Fatigue was a major driver of cycle-sensitive behavioural modifications, manifesting in various ways, including reduced weight lifted, perceived slower reaction times, dropped balls, and difficulty keeping up with the psychological demands of play. These findings align with strength deficits and fatigue observed by Carmichael<sup>21</sup> and Pallavi<sup>22</sup> among women during the luteal and menses phases, though no direct connection to rugby performance had been made previously. Although specific guidelines for menstrual cycle management and nutritional intake are lacking, existing literature highlights the importance of monitoring dietary intake to prevent declines in performance and injury risk.<sup>2,21,23-25</sup> More recently, Hayward<sup>11</sup> investigated the impact of the menstrual cycle on the performance of professional female rugby players, calling for training volume management strategies to match the physical symptoms the athlete presented. The current absence of clear guidelines underscores the need for better strategies to address athlete wellness and performance, particularly during the menstrual phase, to improve fuelling and to manage fatigue.

The perceived exacerbated physical and psychological discomfort brought through contact during rugby is yet to be discussed or presented within the literature; however,

this study builds on challenges noted by Findlay.<sup>5</sup> Participants linked contact apprehension and reduced force applied during a scrum or a tackle to their bleed phase and perceived an increased risk of injury. Although no literature has supported a physiological rationale for increased injury rates during the bleed phase of the menstrual cycle, Hayward<sup>11</sup> found that athletes commonly associated this phase with injury occurrence. Hollie reported experiencing apprehension during contact-based tasks, and they highlighted an associated correlation between their past injuries and menses. Additionally, Blagrove<sup>26</sup> concluded minimal changes in strength outcomes across the phases of the eumenorrheic menstrual cycle. Subsequently, it could be assumed that variances within and between hormonal cycle fluctuations, although minimally altered, could present and be perceived differently across players. Therefore, the increased apprehension of symptom exacerbation refocuses the athlete's attention on avoiding contact, potentially increasing the risk of sustaining an injury during the late luteal and the bleed phase. Future researchers should investigate relationships between technique changes and mechanisms of injuries, to identify if such changes are a direct cause of menstrual symptoms and behaviour apprehension or avoidance.

Within this study, participants emphasised the extent fear of leakage (of menses) has on their performance. Similar to Brown,<sup>4</sup> participants reported heightened anxiety, frequency of changing products, and layering of clothing to prevent visual leaks. Unlike Brown<sup>4</sup> and Kolic,<sup>6</sup> this concern was not driven by media scrutiny but rather the fear of the menstrual blood being noticed by teammates, the opposition, and spectators. The participants highlighted a negative contemporary association between undershorts and performance due to physical discomfort, and concerns regarding their negative appearance to the audience. This demonstrates the mental burden the menstrual cycle has on the player's performance, as concealing their cycle subtracts their attention from their performance.

The contact nature of rugby intensifies the fear of leakage, particularly during scrummaging, lineouts, mauling, and rucking. Forwards within the study reported added stress during these high-contact events, which require those players to be bent over, their groin and gluteal area exposed to the audience and other players. This contributes to a greater emotional burden when managing menstruation, echoing similar findings within literature.<sup>8-10</sup> However, the unique demands of rugby union reinforce societal stigma around menstruation. During an athlete's menses or luteal phase, when negative impacts on performance notably peak, the additional burden of optimal performance is a hurdle athletes should not have to face. The expectation to maintain a 'tough', 'get on with it', unwavering performance and attitude is unnecessary psychological strain, the full cost remaining unknown. This study emphasises the need to normalise

menstruation in international and premiership rugby teams through regular, positive information transference to eliminate the physical and psychological negative implications it can have on player and team performance.

The debate over white shorts exemplifies the disconnect between public messaging and internal team experiences. The Strong Women<sup>27</sup> article portrayed that the England women's rugby team were collectively unbothered by kit colour: "Why should periods be a taboo subject? "Why should we, as women, have to change who we are to make other people more comfortable? It later noted, 'You have a nosebleed (on the pitch) and people are fine with that – so what's the difference having some blood on your shorts?'. However, all England internationals in this study referred to fear of leakage due to short colour. Participants from other International teams shared the concerns surrounding white/light-coloured shorts and leakage, emphasising that a global movement may be required. The results from this study call for greater attention to an inclusive approach to minimise the fear of leakage within the team, such as kit colour.

Participants reported challenges with tight-fitted shirts, especially during the luteal and menses phases of their cycle, when they were feeling bloated, and perceived a higher body temperature, which led to reduced thermal comfort. The combination of fit, texture, and cycle phase led to excessive sweating even during basic skills, intensifying the physical demand of contact. Consequently, the implication of sweating due to bloat and tight-fitted shirts highlights the need to reconsider kit design, particularly as fuelling and hydration are established challenges during menstruation in rugby union.

Currently, no literature exists collating the experiences of athletes within different international rugby team setups. A strength across this study is the diverse global representation of athletes' experiences within rugby union teams across both hemispheres. This study addresses that gap and depicts the unique, shared experiences of each participant between the teams. The results highlight the importance of tackling the consuming burdens of the menstrual cycle, including leakage fears, product availability, kit colour and sizing, and the ramifications these factors have on the athlete's behaviour and performance.

The perceived lack of acknowledgment of low well-being scores, fatigue levels, and reluctance to share challenges involving the menstrual cycle with staff is similar to those of Findlay.<sup>5</sup> Athletes are calling for support teams (medical and performance staff) to instigate improved communication methods and provide practical solutions to minimise the burden of the menstrual cycle on the athletes. Women's rugby teams should look to enhance their current understanding of menstrual characteristics to develop their own strategies to optimise performance when collecting wellness data. Carmichael<sup>21</sup> recently reported the importance of practically acting on wellness

data and addressing undesirable responses received through tracking reports, in addition to educating all involved within the sports environment on the menstrual cycle and their role. Furthermore, a focus on safe communication opportunities and pathways is imperative to understand the implications of the individual athletes' needs across their cycle and create the rapport needed to tackle the perceived taboo of the menstrual cycle. However, the inclusion of content within wellness reports and menstrual cycle tracking was inconsistent, suggesting the need to understand rugby player-specific considerations when tracking to ensure greater compliance and efficacy.

The prevalent behaviour modifications highlighted within this study and a reluctance to communicate personal menstrual challenges were parallel to Hayward, indicating the need to alleviate the menstrual cycle taboo within the sport of rugby. However, to ensure effective information transference and identification regarding the menstrual cycle, effort and education are needed across medical and performance staff. Therefore, a greater understanding and review of current communication tools, strategies, and athletes' perceived effectiveness of such applications is required to add comprehension to the complexity of the menstrual cycle.

### Limitations and recommendations

The participant recruitment strategy was a challenge within this project, with limited email addresses available for international and Premiership clubs. Future researchers should consider purposive and snowball sampling methods for participant recruitment to target potential participants with a known interest in the topic. Stratton<sup>28</sup> suggests that those participants will share the experiences and perspectives of other potential participants who were not reached using the study's current sampling method.

The interviews were not taken during any specific phase of the participants' cycles, which may have influenced the direction and focus of the conversations. In several cases, participants emphasised their current experiences related to their cycle phase at the time of the interview. Interviews completed in the athlete's menses phase of their cycle often prompted reflections on immediate challenges such as fatigue and strength limitations within specific exercises they were training, such as not being able to lift as much load in the gym. Whilst this provided deeper insights into the athlete's real-time experiences, there are risks that this underrepresents performance challenges that may have occurred at other times in the cycle.

### Conclusion

This research has outlined that the perceptions of female rugby union players towards their menstrual cycle are magnified by psychological stress, brought on through kit

challenges, and fear of performance detriments and selection. These concerns provide insights for national governing bodies and world organisations to develop strategies to combat the challenges of elite female rugby players. Notably, fears of leakage, concerns regarding kit colour and fit, and a reluctance to disclose menstrual-related discomfort due to a perceived stigma added to the psychological burden of performance within rugby union. Future researchers should concentrate on identifying strategies used to reduce the burden of the menstrual cycle on performance within elite women's rugby, such as normalising menstrual health conversation, reevaluating kit design to prioritise comfort and confidence, improving tracking systems, and equipping staff with the knowledge and tools to support symptom management.

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