

The impact and experienced barriers menstruation present to football participation in amateur female footballers

ABSTRACT

This study looked to determine the impact different stages of the menstrual cycle has on experienced football performance and exercise ability, and to identify the experienced barriers to football participation menstruation presents in amateur women footballers. An online survey, developed using piloting and expert peer review, was used. The inclusion criteria were non-professional, women currently experiencing regular menstrual cycles, aged ≥ 18 years playing ≥ 60 min football/week in the UK. Descriptive statistics were performed on quantitative data and thematic analysis of the open-ended questions asking participants to list any barriers they felt menstruation presents to playing football. A total of 127 surveys were included. The majority of the respondents were aged between 18-25 (89%) and Caucasian (83%) and competing at the regional/British Universities and Colleges Sport/London Universities Sport Leagues level (69%). Menstruation was reported to 'never' limit football playing in 17% of respondents, 'sometimes' in 47%, 'rarely' in 25% and 'always' in 10% of respondents. The majority (73%) reported one or more barriers menstruation present to football participation. Following thematic analysis, 165 meaning units, 23 themes and seven categories were identified. Confidence and aerobic capacity/endurance were identified to be the aspects most negatively impacted during the *pre-menstrual* and *menstrual* stages. Confidence is likely to be negatively impacted due to the barriers identified. Thus, recommendations on how to reduce these through education of players and involved staff, at the club and the FA level have been made.

HIGHLIGHTS

- 26 • Women amateur footballers in the UK experience barriers to participation in football
27 related to their menstruation period.
- 28 • Clubs/Associations should consider implementations on colour of shorts and ensuring
29 appropriate and accessible toilet facilities.
- 30 • Menstruation is still considered a taboo amongst players and staff.
- 31 • Players experience that their performance is impacted both physically and mentally
32 during their menstruation period.

33

34 **KEYWORDS**

35 Women, girls, soccer, period, challenges

INTRODUCTION

Participation in women's football at all levels has increased exponentially in the past decades, as demonstrated by the number of female players competing in Football Association (FA) affiliated leagues and cups in England rising from 10,400 in 1993 to 147,000 in 2019.[1] As the number of players grows, an increasing proportion are non-elite players, for which less research is conducted than their elite counterparts.[2] As this is a relatively recent change in a sport where masculine participation historically has been predominant, less research is available on women's football.[2] In particular, few studies exist investigating how the menstrual cycle impacts amateur football experienced performance and its barriers to participation, despite evidence showing menstrual cycle symptoms impacts the experience of elite women footballers in the UK[3] and influencing general exercise participation.[4,5] The influence of the menstrual cycle on some physiological processes have been identified.[6] The hormonal fluctuations occurring throughout the menstrual cycle influence maximal oxygen uptake[7–9], fluid retention[10–13], temperature regulation[14,15] and cardiovascular strain[8,9,16]. There is a complex interaction of a multitude of factors during the menstrual cycle, thus the effects it has on exercise are ambiguous. A systematic analysis conducted by Pereira et al. found that a third of the included experimental studies showed a statistical difference in motor output between the follicular and luteal phases. However, of these studies showing a statistical difference, approximately half showed less fatigability during the luteal phase and the other half during the follicular phase. [17] Meanwhile, another recent systematic analysis indicates exercise performance is most reduced during the early follicular phase of the menstrual cycle.[18] Both these studies emphasise that the quality of the evidence is low due to the challenges that arise from conducting menstrual cycle research, thus caution is required when interpreting the results. Such possible challenges may include accurately determining the menstrual cycle phase, low sample sizes[19], reliably measuring the concentration of female

hormones and self-expectancy of studied individuals[20]. Limited research exists on the experienced impacts the menstrual cycle may have on sporting performance.[21,22] Therefore, further insight into the experienced impact of the menstrual cycle on performance and exercise abilities and the barriers experienced is pertinent. This data may then be used to help formulate recommendations to amend the football environment to better accommodate women footballers. Some concepts have already been successfully implemented in many elite women's football teams whereby menstrual cycle tracking determines the subsequent adaptation of training.[23–26] The development of such methods and knowledge is wished to aid the increasing number of amateur women footballers feel more confident playing this sport through means such as the adaptation of training, addressing reported barriers and by ending the taboo surrounding menstruation.[27–29]

The primary objective of this study is, therefore, to identify any experienced barriers to football participation menstruation presents in UK amateur women footballers, and to determine players' perception of the impact the various menstrual cycle phases have on football performance.

MATERIALS AND METHODS

This research has been ethically approved by the Queen Mary Ethics of Research Committee (approval code: QMREC2018/48/043).

Survey Development

The development of the survey followed the steps outlined by Malliaropoulos et al.[30] to enhance its validity and included input from two medical experts in women's football, who directed the development of the survey. The developed survey was first piloted on three participants meeting the inclusion criteria. Following the pilot test, amendments were made to

the survey prior to being reviewed by another independent expert to ensure face validity. The details of the content of the final 19-item survey are shown in Appendix 1 and took under 10 minutes to complete. In order to aid respondent's comprehension and to best evaluate experienced football performance, the menstrual cycle was split into relevant stages (Figure 1).

**** Figure 1 near here ****

Inclusion Criteria

The inclusion criteria were non-professional, women (sex – biological definition of women and not social construct[31]) currently experiencing regular menstrual cycles, aged ≥ 18 years, playing ≥ 60 min football/week in the UK.

Survey distribution

The survey was designed and administered online with the use of Jisc Online surveys software (Jisc, Bristol, UK). The survey was advertised to the target population through social media and by email promotion. The initial email was sent to email addresses of female football clubs, obtained through the official league websites. It included invitations for sharing the survey **with** players meeting the inclusion criteria if they agreed to participate. The participants gave informed consent by indicating they agreed to take part after reading the participant information sheet and consent form at the start of the survey. The survey could only be accessed once informed consent was given.

Data analysis

Quantitative

Data was analysed descriptively (count and percentages of total population) to summarise the baseline characteristics of age, ethnicity, football, menstruation and contraception background of the participants that completed the survey.

Qualitative

Thematic analysis of the open-ended question of the survey asking participants to list any barriers they felt menstruation presents to playing football, was conducted using Braun and Clarke's six step model.[32] Analysis was approached inductively by tagging each response with applicable themes. These were then compared and clustered to form categories.

RESULTS

Sample Size

A total of 132 surveys were completed online. From this, five (3.8%) participants were excluded as they did not meet the inclusion criteria, totalling 127 responses representing an estimated 0.13% of the target population.

Participant characteristics and self-reported football background

The majority of the respondents were aged between 18-25 (89%) and Caucasian (83%; Table 1). Of the respondents, 69% currently played football at the regional/British Universities and Colleges Sport (BUCS)/London Universities Sport Leagues (LUSL) level and 14% currently play at FA Women's National Leagues level or higher. Respondents had played football for 11.1 ± 4.9 years and played 5.6 ± 1.4 hours of football on a typical week. Of the respondents, 94% reported playing outfield, 2% in goal and 4% reported playing in both positions. Furthermore, 26% of respondents reported currently using hormonal contraception, whilst the remaining 74% did not.

**** Table 1 near here ****

Self-reported menstrual symptoms

The most prevalent symptoms which respondents ‘always’ experienced were stomach cramps followed by bloating and breast tenderness reported by 45%, 31% and 28% of participants, respectively (Figure 2). The most prevalent symptoms which respondents ‘often’ or ‘sometimes’ experienced were tiredness, low energy and low mood reported by 70%, 68% and 68% of participants, respectively (Figure 2). The only symptom ‘never’ experienced by the majority of respondents was vomiting. Other symptoms which were most commonly ‘rarely’ or ‘never’ reported by participants were constipation, nausea and poor appetite (Figure 2).

**** Figure 2 near here ****

Self-reported experienced impact of menstruation on football playing

Menstruation was reported to ‘never’ limit football playing in 17% of respondents, ‘sometimes’ in 47%, ‘rarely’ in 25% and ‘always’ in 10% of respondents (Figure 3). Menstruation was reported to have never caused suffering whilst playing football throughout the month by 21% of respondents, whilst 67% reported having suffered 1-3 days and 12% suffered 4-8 days of the month (Figure 3). Football was never avoided throughout the month due to menstruation by 72% of respondents, whilst 24% of respondents avoided football for 1-3 days a month and 3% avoided football 4-8 days a month (Figure 3).

**** Figure 3 near here ****

The impact different stages of the menstrual cycle have on aspects of experienced football performance

In the *pre-menstrual phase*, confidence, aerobic capacity/endurance and overall performance were the most commonly reported categories where worsening of performance was reported. Of the participants, 35%, 28% and 28% reported performance being ‘worse’ or ‘much worse’ in these respective categories when compared to the rest of their cycle (Figure 4). In the *menstrual phase*; aerobic capacity/endurance, confidence and powerful movements were the most commonly reported categories where worsening of performance was reported. Of the participants, 61%, 59% and 58% reported performance being ‘worse’ or ‘much worse’ in these respective categories when compared to the rest of their cycle (Figure 4). In the *mid-cycle phase*; confidence, aerobic capacity/endurance, and powerful movements were the most commonly reported categories where worsening of performance was reported (Figure 4). Of the participants, 6% reported performance being ‘worse’ or ‘much worse’ in all these respective categories when compared to the rest of their cycle (Figure 4).

**** Figure 4 near here ****

Experienced barriers menstruation present to football participation

A total of 93 respondents (73%) reported one or more barriers menstruation presents to football participation. Following thematic analysis, 165 meaning units, 23 themes and seven categories were identified (Appendix 2). Relevant examples are shown in Table 2.

**** Table 2 near here ****

Physical symptoms

Physical symptoms were the most reported barrier to football participation amongst the respondents. Weakness/low energy (n=19) was the most prevalent physical symptom, followed by cramps (n=17) and discomfort (n=11). Weakness and lower energy levels **were** described by a respondent as making *'my whole body feels much more exhausted than when I am not menstruating, and I feel a lot slower- effecting my performance'*. Others also reported *'muscle fatigue'* during menstruation to have a negative impact on performance and thus, **it** was a barrier. Cramps were also described to affect participation in those with severe symptoms, as exemplified by a respondent: *'my menstrual cramps are incredibly painful to the point where I often pass out. This means the first 2 or 3 days of bleeding I am completely unable to participate in strenuous activity that requires me to be on my feet for long periods of time'*. Other physical symptom themes reported as barriers include pain (n=10), nausea, vomiting, fainting and headaches (n=5), breast soreness (n=2), back pain (n=2) and bloating (n=1).

Psychological symptoms

The most common psychological symptoms reported were decreased confidence (n=14), mental state (n=9) and focus (n=5). Multiple aspects contributed to decreased confidence being a barrier to football, with one respondent stating *'anxiety tends to spike before I begin my period so sometimes I find it hard to rationalise actually making myself go to training'*, whilst another reported *'I am also aware you are more likely to get injured on your period which can affect my confidence when playing'*. Another player expressed confidence being affected by the fear of leakage: *'lack of confidence when exercising, as a result of being aware of my bleeding and the potential of it 'leaking''*. Nine respondents reported **their** mental state to be a barrier to playing football when menstruating, with a respondent recalling that **the** *'impact on your mood can impact motivation levels'*. Five respondents mentioned focus as a barrier, with one respondent stating: *'I feel like you are always subconsciously worried when playing around*

your period'. Other psychological barriers reported were self-awareness (n=4) and decreased motivation (n=4).

Kit and fear of leaking

Kit and fear of leaking was reported to be a barrier by 21 of the respondents. The colour of the kit used can be a barrier to football participation, as summarised by a respondent: *'sometimes you can feel uncomfortable, especially if your teams plays in white shorts or you have to get changed in a shared changing room'*. Fear of leakage was also reported as a barrier by respondents, as exemplified: *'If I'm on the first or second day, I get overly conscious about leaking because I bleed so much'*. One respondent alluded to how these barriers were interlinked, stating: *'appropriate kits (white shorts can sometimes make players paranoid/anxious around that time of the month)'*.

Sanitary products

Sanitary products were reported to be a barrier to football participation by 13 respondents. One respondent commented on how the use of sanitary products meant *'changing in between half's, feeling uncomfortable on the pitch if you're wearing a pad'*. Another respondent reported on the associated discomfort: *'quite uncomfortable at times if [pad] twists and it ups the worry'*.

Facilities

Facilities were reported to be a barrier to football participation by nine respondents. One of the respondents commented on how *'some older facilities often don't have sanitary bins which may put other people off using these facilities whilst on their period'*, whilst another respondent highlighted accessibility as an issue : *'lack of pitch side toilet facilities (at lots of the men's grounds) which makes it awkward to leave the warm-up/halftime to go to the toilet'*. Other

respondents reported it *'can feel uncomfortable [...]to get changed in a shared changing room'*.

Social taboo

Social taboo was reported to be a barrier to football participation by six respondents. One respondent reported feeling uncomfortable discussing the topic of menstruation with male coaches: *'societal pressure aspect as often have male coaches so can not always feel comfortable explaining if you're suffering with pain'*. On the other hand, another respondent commented on how the response of coaches could present a barrier, saying: *'I have had coaches in the past who 'don't understand''*.

Performance

The impact of menstruation on performance was reported to be a barrier to football participation by six respondents. One of the respondents commented on how adaptation of training schedules can impact continuity: *'definitely have to adapt your individual training schedules to your cycle. So can be hard to get continuity in certain training'*. Another respondent stated menstruation meant *'missed sessions and games or poorer performance if you still participate'*

Nutrition and hydration

Nutrition and hydration when menstruating was described as a barrier to football participation by three respondents. One respondent commented that *'sickness or cramps affecting eating habits before games'* whilst another stated *'dehydration- having to stop more for water, this includes during games'* were barriers.

Injury fear

Fear of injury was reported by two respondents as a barrier to football participation. One respondent reported: *‘I’ve heard that injuries may be more likely too due to joint flexibility’*, thus presenting a barrier to football participation.

General hygiene

General hygiene was reported by two respondents as a barrier to football participation, with one respondent reported feeling *‘dirty’* and another reported *‘feeling prepared/cleanliness/hygiene’* was a barrier.

DISCUSSION

The primary objective of this study was to identify any experienced barriers to football participation menstruation presents for UK amateur women footballers, and to determine players’ perception of the impact the menstrual cycle phases have on football performance. The principal findings were that menstruation symptoms, external and sociological factors, performance, nutrition, hydration, and hygiene have been identified as barriers to football participation in the target population. The majority of amateur female footballers experienced their football performance and exercise ability to be worse during the menstrual phase of the menstrual cycle.

Stomach cramps, low mood and irritability were the most common menstrual symptoms occurring at least ‘sometimes’ in 90%, 86% and 86% of the target population respectively. These results are in concordance with previous studies where the prevalence of negative symptoms related to menstruation has been reported to be in the range of 77-93%.[33–35] Furthermore, menstruation was reported to limit play to some extent in 83% of respondents and caused 78% to suffer when playing football. Despite these reported limitations, avoidance

of participation remains comparatively low, with 28% of respondents reporting avoiding playing football due to menstruation. This may be explained due to exercise being shown to be effective in improving many of the negative physical symptoms experienced whilst menstruating.[36] The perceptions women have towards menstruation may also explain the comparatively low rates of absenteeism as many women do not view menstrual symptoms to be a 'real' or 'legitimate' illness, thus, many women learn to manage these without seeking medical help.[37] However, as this study did not quantify the severity of symptoms in participants this explanation is beyond the scope of this paper. In female football players, internal and external pressures to perform may also influence the low rates of absenteeism observed.[34]

The barriers reported by amateur female footballers define the challenges faced at multiple levels within football and how these are interlinked (Figure 5). To address the barriers identified in this study, suggestions for practical recommendations have been outlined below. The most reported barriers to football participation were related to the physical and psychological symptoms experienced when menstruating. These barriers involve both the football player herself, her coaches and potentially medical support from e.g., a general practitioner using evidence-based management strategies. Female footballers may benefit from apps to monitor their menstrual cycle to help understand their symptoms and potentially individualise, modify and optimise their training.[23,26] Improved female health education of coaches, in line with the requirements outlined in e.g., the UEFA Fitness Competence Framework[38] for coaching education, is needed to allow the coach to support female players with symptoms as well as performance strategies. This will consequently help reduce the taboo around menstrual cycles, which was mentioned as a barrier by players, as they are likely to feel more at ease if such conversations are initiated by staff[34] (Figure 5). Furthermore, alternative methods such as the use of online communities with the purpose of sharing experiences, doubts

and advice around menstruation in female football, could offer opportunities **to reduce** the menstruation taboo. [39]

**** Figure 5 near here ****

This study also identifies how barriers controlled by clubs and/or associations act as barriers. Wearing white shorts was identified as a barrier by players and it can be questioned why clubs decide to use similar kits for male and female teams. Based on these findings, clubs with female teams should consider shorts colour selections and aim for playing in dark coloured shorts to reduce the anxiety and worry female footballers expressed about bleeding through light coloured shorts when menstruating. Similar adaptations have already successfully been introduced by the national women's rugby governing body after concerns were raised, thus a similar framework for implementation can be followed.[34] Furthermore, we recommend all football clubs to have appropriate facilities to accommodate female football players, as these factors have been identified as barriers.[40] As a minimum, this should include: a well-maintained individual toilet cubicle with a sanitary bin. These should be accessible during half-time, to allow players to change their sanitary products. Overall, barriers to participating in football during the menstrual cycle still exist in the UK today. Awareness of the abovementioned strategies are likely to allow for a fairer ability to participate in football and to encourage football participation for players throughout their menstruating period.

In the *pre-menstrual* and *menstrual* stages of the menstrual cycle, confidence and aerobic capacity/endurance were experienced to be the most negatively impacted. The reported worsening in aerobic capacity/endurance may be explained as a result of blood loss in menstruating women, who are hence more likely to suffer from iron deficiency and anaemia. This may result in weakness, fatigue and impaired cognition which can decrease aerobic

capacity/ endurance and therefore impact football performance.[41–45] Furthermore, the suboptimal dietary intake of iron reported in exercising females may exacerbate this impact, and should thus be addressed in female footballers who may be at risk.[46] This reflects the findings in athletes reported by Brunivels et al.[35] Confidence when playing football was reported to be the most commonly negatively impacted aspect of performance during the *pre-menstrual stage* and was the second most common during the menstrual stage. This is likely a consequence of the multitude of barriers identified in this study which can influence female footballers' confidence as has been described previously.[47–49]

Strengths and Limitations

There are several limitations that need to be considered when interpreting the results. The retrospective study design meant recall bias limited the accuracy of the results. Moreover, the questionnaire design did not explore other possible confounding factors such as other health conditions impacting performance when menstruating (e.g. endometriosis).[50]

Respondents are likely to have completed the questionnaire when they were at different phases of their menstrual cycle, which may have influenced their perceptions and therefore their responses.[51] Responses also depend on player knowledge about menstrual cycles and re-call bias of players' ability to correctly match menstrual cycle phases and their experiences. However, questions were extracted from validated questionnaires, to exemplify, for menstruation characteristics, an excellent correlation between daily bleeding-related symptom data ($p > 0.7$ in all domains) and a consistent ability to discriminate between women with and without heavy menstrual bleeding ($P < 0.0001$).[52]

The proportion of players identifying as 'white' (83%) matches the proportion of white female football players. However, the ethnicity of respondents is representative of the target population as the frequency of respondents self-reported in the UK (84.8%).[53] It is however

important to highlight that ethnicity and social class were not considered when synthesising the results, we recommend future research to consider these aspects. It is also acknowledged that online surveys are likely to be biased as participants with issues/concerns are more likely to complete questionnaires.[54]

CONCLUSION

This study identifies how menstruation presents a barrier to football participation and limits play in a majority of female footballers. Confidence and aerobic capacity/endurance were identified to be the aspects most negatively impacted during the *pre-menstrual* and *menstrual* stages. Confidence is likely to be negatively impacted as a result of the barriers identified. Thus, recommendations on how to reduce these through education of players and involved staff, at the club and the FA level have been made.

ACKNOWLEDGMENTS

None

DECLARATION OF INTEREST STATEMENT

None declared

FUNDING

This study was not financially funded.

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- 541 Figure 1. Diagram utilised in the survey to show the different stages of the menstrual cycle
- 542 Figure 2. Self-reported frequency of occurrence of menstrual symptoms
- 543 Figure 3. Self-reported experienced impact of menstruation on football playing
- 544 Figure 4. Self-reported impact different stages of the menstrual cycle has on aspects of
- 545 experienced football performance
- 546 Figure 5. Reported barriers to football participation depicting how these are interlinked