

TITLE

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

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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

36 INTRODUCTION

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

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

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

76

77 **MATERIALS AND METHODS**

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

80

81 **Survey Development**

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

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

90

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

92

93 **Inclusion Criteria**

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

97

98 **Survey distribution**

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

107

108 **Data analysis**

109 *Quantitative*

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

113 *Qualitative*

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

118

119 **RESULTS**

120 **Sample Size**

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

124

125 **Participant characteristics and self-reported football background**

126 The majority of the respondents were aged between 18-25 (89%) and Caucasian (83%; Table
127 1). Of the respondents, 69% currently played football at the regional/British Universities and
128 Colleges Sport (BUCS)/London Universities Sport Leagues (LUSL) level and 14% currently
129 play at FA Women's National Leagues level or higher. Respondents had played football for
130 11.1 ± 4.9 years and played 5.6 ± 1.4 hours of football on a typical week. Of the respondents,
131 94% reported playing outfield, 2% in goal and 4% reported playing in both positions.
132 Furthermore, 26% of respondents reported currently using hormonal contraception, whilst the
133 remaining 74% did not.

134

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

136

137 **Self-reported menstrual symptoms**

138 The most prevalent symptoms which respondents ‘always’ experienced were stomach cramps
139 followed by bloating and breast tenderness reported by 45%, 31% and 28% of participants,
140 respectively (Figure 2). The most prevalent symptoms which respondents ‘often’ or
141 ‘sometimes’ experienced were tiredness, low energy and low mood reported by 70%, 68% and
142 68% of participants, respectively (Figure 2). The only symptom ‘never’ experienced by the
143 majority of respondents was vomiting. Other symptoms which were most commonly ‘rarely’
144 or ‘never’ reported by participants were constipation, nausea and poor appetite (Figure 2).

145

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

147

148 **Self-reported experienced impact of menstruation on football playing**

149 Menstruation was reported to ‘never’ limit football playing in 17% of respondents, ‘sometimes’
150 in 47%, ‘rarely’ in 25% and ‘always’ in 10% of respondents (Figure 3). Menstruation was
151 reported to have never caused suffering whilst playing football throughout the month by 21%
152 of respondents, whilst 67% reported having suffered 1-3 days and 12% suffered 4-8 days of
153 the month (Figure 3). Football was never avoided throughout the month due to menstruation
154 by 72% of respondents, whilst 24% of respondents avoided football for 1-3 days a month and
155 3% avoided football 4-8 days a month (Figure 3).

156

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

158

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

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

173

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

175

176 **Experienced barriers menstruation present to football participation**

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

180

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

182

183 ***Physical symptoms***

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

196

197 ***Psychological symptoms***

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

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

211

212 ***Kit and fear of leaking***

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

221

222 ***Sanitary products***

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

227

228 ***Facilities***

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

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

236

237 ***Social taboo***

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

244

245 ***Performance***

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

252

253 ***Nutrition and hydration***

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

258

259 ***Injury fear***

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

263

264 ***General hygiene***

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

268

269 **DISCUSSION**

270 The primary objective of this study was to identify any experienced barriers to football
271 participation menstruation presents for UK amateur women footballers, and to determine
272 players' perception of the impact the menstrual cycle phases have on football performance.

273 The principal findings were that menstruation symptoms, external and sociological factors,
274 performance, nutrition, hydration, and hygiene have been identified as barriers to football
275 participation in the target population. The majority of amateur female footballers experienced
276 their football performance and exercise ability to be worse during the menstrual phase of the
277 menstrual cycle.

278 Stomach cramps, low mood and irritability were the most common menstrual symptoms
279 occurring at least 'sometimes' in 90%, 86% and 86% of the target population respectively.

280 These results are in concordance with previous studies where the prevalence of negative
281 symptoms related to menstruation has been reported to be in the range of 77-93%.[33–35]

282 Furthermore, menstruation was reported to limit play to some extent in 83% of respondents
283 and caused 78% to suffer when playing football. Despite these reported limitations, avoidance

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

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

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

311

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

313

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

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

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

342

343 **Strengths and Limitations**

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

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

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

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

363

364 **CONCLUSION**

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

371

372 **ACKNOWLEDGMENTS**

373 None

374

375 **DECLARATION OF INTEREST STATEMENT**

376 None declared

377

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380

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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